



BINDAREE BEEF
—AUSTRALIA—

ENVIRONMENTAL IMPACT STATEMENT

For proposed

BIO-DIGESTER PLANT AND RENDERING PLANT

VOLUME 1

7307 Gwydir Highway
Inverell NSW 2360

Prepared for:

Yolarno Pty Ltd

PO Box 405

Inverell, NSW, 2360

Our reference:

13060



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TO WHOM IT MAY CONCERN:

We, the undersigned, hereby certify that we have read this Environmental Impact Statement prepared on behalf of Bindaree Beef (Yolarno Pty Ltd) by Mitchel Hanlon Consulting Pty Ltd and I believe the information contained in this document in relation to:-

1. The proposed use of the land is correct;
2. The information supplied by Bindaree Beef (Yolarno Pty Ltd) in regard to the present use of the site is true and correct; and
3. This document represents an accurate statement of the proposed development for the land and the methodology for environmental protection of the land.

John Newton

Director

Signature

11 July 2014

Date

David Sneddon

Maintenance & Projects Engineer

Signature

11 July 2014

Date



Submission of Environmental Impact Statement (EIS)

Prepared under the Environmental Planning and Assessment Act 1979.

EIS Prepared by

Name	Jocelyn Ullman
Qualifications	B U R P (UNE), Post. Grad.Public Policy (Murdoch) MPIA
Address	Mitchel Hanlon Consulting Pty Ltd PO Box 1568 Tamworth NSW 2340

In respect of

Proponents Name	Yolarno Pty Ltd
Proponent Address	7307 Gwydir Highway, Inverell NSW 2360
Land on which activity to be carried out: address	Lot 83 in DP. 753638
	Parish of Auburn Vale County of Hardinge
Proposed development	Development of a Bio-digester Wastewater Treatment Plant and Rendering Plant

Statement of Environmental Effects

An EIS and all required plans have been attached.

Certificate

I certify that I have prepared the contents of this Statement and to the best of my knowledge:

It is true in all material particulars and does not, by its presentation or omission of information, materially mislead.

Signature

Dated: 11 July 2014

Name

Jocelyn Ullman



Executive Summary

The Proponent

Bindaree Beef is one of Australia's largest meat processors and a prominent leader in the Australian meat processing industry.

It is a family owned and operated processing plant at Inverell in northern NSW capable of processing 1,100 cattle per day and employs over 700 people from the surrounding region. This operation is strategically located to ensure that Bindaree Beef can source cattle 12 months of the year.

The Proposal

The proposed project involves the installation of a wastewater treatment system (bio-digester) and new rendering plant facility. The bio-digester generates bio-gas from waste product and effluent, utilising this gas for creating energy. This process eliminates the need for coal and reduces electricity needs. The net result is zero discharge of waste, improved environmental outcomes and a significant reduction in carbon emissions.

This application for development consent seeks approval for the construction and operation of:

- An anaerobic digester, utilising abattoir wastewater and waste solid products for generation of bio-gas; and
- A rendering plant for rendering of inedible products for purified fat and protein production.

This project complements the existing meat processing operations and the abattoir operations will remain largely unchanged.

There is no proposed staging of the bio-digester and rendering plant project. The construction phase is planned to commence January 2015 for completion late 2015/early 2016.

The need for the development is driven by the increasing pressure on agricultural businesses to become more efficient and economically viable. Bindaree Beef have identified that their competitive advantage is dependent on becoming innovative and implementing state-of-the-art technologies. The proposed development will increase the efficiencies of the rendering plant and improve the environmental sustainability of the site.



Approvals Required

This Environmental Impact Statement (EIS) has been developed in response to the NSW State Significant Development (SSD) requirements. Bindaree Beef are seeking State Significant Development Consent under Division 4.1 (Part 4) of the Environmental Planning and Assessment Act 1979 (EP&A Act).

A request for Director-General's Requirements (DGRs) was made to the Department of Planning and Infrastructure (DP&I) under Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation) in August 2013. This was supported by a Preliminary Environmental Assessment outlining the project details. The DGRs were issued by DP&I on 13th September 2013.

This EIS has been prepared by Mitchel Hanlon Consulting on behalf of Bindaree Beef to support the application for Development Consent under Section 78A (8A) of the EP&A Act. It has been prepared in the form and content required under Schedule 2 of the EP&A Regulation

Assessment of Environmental Impacts and Mitigation Measures

The following is a summary (not in any particular order) of the main points of concern raised by the agencies, the community and as part of the scoping and risk assessment undertaken as part of the project.

Traffic

Current operations indicate approximately 660 employees are expected onsite each weekday, with staff levels spread out over shifts. The traffic surveys conducted indicate that, at present traffic generated by the site includes approximately 430 vehicles per day, 130 of which are heavy vehicles (30% of the all site flows).

Bindaree Beef records all truck movements on site. On average, up to five (5) 25t B-double trucks and up to three (3) 40 B-double tankers enter the site per operational day.

The maximum hourly vehicle flow was observed during the PM peak period when 336 vehicles traversed the intersection of the Gwydir Highway and Bindaree Beef access road. The *RTA Guide to Traffic Generating Developments* indicates a level rural road with 10% heavy vehicle traffic has a capacity of 2390 vehicles per hour, which indicated the current design capacity ratio of approximately 0.14 during peak periods.



Observations made onsite show that there are little if any delays for through traffic movements along the Gwydir Highway at its intersection with the Bindaree Beef access road. Traffic entering or exiting the access road will also experience minimal delays.

The key intersection for this proposed development site is the intersection of Gwydir Highway and Bindaree Beef access road. A Sidra analysis was undertaken to determine the current operation of this intersection, which found all approaches to operate at a satisfactory level.

The proposed development and the ensuing process will eliminate the need for coal and reduce electricity needs. No additional staff will be added as a result of the development proposal (although some staff will be re-trained) and as such, no additional traffic or parking demands will be generated by the site upon completion of the construction phase.

A 10% increase in traffic flows to/from the site during the construction phase is expected. Given the current site generates approximately 430 trips to the site per day, an additional 43 trips to the site would be expected during the construction phase. It is estimated up to 64 construction labourers will be on site at any given time during the construction phase, and the traffic generated by these construction crews has been factored into the construction traffic demand generation.

All vehicle access to the subject site will continue to occur via the existing access main point from Gwydir Highway. This access was upgraded in 2008 to include a centre divider to prevent traffic from crossing into opposing lanes when turning.

The overall conclusion from the investigation is that traffic and parking arrangements for the development proposal are satisfactory and that there is no traffic or parking impediments to the development.

Waste Management

Given that all organic matter generated within the abattoir will ultimately end up in the bio-digester, the proposal will not generate any additional waste streams/types.

As a result of the proposal, Bindaree Beef will actually decrease the volume/quantity of waste generated within the facility that requires offsite disposal.



Visual Amenity

The aesthetic amenity of the proposed development has been considered in detail within the context of the regional surrounds. While the existing abattoir facility incorporates vegetation plantings which effectively screen out external receptors in most directions, it has been noted that the proposed bio-digester facility is likely to be more visually prominent than existing infrastructure.

Mitchel Hanlon Consulting engaged MeatEng to prepare visual models of the proposed infrastructure and existing surrounds. Visual modelling (3D perspectives, elevation plans and colour montages) of the proposed infrastructure and existing environment have been prepared.

The proposed development is located on a flat between an eastern and western ridge of higher relief towards the rear of the site. Due to existing vegetation and topography, it is expected that receptors to the east, south and west of the development will experience minimal impact on amenity.

It is noted, from visual impact modelling, that the infrastructure may be slightly more visually prominent than existing infrastructure when viewed from the Gwydir Highway. Whilst existing tree plantings will help to minimise the impact, additional landscaping and the careful selection of colours and finishes on the new infrastructure will also be undertaken.

Air Quality

The proposed upgrade will improve efficiency by generating bio-gas from various waste streams in the plant to generate steam and electricity to offset reliance on grid electricity.

Currently the main sources of emissions from the existing abattoir operations are the coal fired boiler, anaerobic and aerobic wastewater lagoons, fugitive releases from the rendering building, bio-filter and holding pens.

The proposed upgrade of the plant will result in the removal of many of these odourous sources including the anaerobic and aerobic wastewater treatment lagoons and the coal fired boiler.

The proposed changes to the Bindaree Beef site at Inverell are expected to result in a positive air quality impact at all surrounding sensitive receptors.



Noise

Noise monitoring was carried out at the site to determine the existing noise environment near three sensitive receptors and to obtain sound pressure levels of the external noise sources at the plant.

The construction of the new plant will occur during the daytime, whilst the existing plant will be operational. The forecasted day noise levels during the construction phase are predicted to comply with the relevant criteria at all sensitive receptors.

The future noise sources were modelled to represent operating hours of the plant. In addition, some existing noise sources were also modelled, specifically forklift and truck movements, dam pump, town water pump house, irrigation pump, manure store and cattle unloading activities.

The predicted night noise levels showed that the highest noise level will be 34 dB(A) at 7360 Gywdir Highway during worst-case meteorological weather conditions. These noise levels comply with the night time criterion of 41 dB(A) at night.

The noise levels at each sensitive receptor are predicted to comply with the appropriate night time criteria with the future plant in operation.

Whilst all the criteria are met for all scenarios, the difference between the existing and future operations of the plant will become less noticeable for some sensitive receptors and more noticeable for other sensitive receptors. This change is due to the noise sources moving away from the main road and closer to different sensitive receptors.

Overall, the noise levels from the future plant may increase at some receptors, however due to the distances involved; this increase is unlikely to be intrusive. The ambient noise environment is dominated by a range of farming related activities, insect, birdsong, or traffic. These sources are likely to continue being the dominant noise sources for the majority of the sensitive receptors.

Greenhouse Gas

The proposed bio-digester will generate bio-gas from production, waste product and effluent, utilising this gas for creating energy. This process eliminates the need for coal and reduces electricity needs. The net result is zero discharge of waste, improved environmental outcomes and a significant reduction in carbon emissions.

The total greenhouse gas emissions for 2012-2013 were calculated to be 64.73 kilotonnes CO₂-e per annum, based upon production values provided by Bindaree Beef. At full capacity the emissions would increase to a total of 68.8 kilotonnes per annum.



Comparing the results of the current and future cases at full capacity, a total of 33.7 kilotonnes per annum is predicted to be saved. Over the 30 year life of the project this equates to 1,013 kilotonnes of CO₂-e.

The project will reduce Bindaree Beef's total overall greenhouse gas emissions by 52% per annum.

Hazard and Risk

The proposal includes a 9,000m³ bio-gas storage dome that has undergone a hazard and risk assessment.

The three major risk from the storage of bio-gas at the Bindaree Beef abattoir are the release of a jet fire from tank puncture, a vapour cloud explosion from a tank rupture or start-up and the unignited release of a significant amount of bio-gas onsite.

The Hazard and Risk Assessment prepared for the project provides models of these events showing that there will be no offsite impacts if these events where to occur.

The potential for incidents to occur at the site is well understood and the design of the proposed bio-gas storage facility and equipment will minimise the probability of an incident occurring and mitigating an incident if it did occur.

The consequence of the modelled worst case scenarios are only considered to have a major impact with no catastrophic impacts predicted. In addition, the likelihood of these events are all low to rare and as such are not considered to be significant onsite risks provided that internal health and safety measures are implemented to mitigate and manage the risks.

Stakeholder Engagement

Community and stakeholder engagement has been undertaken as part of the EIS preparation to ensure all relevant parties have had the opportunity to participate in the consultation process. The key goal of the process has been to provide stakeholders and affected parties with appropriate details and information to enable them to form their views and comments. This ensures all relevant issues have been considered before final decision-making is undertaken.



Mitigation Measures

A number of mitigation measures are proposed to ensure the continued operation of the abattoir and protection of the Inverell community and environment as a result of the new rendering plant and bio-digester plant. These mitigation measures range from retention of the buffer under the Inverell Local Environmental Plan 2012 to erosion and drainage management to ongoing environmental monitoring to include water testing. The full summary of mitigation measures proposed for the project is contained in 5.27.

Justification for the Proposal

Economic and Social

From an economic perspective, the proposed bio-digester will benefit Bindaree Beef by saving an estimated \$4.2 million in annual production costs, which in turn will provide Bindaree Beef a competitive advantage for its domestic and overseas sales.

The development also represents the opportunity for a significant and sustained stimulus to both the local and regional agricultural economy.

During the construction phase, Inverell's LGA residents will benefit from more jobs (up to 60). The local economy will benefit from increased consumer spending by local businesses supplying labour and/or goods and services during construction.

It is anticipated that during the construction phase of the project an estimated \$13 million will be spent on good and services from Australian suppliers. A significant amount of this \$13 million will be injected into the regional economy particularly through labour which will be sourced locally as much as possible.

An estimated \$1.65 - \$5.1 million is expected to be spent directly within the Inverell LGA. Bindaree Beef anticipates spending at least \$1.65 million during the construction phase of the project regionally across the following inputs:

- Labour \$700,000
- Good \$600,000
- Services \$350,000

Once commissioned, the bio-digester will benefit the local economy by providing sustainable employment and local business spending on goods.



In total, the project could increase consumer spending and consumption in 2015 within the range of \$3.66 - \$11.53 million.

The proposed bio-digester and new rendering plants will enable Bindaree Beef to grow its business and provide their workforce long term employment opportunities.

Without the continued operation of Bindaree Beef a loss to the region's economy as high as \$404.2 million (based on the 2012/13 year) could be expected.

Overall, Inverell's LGA is competitive with sufficient human resources and local businesses available to make the most of the opportunity afforded the region from the proposed bio-digester and rendering plants.

Ecologically Sustainable Development

Bindaree Beef is committed to the use of environmentally friendly practices in the development of the proposed facility. Furthermore, in considering this application, it needs to be remembered that Ecologically Sustainable Development (ESD) requires the effective integration of economic and environmental considerations in the decision-making process.

This EIS has outlined the current environmental qualities of the site and mitigation measures to minimise environmental impact from the proposed development.



Conclusion

The proposed development of a bio-digester plant and a new rendering plant creates a number of key benefits for Yolarno Pty Ltd including:

- A state-of-the-art wastewater treatment plant to effectively utilise wastewater and produce bio-gas, effluent and solid fertiliser by-products;
- Providing a renewable energy source of bio-gas for the anaerobic digester and rendering plant electricity and steam needs;
- Improve rendering efficiencies on the site by reducing cooking times, improving electrical and steam consumption and removing the use of coal as an energy source;
- Reduction in energy consumption of the site by 79% due to the removal of coal as an energy source and reduced electricity requirements; and
- Reduction of the greenhouse gas emissions from the site due to the elimination of coal burning and decommissioning of the anaerobic and aerobic treatment ponds.

This EIS outlines the proposal, the regulatory framework, potential impacts from the project on the environmental and the Inverell community and provides a number of mitigation measures to address these impacts.

This type of development is a first for the abattoir industry in Australia and will exceed current best practice for abattoir wastewater treatment. The development will enhance the environmental and economic performance of the facility and demonstrate considerable innovation for the abattoir industry.

Bindaree Beef is considered a leader in the area of red meat abattoir wastewater treatment and is determined to deliver a project that will benefit not only the environment, Inverell Community but also enable Bindaree Beef to grow its business and provide their workforce long term employment opportunities.



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1.0 Introduction

1.1 Background

Bindaree Beef is one of Australia's largest meat processors and a prominent leader in the Australian meat processing industry.

It is a family owned and operated processing plant at Inverell in northern NSW capable of processing 1,100 cattle per day and employs over 700 people from the surrounding region. This operation is strategically located to ensure that Bindaree Beef can source cattle 12 months of the year.

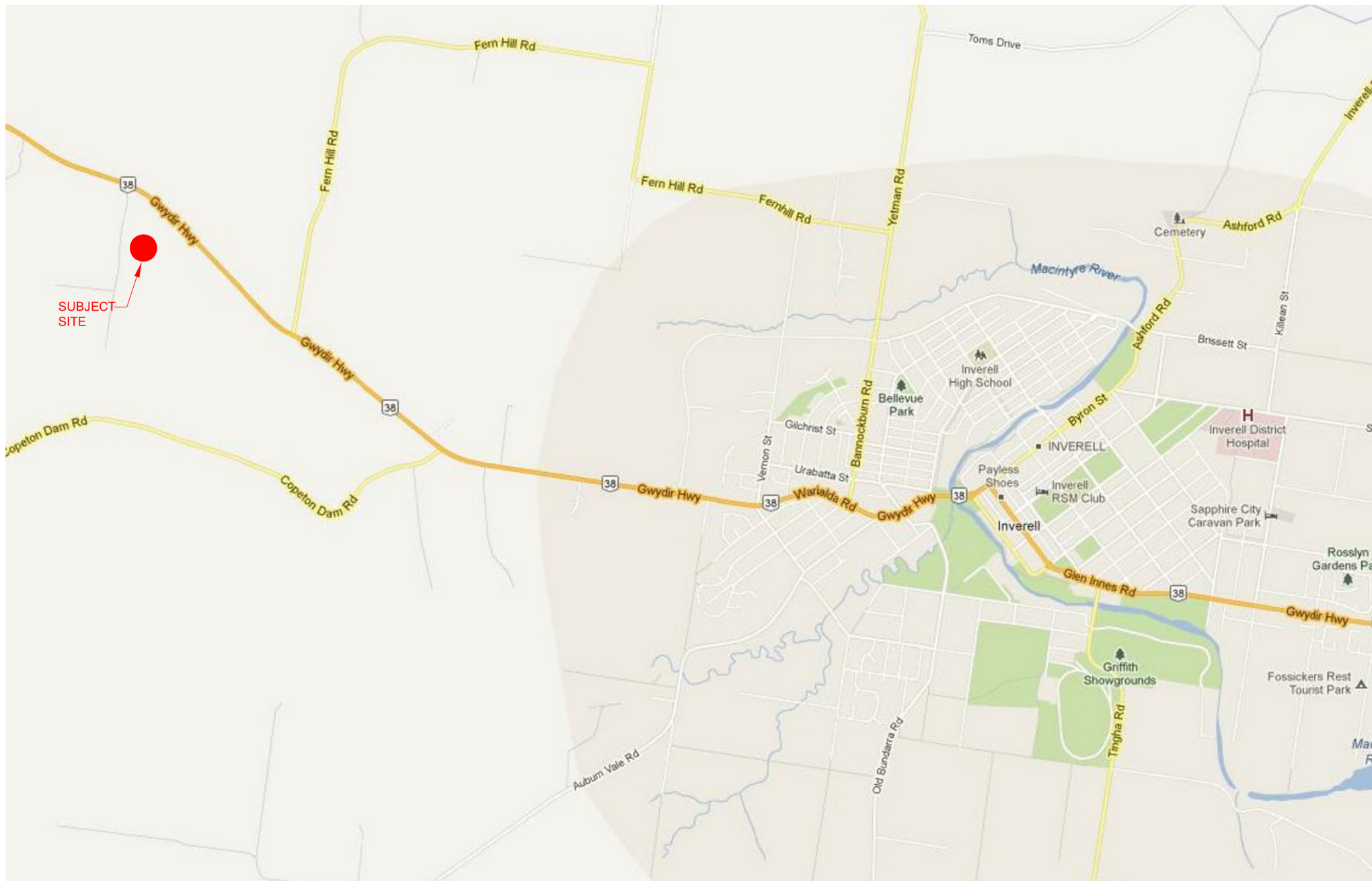
Figure 1 provides a locality plan of the existing Bindaree Beef abattoir site.

With the introduction from 1 July 2012 of the carbon pricing regime by the Australian Federal Government, Bindaree Beef has become liable for a significant additional annual expense through carbon taxes and increasing electricity costs. As a result, Bindaree Beef management have investigated options of reducing carbon emissions by modifying or replacing their existing plant.

Currently Bindaree Beef annually emits approximately 47,600 tonne CO₂e in total per annum of which 29,000 tonne CO₂e (taxable component) is from the burning of coal and emissions generated from the use of electricity.

In early 2013 Bindaree Beef Pty Ltd lodged an application through Aus-Industry Clean Technology Food and Foundries Investment Program for a new rendering plant and bio-digester plant. The outcome of this application has been successful with the Commonwealth funding near \$23 million as a dollar for dollar grant ratio towards the development. The overall cost of the new rendering plant and bio-digester plant project was estimated to be \$46 million.

The proposed project involves the installation of a wastewater treatment system (Bio-digester) and new rendering plant facility. The bio-digester generates bio-gas from waste product and effluent, utilising this gas for creating energy. This process eliminates the need for coal and reduces electricity needs. The net result is zero discharge of waste, improved environmental outcomes and a significant reduction in carbon emissions.





1.2 The Proponent

The proponent for the development is Bindaree Beef Pty Ltd. The contact details are:

Bindaree Beef (Yolarno Pty Ltd)
7307 Gwydir Highway,
P.O. Box 405,
INVERELL NSW 2360
Phone: 02 6721 1411
Fax: 02 6721 1351
Website: www.bindareebeef.com.au

Bindaree Beef or Yolarno Pty Ltd have not been the subject of any proceedings under Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources.

1.3 Project Context

Australia is one of the world's largest producers of red meat, with the industry contributing \$15 billion to the Australian economy. Australia's beef cattle herd is over 30 million animals, supplying beef products both domestically and for export to over 100 countries within Asia, Africa and Europe (Clean Energy Council, 2008).

In 2006-07, Australian abattoirs processed around 2.2 million tonnes of beef and veal, with up to 1.8 million tonnes of waste solids produced per year from 150 abattoirs (Clean Energy Council, 2008). The appropriate chemical composition and consistency of waste products from abattoirs make them an ideal industry to harness the benefits of Bio-energy. In the current carbon-constrained world, the use of renewable energy sources is increasingly becoming economically viable to reduce the reliance on fossil fuels for energy production.

For many Australian businesses, energy security is a critical factor for production. Electricity use is generally a large economic cost for industry, with electricity prices ever increasing in regional areas. Reducing energy consumption and ensuring a secure electricity supply have been identified by Bindaree Beef as priorities for future business expansion.



Effective waste disposal is a key environmental issue affecting meat processing industries. Meat processing wastes are high in nutrients and an odour source, often creating environmental and amenity issues. Current practice is for meat processing wastes to be utilised on agricultural land via irrigation of wastewater and spreading of solid waste. This can often lead to soil nutrient overloading, leaching of nutrients into groundwater and odour issues if wastes are poorly managed. Utilising these waste products as energy sources for anaerobic digestion has the ability to transform traditional waste management practices for abattoirs.

Bindaree Beef abattoir currently uses 19 GWh per year of electricity and over 7300 tonnes per year of coal for abattoir operations, resulting in a large economic cost and high greenhouse gas emissions from the site. Bindaree Beef currently emits 47,672 tonnes CO₂e/year (from the burning of coal and emissions from the use of electricity) and has been liable to pay carbon tax as one of the top 500 polluters on 29,000 tonnes.

Emissions from wastewater disposal have accounted for 26% of the sites greenhouse gas emissions, in addition to emissions from electricity use and burning of coal. The high electricity costs, reducing reliance on grid electricity supply and high greenhouse gas emissions have been key drivers for identifying renewable energy options for the abattoir.

Anaerobic digestion and associated bio-gas generation is a well-established Bio-energy conversion technology and is commercially proven around the world. The process uses bacteria to breakdown solid waste and wastewater with a high concentration of organic material in the absence of oxygen. Bio-energy can help diversify Australia's energy supplies and reduce reliance on fossil fuels. Bio-energy currently supplies less than 1% of Australia's electricity demand, with large potential to produce more energy from organic resources (ABARE, 2001).

Bindaree Beef have identified the long-term benefits of implementing a Bio-energy project for the operation. The benefits of reducing dependence on coal, creating a secure electricity supply and reducing greenhouse gas emissions for the site will provide financial and environmental benefits. This will secure Bindaree Beef's future as a leading family-owned meat processing business.



1.4 Project Need

In broad terms the project is centred on reducing carbon emissions and energy by replacing an ageing, inefficient, coal-fired rendering plant and installing an anaerobic digester. The bio-digester will transform the current wastewater stream into bio-gas which will fuel the new rendering plant and reduce overall energy consumption.

A prime objective of the project is to reduce greenhouse gas emissions via the elimination of coal. The secondary objectives are to reduce grid electricity consumption and eventually eliminate the purchase of electricity from the grid. This will subsequently reduce greenhouse gas emissions from the site and reduce the Carbon Abatement Scheme obligations.

The employment opportunities of the Inverell area will also be increased during the construction of the rendering plant and bio-digester. The project secures the long term sustainability of the operation and provides permanent economic support for the region. The implementation of innovative technology will place the company as a global industry leader in the adoption of anaerobic digestion for wastewater treatment in the meat processing sector. The positive positioning of Bindaree Beef as a national case study for the environmental management of abattoir wastes has the potential to set a new best management practice standard for the industry.

To achieve the project outcomes, a team of both internal staff and external consultants have been engaged to ensure the project is developed within the engineering design requirements and to ensure statutory planning compliance.

1.5 Environmental Impact Statement Document

This Environmental Impact Statement (EIS) has been developed in response to the NSW State Significant Development (SSD) requirements. Bindaree Beef are seeking State Significant Development Consent under Division 4.1 (Part 4) of the Environmental Planning and Assessment Act 1979 (EP&A Act).

A request for Director-General's Requirements (DGRs) was made to the Department of Planning and Infrastructure (DP&I) under Schedule 2 of the Environmental Planning and Assessment Regulation 2000 (EP&A Regulation) in August 2013. This was supported by a Preliminary Environmental Assessment outlining the project details. +

The DGRs were issued by DP&I on 13th September 2013, a copy of which are contained in Appendix A.



This EIS has been prepared by Mitchel Hanlon Consulting on behalf of Bindaree Beef to support the application for Development Consent under Section 78A (8A) of the EP&A Act. It has been prepared in the form and content required under Schedule 2 of the EP&A Regulation

This EIS outlines all issues raised during the stakeholder and community consultation process. It fulfils the requirements of the DGRs by adequately assessing the environmental, social and economic impacts of the project.

The EIS consists of two volumes:

- Volume 1 – Main report (prepared by Mitchel Hanlon Consulting)
- Volume 2 – Appendices



2.0 Existing Environment

2.1 Site Location

Bindaree Beef abattoir is located approximately 3 km west of the township of Inverell in northern NSW within the Inverell Shire Council Local Government Area.

The township of Inverell, with a population of 16,000, is located approximately 570 km north-west of Sydney. Inverell is a commercial and service centre located on the western edge of the New England Tablelands.

The main agricultural enterprises in the region are cattle and sheep grazing, irrigated agriculture on the valley floodplains, and fruit and nut production.

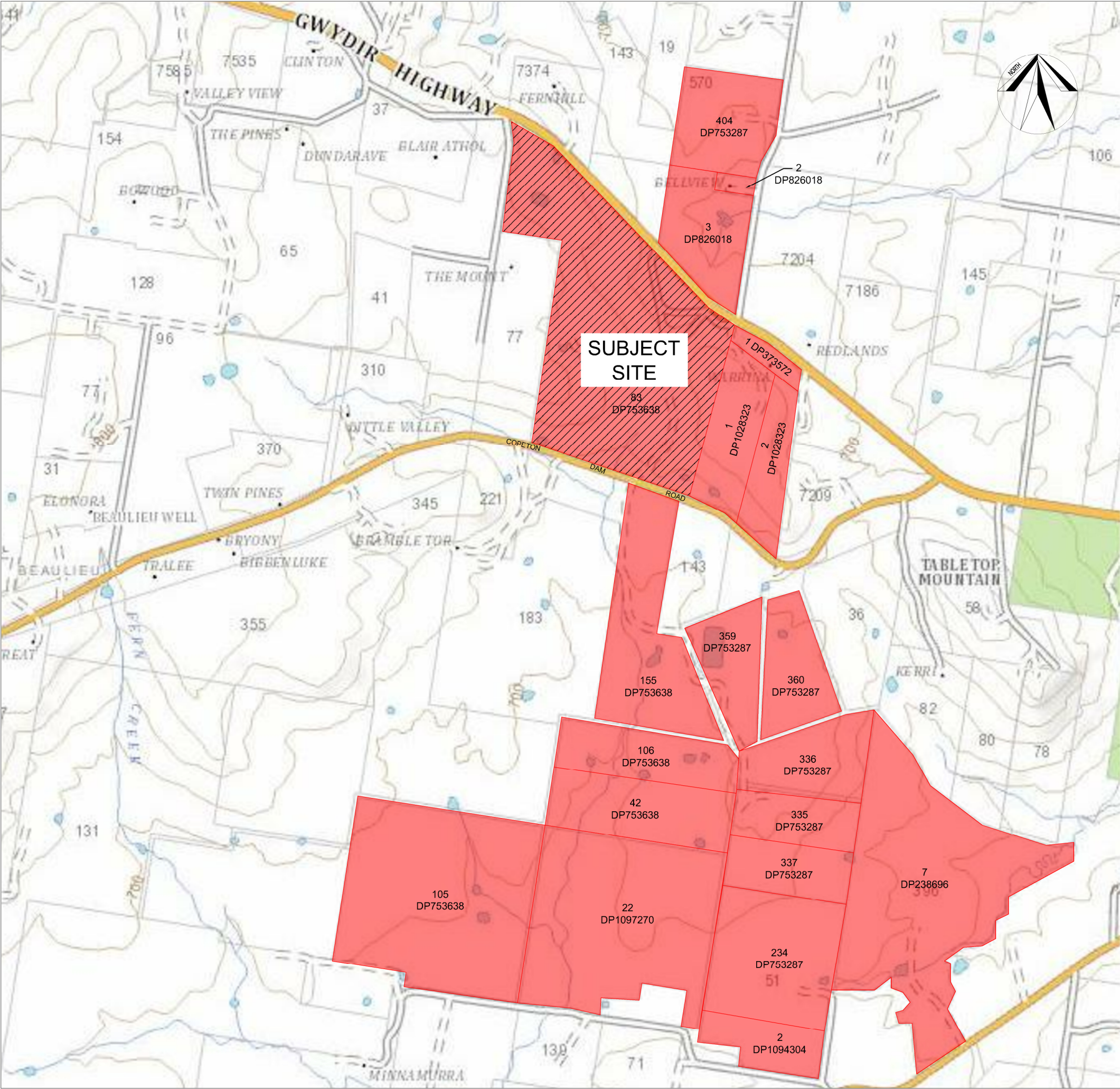
The area of the abattoir and surrounding holding pens is 119 ha, whilst the adjoining farm “Alsace” is 479 ha which is also owned by Bindaree Beef.

Plate 1 provides an aerial perspective of the site.



Plate 1: View of Site – Looking Southwest

Figure 2 identifies the cadastral information for the property. Figure 3 provides an aerial plan of the existing Bindaree Beef and its landownership.



Source: NSW LPI

LEGEND

BINDAREE BEEF
LANDOWNERSHIP

NOTE: SEE PRELIMINARY
ENVIRONMENTAL ASSESSMENT
REPORT FOR DETAILS OF THE
PROPERTIES

TOTAL OWNERSHIP		
REGISTERED OWNERSHIP	LOT / DP	AREA (APPROX.)
YOLAMO PTY LTD	83/753638	120ha
	1/1028323	17.64ha
	2/1028323	13.29ha
	1/373572	4.178ha
	3/826018	22.90ha
	2/826018	2.015ha
	155/753638	42.80ha
	106/753638	16.43ha
	42/753638	32.39ha
	359/753287	18.29ha
	360/753287	19.49ha
	336/753287	19.65ha
	335/753287	15.58ha
	337/753287	15.88ha
	105/753638	80.98ha
N McDONALD	7/238696	89.78ha
K NEWTON	2/1094304	14.78ha
	234/753287	39.11ha
L BELBECK	404/753287	24.11ha
TOTAL AREA		668.37ha

Source: NSW LPI

Figure 2
Ownership
Site Plan





2.2 Site History

The abattoir operation was established on the subject site in 1951, as North West Abattoir, originally for both cattle and sheep. However, sheep have not been processed at the abattoir since 1976.

The existing plant has a long history in its strategic location in the Inverell district. Originally built and operated by the Smorgon Group, it has always been a high volume processing facility.

Bindaree Beef (Yolarno Pty Ltd) have owned and operated the abattoir at Inverell since acquisition of the facility in 1995.

Inverell has a favourable position as a livestock and freight hub. There is also a need to create process efficiencies that support future processing of meat packaged for the domestic and international markets.

The site is suitable for the proposed development as it will complement the existing infrastructure and improve on the current waste management practices in place.

2.3 Land Use

Table 1 and Table 2 outline the site details and property cadastral information. Appendix B includes the title search results for the property.

Bindaree Beef is surrounded by rural agricultural land. There are a number of smaller rural holdings to the western side of the subject property on McNeils Lane and Wattle Hill Road. These properties are over 1.5 km from the proposed development site. The proposed development site is zoned RU1 – Primary Production under the Inverell Local Environmental Plan 2012.

The closest onsite sensitive receptor is 535m to the east, and closest offsite sensitive receptor is 725m to the east. The Department of Environment and Climate Change has a depot approximately 2.3km to the east of the subject site along the Gwydir Highway.



Table 1: Site Details

Description	
Applicant	Yolarno Pty Ltd trading as Bindaree Beef
Site Owner	Yolarno Pty Ltd
Site Address	7307 Gwydir Highway, Inverell NSW 2360
Title Details	83/753638
Parish	Auburn Vale
County	Hardinge
Current Land Use	Rural Industry – Livestock Processing Industry
LGA	Inverell Shire
Zoning	RU1 – Primary Production



Table 2: Property Cadastral Details

Ownership	Lot	DP	Area (approx.)	Infrastructure
Yolarno Pty Ltd	83	753638	120ha	Abattoir, car park, storage ponds, holding paddocks
	1	1028323	17.64ha	Storage shed
	2	1028323	13.29ha	Nil
	1	373572	4.178ha	Residence
	3	826018	22.90ha	Nil
	2	826018	2.015ha	Residence
	155	753638	42.80ha	Nil
	106	753638	16.43ha	Nil
	42	753638	32.39ha	Nil
	359	753287	18.29ha	Nil
	360	753287	19.49ha	Nil
	336	753287	19.65ha	Nil
	335	753287	15.58ha	Nil
	337	753287	15.88ha	Nil
	105	753638	80.98ha	Nil
N McDonald	22	1097270	73.86ha	Nil
	11	1188771	24.11ha	Residence
N McDonald	7	238696	89.78ha	Residence
K Newton	2	1094304	14.80ha	Nil
	234	753287	39.11ha	Residence
TOTAL			668.37ha	





2.4 Existing Abattoir Facility

The current abattoir facility includes:-

- Unloading yards and holding pens;
- Slaughter floor;
- Boning rooms;
- Cold storage and freezer areas;
- A rendering plant for processing inedible animal by-products into tallow and meat meal;
- Workshops;
- Two coal-fired boilers;
- Car parking; and
- Administration buildings.

Figure 3 provides an aerial interpretation of the site operations at the Inverell site whilst Figure 4 is of the site layout.



2.5 Topography

The main topographic features of the Inverell region comprise of broad flat valleys with low ridges. The landscape has resulted from the erosion of a large shield volcano with its centre located between Glen Innes and Armidale.

The topography of the immediate proposal area has an approximate range of 740~750m ASL with a slope of approximately 6%. The proposed development area is contained within the lowlands between two hills to the east and west.

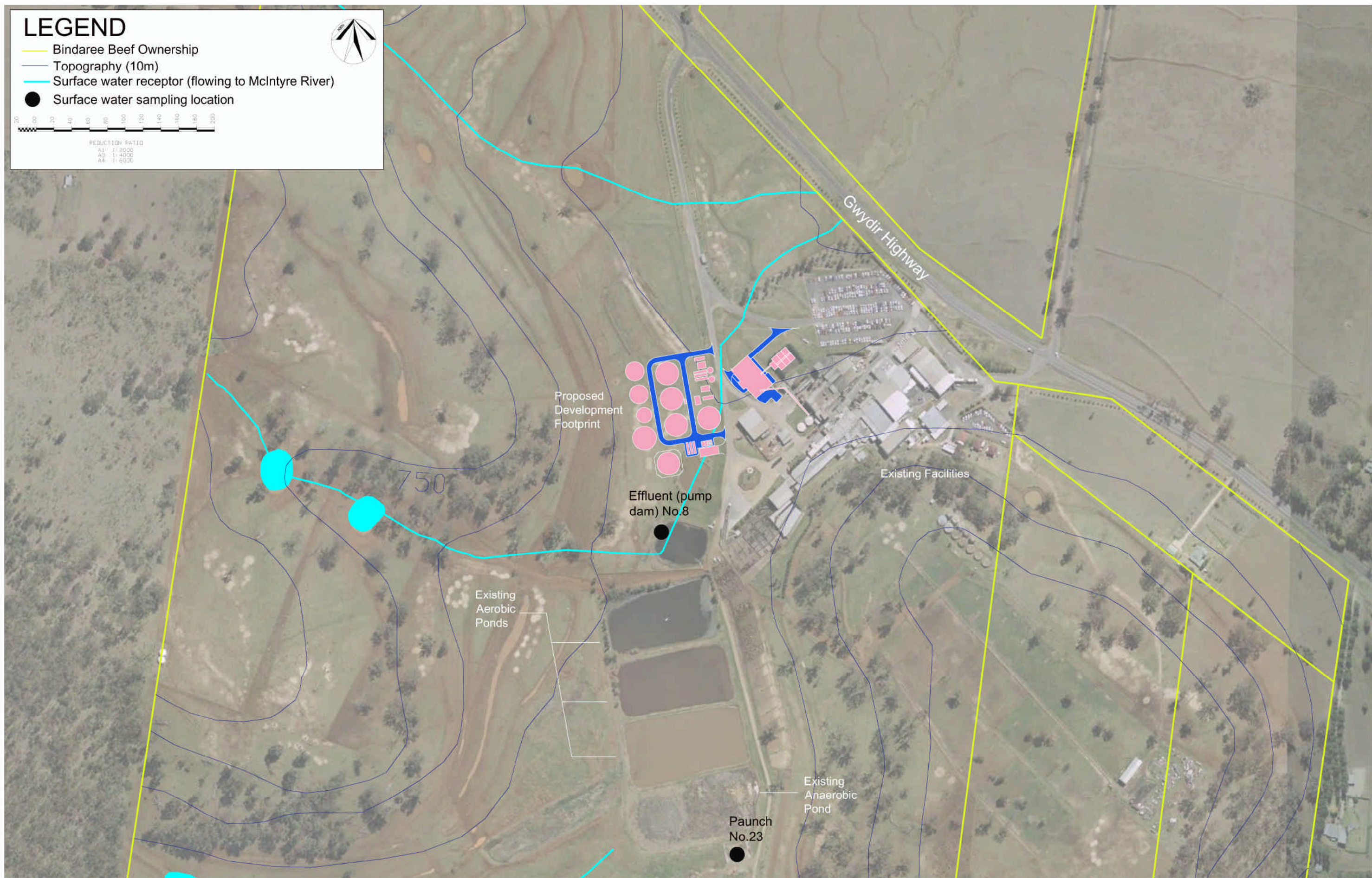
The topography of the existing Bindaree Beef wastewater irrigation area has an approximate topographic range of 630~710m ASL. The slope of the wastewater irrigation areas ranges from 2.4-4.8%. The landscape is comprised of a number of gently sloping hills and intermediate plains forming part of the Spring Creek and Auburn Vale Creek catchments.

Figure 5 shows the topographic features of the proposed development site.

2.6 Climate

The climate of Inverell is a function of elevation (approximately 600m above sea level) and the position of the town on the western side of the Great Dividing Range. Generally the weather patterns are dominated by the position of high pressure areas over the Australian Continent which tends to produce southeast gradient winds across south-eastern Australia (particularly in winter).

Occasionally cold fronts moving up the east coast produce north westerly winds ahead of the front. In summer low pressure troughs produce a similar effect.





2.6.1 Temperature

A Bureau of Meteorology (BoM) automatic weather station (AWS) exists in close proximity to the proposal site. Historic temperature averages have been recorded at the Inverell Comparison (station number 056017). Validated data is currently available from this station since records began in 1874-1977. This site is located approximately 4.5 km from the proposed development site.

A graph displaying the monthly fluctuations in mean daily minimum and mean daily maximum temperatures at the Inverell Comparison AWS is shown in Figure 6.

Air temperatures during the morning tend to be cool to mild, varying from 6.8°C~9.1°C in winter, to 22.5°C~23.4°C in summer. Air temperatures during the afternoon tend to be cool to mild, varying from 15.1°C~16.6°C in winter to 28.2°C~29.1°C in summer.

The average annual maximum daily air temperature is 23.5°C, and the average annual minimum daily air temperature is 7.6°C (BOM 2013).

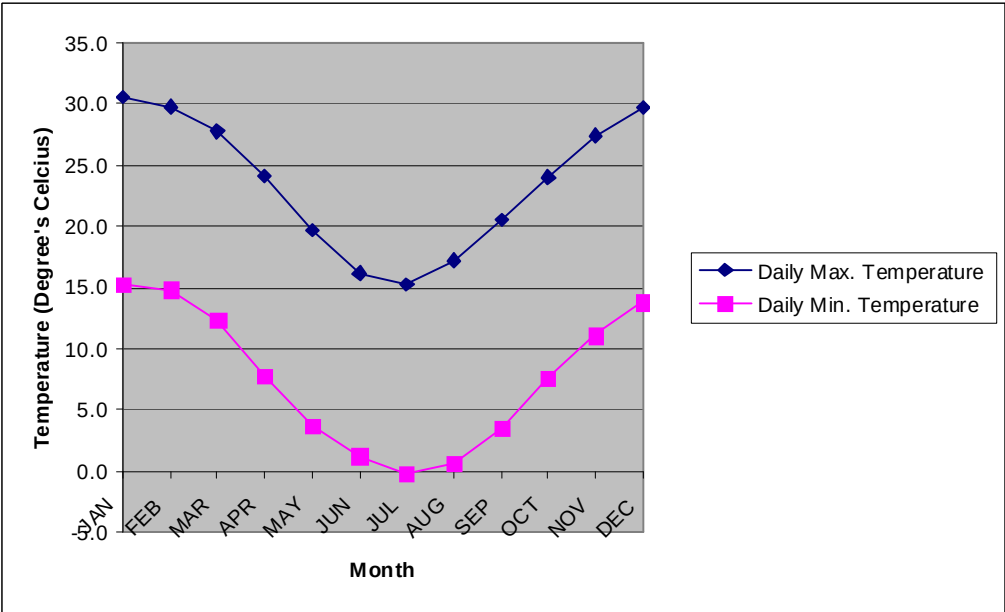


Figure 6: Mean Daily Maximum and Minimum Temperatures for Inverell



2.6.2 Rainfall

A graph displaying both the mean monthly rainfall and the median monthly rainfall at the Inverell Comparison AWS is shown in Figure 7. The rainfall experienced at the Inverell Comparison AWS can be described as moderate, approximately 767 mm per annum.

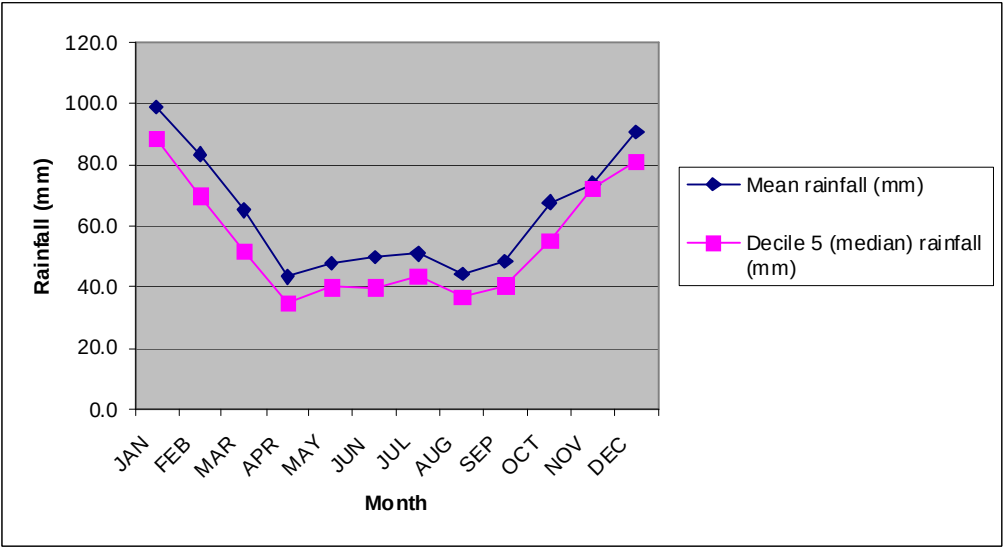


Figure 7: Mean Monthly Rainfall for Inverell



2.7 Surface Water

Inverell is part of the NSW Border Rivers-Gwydir Catchment, within the Inverell (Sapphire Country) sub-region. The Border Rivers Catchment is approximately 49,500 km², with 24,500 km² situated within NSW. The Inverell sub-region incorporates the Slopes landscape area and the headwaters of the Macintyre and Severn Rivers (BRG CMA, 2013). The surface water flows in this landscape are driven by high intensity rainfall events, intensive cropping and grazing pressures, and deep drainage.

The Inverell area surface water is managed under the Water Sharing Plan for the Border Rivers Unregulated and Alluvial Water Sources 2012. There are no surface water entitlements current for the subject site under this Plan.

The subject property is located within the Macintyre River and Copeton Dam catchments. Surface water from the current abattoir site flows to the north east across the Gwydir Highway to the Macintyre River downstream of Inverell.

Surface water from the eastern side of the current wastewater irrigation area flows from the property to the Spring Creek catchment to the east, meeting the Macintyre River at Inverell. The surface water from the western side of the current wastewater irrigation area flows to the south west into the Auburn Vale Creek catchment a tributary of Copeton Dam which is over 13 km downstream.

The property is positioned high in the headwaters of the Macintyre and Copeton Dam catchments, and is only exposed to short-term localised flooding. Flood waters recede quickly as the water moves offsite. There are no surface water irrigation licenses current for the property.

Surface water monitoring has currently been undertaken as part of the Environmental Protection Licence (EPL) monitoring requirements for the abattoir operations. The monitoring data is discussed further in Section 5.11.6.



2.8 Groundwater

The groundwater sources within the Inverell region are dominated by fractured rock aquifers including Palaeozoic and Mesozoic granites, basalts, unconsolidated sediments and metasediments. The Inverell region is underlain by sandstones, shales and mudstones of the Great Artesian Basin. The groundwater source is approximately 175,250 ha, occurring throughout the whole Inverell district and extending to Delungra in the west. In the south-west it forms the water-shed with the Gwydir and Macintyre Rivers.

Groundwater resources within the Inverell region are managed under the Water Sharing Plan for the NSW Murray-Darling Basin Fractured Rock Groundwater Sources. The subject site is located within the Inverell Basalt Groundwater Source, part of the New England Fractured Rock and Northern Basalts Water Resource Plan Area. There are no identified high priority groundwater dependant ecosystems located on the subject property as outlined by this document. The groundwater entitlements for the subject property are for stock and domestic use. There are no irrigation licenses current for the property.

A desktop hydrology study was undertaken to aid in the identification of sensitive receptors on the proposed development site that could potentially be impacted by the proposal. The findings of this investigation are summarised in Section 5.11. The groundwater works summaries for the identified bores can be found in Appendix R.



2.9 Geology and Soil

The site exists in the geological region of New England with a geological age of Silurian to Triassic (206 to 443 million years old). The landforms of this region include mountain ranges, dissected plateaus, hills and ridges. This geological region incorporates Late Silurian to Middle Triassic shelf and trough sediments, felsic to mafic volcanics and continental sediments. The continental sediments display major breaks in the Middle Devonian, Middle to Late Carboniferous, Middle to Late Permian and early Triassic. There is also evidence of tertiary volcanics within the local geology (NSW Government NR Atlas, 2014).

The largest deposits of bauxite in NSW are found in the Inverell region, where approximately 11 Mt have been located. Bauxite deposits are generally found along ridges and on the crest of flat hills, and are mostly hidden beneath a thin veneer of soil. The deposits have formed on the basaltic volcanics of the Tertiary Volcanic Province of northeast New South Wales.

Groundwater works summaries identify the soil material on the property extends to approximately 7 m, with basalt parent material extending to over 100 m. This parent material has provided the basis for the soil characteristics of the site.

The subject property comprises of two distinct soil types, black/grey vertosols and red ferrosols. Black and grey vertosols cover the majority of the property over the eastern and northern areas of the proposed development site and wastewater irrigation area. They vary in depth between 40cm to 1.2 m. The surface soils are characterised by high clay percentage, minimal rock and mottling, and self-mulching properties. At depth clay content decreases, small pieces of decomposed rock are present and slight mottling appears below 60 cm.

Red ferrosols are present on the western side of the wastewater irrigation area. They are characterised by a deep profile extending over 1 m, clay loam soils, small decomposed rock from 1 m and mottling from 80 cm. Both soils are highly fertile and demonstrate suitability for construction and wastewater utilisation.



2.10 Extractive Industries

The proposed development area is within the Exploration Licence (EL) 7277. This licence is held by Volcan Holdings for bauxite exploration activities.

Robert Coenraads (Principal Project Geologist) of Volcan Holdings was contacted on the 10th September 2013 to discuss the project and potential impacts on the exploration area. It was confirmed by Volcan Holdings that the exploration area activities are located further to the west of the abattoir site and that the proposed development would not impact any bauxite exploration activities.

There are no operating mines in the vicinity of the proposed development. The proposed development will not restrict access for future exploration activities in the area.

2.11 Flora and Fauna

The Inverell region straddles four bioregions; the New England Tablelands, Nandewar, Brigalow Belt South and the Darling Riverine Plain. The majority of fertile soils in this area have been extensively cleared. Woody vegetation cover (>20% canopy cover) for nearly half of the Inverell region is below 30% and is only marginally higher for the remaining parts of the area. Therefore, the Inverell area contains bioregions which have suffered major land clearing, land degradation and biodiversity decline. A number of threatened species are known to occur within the Border Rivers – Gwydir catchment area, including the Regent Honeyeater, and Squirrel Glider.

An assessment of flora and fauna within the immediate development area and wastewater irrigation area has been made with reference to the proposed development. The assessment was based upon a field assessment and literature review. All information has been addressed in reference to the Threatened Species Conservation Act 1995, the Environmental Planning & Assessment Act 1979 and the Environment Protection and Biodiversity Conservation Act 1999, as well as other relevant legislation and planning instruments.

For the purpose of the investigation, only areas which fall within the immediate bio-digester development footprint and wastewater irrigation areas were assessed.



3.0 The Proposal

3.1 Introduction

This application for development consent seeks approval for the construction and operation of:

- An anaerobic digester, utilising abattoir wastewater and waste solid products for generation of bio-gas; and
- A rendering plant for rendering of inedible products for purified fat and protein production.

The proposed facility is to be owned and operated by Bindaree Beef.

The proposed bio-digester plant and rendering plant upgrade are part of a larger site development process currently being undertaken by Bindaree Beef. This project complements the existing meat processing operations and the abattoir operations will remain largely unchanged.

A Development Application (DA ref: 136/2013) for a Modified Atmosphere Packaging (MAP) facility adjacent to the proposed bio-digester site was approved by Inverell Shire Council on 23 December 2013.

The bio-digester and rendering plant project is not proposed to be staged, with the estimated 12 month construction period planned to commence January 2015 with completion late 2015/early 2016.

The need for the development is driven by the increasing pressure on agricultural businesses to become more efficient and economically viable. Bindaree Beef have identified that their competitive advantage is dependent on becoming innovative and implementing state-of-the-art technologies. The proposed development will increase the efficiencies of the rendering plant and improve the environmental sustainability of the site.



3.2 Current Waste Management

The current abattoir operation generates significant amounts of liquid and solid waste. Wastes are categorised generally into “red” and “green” streams. The red stream component is made up of blood; fats, oils and grease; and wash-down water from the meat processing plant. The green stream component is made up of paunch and manure. Inedible products such as head, feet, bone, and intestines are directed to the rendering plant for further processing.

Currently the red waste streams are directed to effluent holding ponds for anaerobic and aerobic breakdown of organic material. The resulting wastewater is irrigated on to surrounding agricultural land owned by the proponent for crop production. Solid waste including paunch and manure from pen cleaning are stored on an impermeable pad and then spread onto agricultural land. These methods of waste disposal are standard practice for abattoir wastes in NSW.

The current waste management process at Bindaree Beef involves:-

- Approximately 1.3 ML/day (5 days a week) of wastewater travels through a trommel and flotation tank to remove solids before being pumped to the anaerobic pond for treatment.
- The wastewater flows through the three aerobic ponds for treatment and then is pumped to the wet weather storage for irrigation.
- Solid meat waste filtered from the wastewater stream is removed and taken to the rendering plant for processing.
- Paunch material is separated through a trommel and is stored on a compacted pad to dewater. It is then trucked to the cropping areas and spread.
- Manure from the holding pens is cleaned regularly and stored on a compacted pad prior to spreading on-farm.
- Solid inorganic waste (packaging waste, plastics and general domestic waste) is stored in skip bins and transported to the Inverell landfill for disposal.

Figure 8 outlines the current waste management process undertaken at the abattoir site.

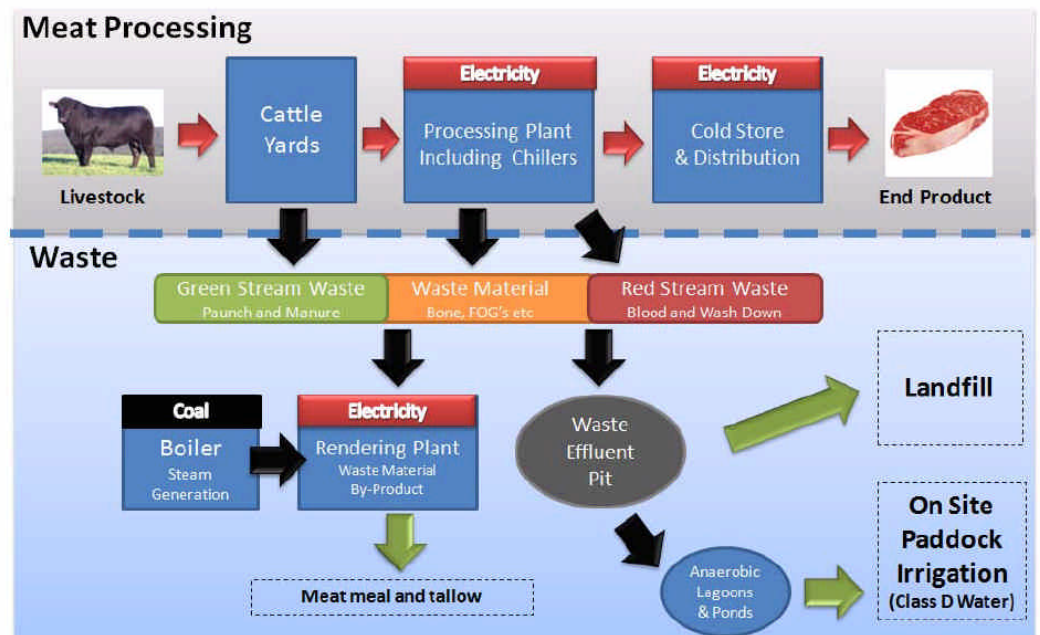


Figure 8: Current Meat Processing Waste Flow Diagram

Post-Project Operations

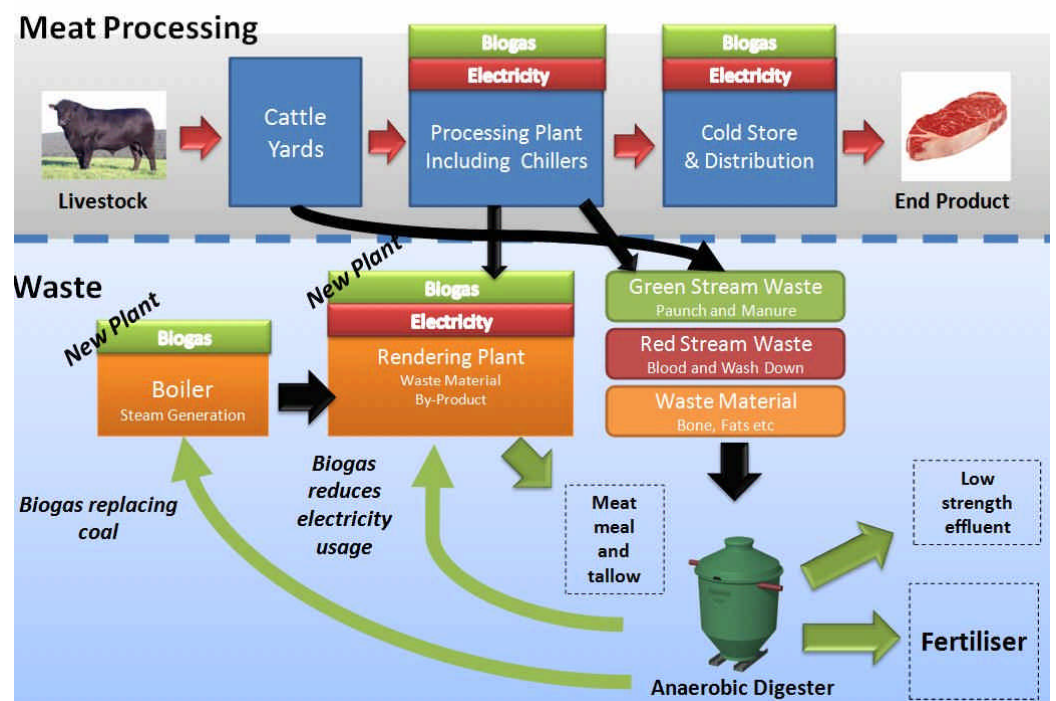


Figure 9: Post-Development Meat Processing Waste Flow Diagram



3.3 Bio-energy Basics

3.3.1 What is Bio-energy?

Bio-energy is defined as energy that is produced from organic material (plants and animals) and is generally discussed in the context of renewable energy. Feedstock is the term given to the organic material used as the source of energy for conversion. The progress of Bio-energy has been controversial in Australia due to the concern that native forests could be used as a feedstock for electricity production. Similarly, there are food security concerns that food crops such as corn and oil seeds could be used for energy production.

There are numerous organic materials that can be utilised as a feedstock for bio-energy production and some include:

- Agricultural residues (such as wheat straw, sugarcane and nut shells);
- Dedicated energy crops such as oil seeds and tree crops;
- Wood wastes and forest residues;
- Wet wastes such as manures and sewage; and
- Commercial and industrial wastes (DEUS, 2004).

There are also a number of technologies available for conversion of feedstock biomass into stationary energy for electricity, including:

- Direct combustion;
- Gasification;
- Pyrolysis;
- Anaerobic digestion;
- Co-Generation (Combined Heat and Power);
- Fermentation and chemical processing; and
- Steam or gas turbines.

Figure 10 outlines the process of conversion of feedstock's into energy for electricity production, heating and cooling or for transport.

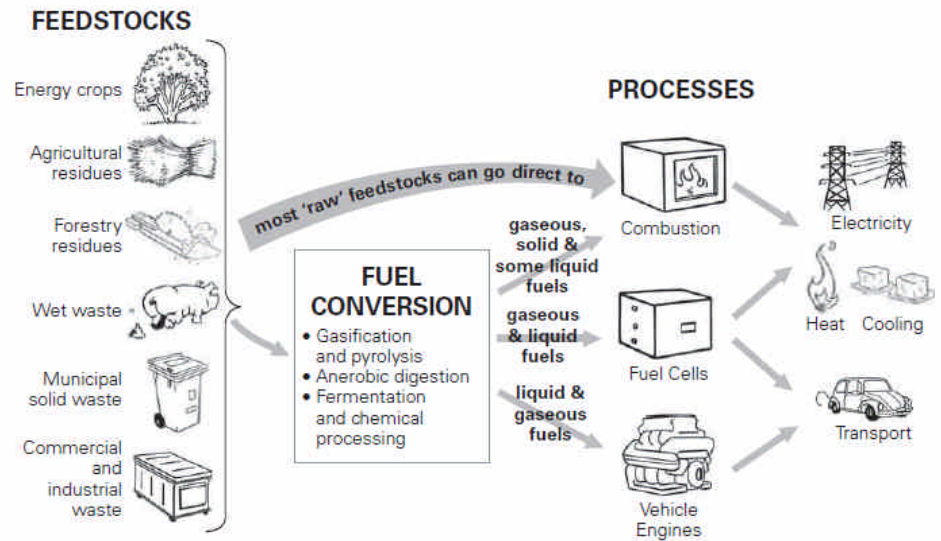


Figure 10: Bio-energy Process

3.3.2 Feedstock

The process of anaerobic digestion is particularly suited to wet wastes such as meat processing wastes and animal manures that do not contain lignin. Lignin is the natural strengtheners in plants and is not conducive to being chemically broken down via anaerobic digestion. The carbon : nitrogen ratio of the feedstock is also important for anaerobic digestion. Typically, animal manures have a carbon: nitrogen ratio of 25:1 which is ideal for the digestion process. Meat processing waste has a high percentage of fats and oils which are also suitable feedstock.

The feedstock for the Bindaree Beef bio-digester will be the wastewater stream from the abattoir operations. It is not proposed that any additional feedstock is required for the anaerobic digestion process.



3.3.3 Anaerobic Digestion

Anaerobic digestion and associated bio-gas generation is a well-established bio-energy conversion technology and is commercially proven around the world. The process uses bacteria to breakdown solid waste and wastewater with a high concentration of organic material in the absence of oxygen.

A bio-gas plant functions primarily as a waste reduction system, recovering energy from organic waste streams by digesting it in an anaerobic environment and, in the process converting, it into gas for use in burners, generators or similar gas-fired applications. Furthermore, a well-operated bio-gas plant will produce wastewater with minimal organic matter, which is suitable for use as low-odour fertiliser.

Anaerobic digestion occurs within a sealed tank system to promote the controlled build-up of bio-gas. The process occurs under mesophilic conditions (between the temperatures of 20-40°) and is a continuous process where feedstock can be constantly added and end products constantly removed. Figure 11 outlines the chemical reaction process within the anaerobic digester.

The proposed technology comprises of two anaerobic process:

- Upflow Anaerobic Sludge Blanket (UASB); and
- Continuous Stirred Tank Reactor (CSTR).

The two systems will operate synergistically to not only produce the highest gas yield, but also reduce the amount of wastewater to be treated.

The UASB process will treat the low nutrient / high volume wastewater component, and the CSTR process will treat the high nutrient / low volume solids component of the waste stream.

This is a robust and flexible feedstock conversion process and provides higher conversion rates due to the increased biodegradability of particulate matter. The higher conversion of organic matter equates to a higher efficiency of the anaerobic digester and more bio-gas production.

This conversion technology was identified as the most suitable for the proposed development due to its conversion rates, suitability for the feedstock and quantity of bio-gas production.

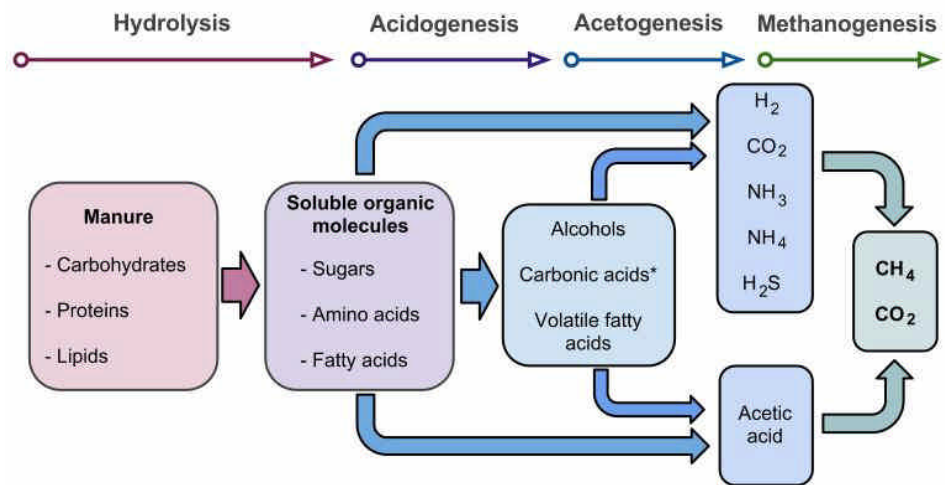


Figure 11: Anaerobic Digestion Chemical Reaction

3.4 Proposed Anaerobic Digester Development

The proposed anaerobic digester plant will utilise the waste streams to generate bio-gas, solid fertiliser and liquid digestate. This proposed technology will accept all organic waste material from the abattoir, including paunch which is currently difficult to process.

The proposed rendering plant will provide increased efficiencies in both electricity and steam usage. Handling of rendering products will be more efficient and streamlined from the abattoir floor to the rendering plant. Cooking odour from the plant currently extend beyond the site boundary creating amenity issues for neighbouring residences. The new rendering plant will minimise the odour emissions as the building will be fully enclosed, well ventilated with point source extraction for odour control. This will also assist with decreasing the cooking time required. Currently, the rendering plant uses coal as an energy source, and subsequently creates odour and smoke stack visual amenity issues. The new plant will negate the need for coal use, and reduce the greenhouse gas emissions and odour issues from the site.

The existing total energy use for the facility is 278,913 GJ/year. The current energy use from coal is over 210,000 GJ/year. It is estimated that the total reduction in energy consumption due to the proposed development is 79% due to the removal of coal as an energy source and electrical reduction from improved efficiencies. Table 3 outlines the post-development energy use.



Table 3: Energy Use

ENERGY SOURCE	CURRENT (GJ/YR)	POST-DEVELOPMENT (GJ/YR)
Coal	210,436	Nil (replaced by bio-gas)
Electrical	68,477	57,878
Total	278,913	57,878

Table 4 details the improved efficiencies in electrical energy consumption for the facility.

Table 4: Electrical Energy Reduction Breakdown

PROCESS	ELECTRICAL ENERGY REDUCTION (GJ/yr)
Rendering Plant development	6,909
Electricity generation from bio-gas	3,690
Total Reduction	10,599

The bio-digester and rendering plants will be located on vacant land close to the current abattoir operations. Figure 4 shows the proposed site layout for the bio-digester and rendering plant. Plate 2 shows the bio-digester development site.



Plate 2: Bio-digester Development Site

A detailed description of the bio-digester and rendering plant processes is outlined in the following sections.



3.4.1 Pilot Digester Plant

A pilot anaerobic digester plant has been established and operational at the Bindaree Beef site since November 2012. This plant was installed to provide a proof of concept to ensure the technology would achieve a solution and test aspects of the technology that have not been commercially implemented in Australia.

The pilot plant has been in operation continuously since commissioning and has been valuable in providing proof to the stakeholders in the project of the technical capability of the design.

The objectives of the pilot plant were to measure the quality and quantity of the bio-gas production based on the wastewater feedstock, and also to provide a data set capable of proving scale up assumptions to a full sized plant. The data collected was also used to assess the anaerobic digester treatment performance and confirm design and engineering requirements for the full scale system.

The pilot plant produced results within the expected range. Methane production was within the target range of 65-75% methane concentration, peaking at 73% methane. The organic material destruction rate was 82% on average, demonstrating that the chemical balance was optimal, the pre-treatment of the organic material was successful and the anaerobic digestion process was effective.

The positive results from the pilot plant have given confidence to the project team and investors that the concept has been verified under Australian conditions and with site-specific wastewater feedstock. The results were promising that the full-scale plant will be successfully implemented and operate at a high level of bio-gas production.

A simplified version of the process is outlined in Figure 12.

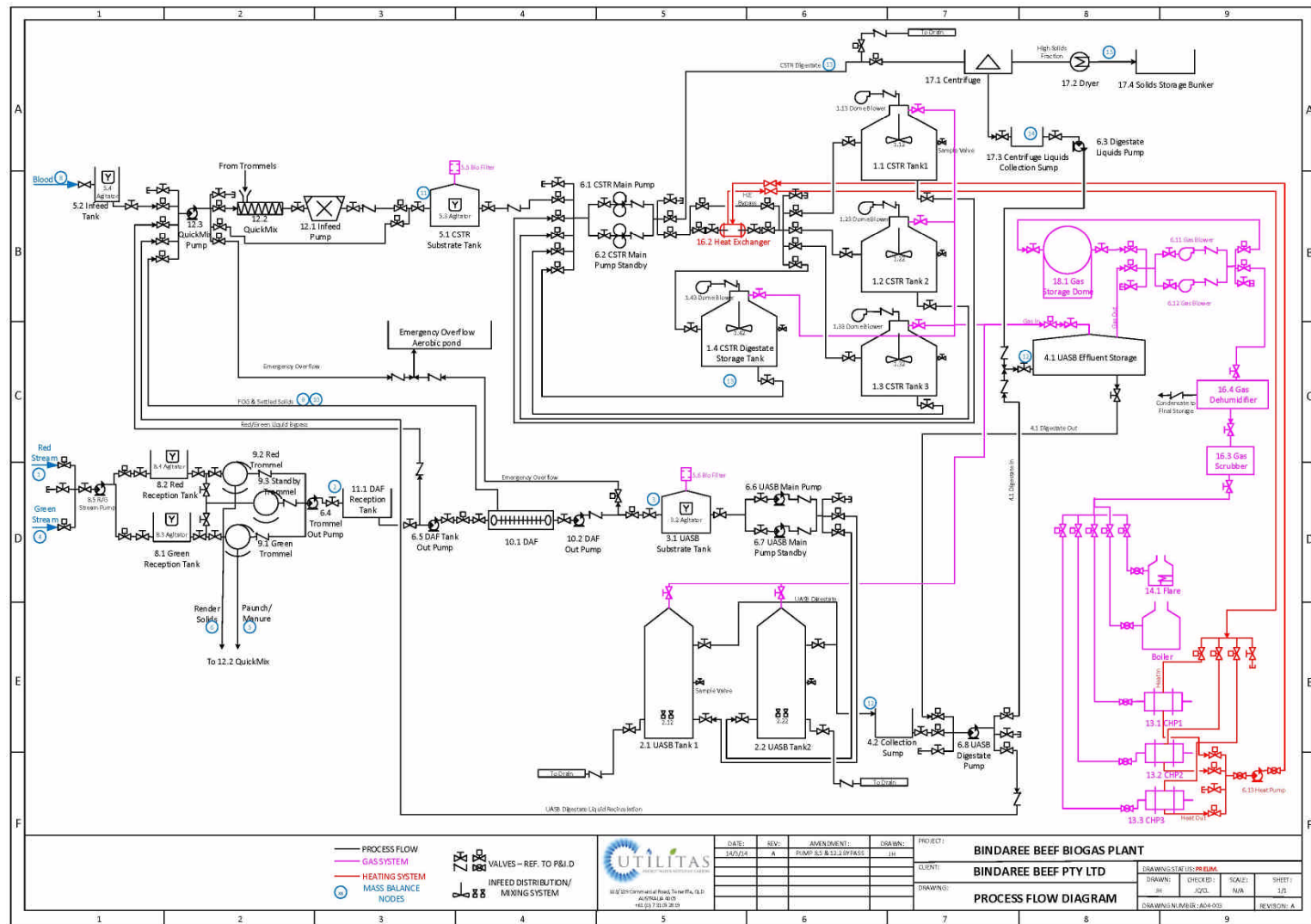


Figure 12: Process Diagram of Anaerobic Digestion (Utilitas Diagram)



3.4.2 Pre-Treatment Processing of Waste Streams

3.4.2.1 Red Stream

The red waste stream comprises primarily of wash-down blood from the abattoir kill floor and processing areas. Pure raw blood also forms part of the red stream.

The red stream will enter a trommel to remove the render solids from the liquid wastewater. The trommels will separate the solid material from the wastewater for further processing through either the UASB or CSTR digester tanks

The trommel is a stainless steel, wire screen with slots to allow the liquid waste to flow through and capture the solid material. The trommels will operate via a variable speed drive controlled by a level indicator in the flow receival tank. The speed of the trommel will adjust in relation to the flow of liquid in the receival tank.

The red stream will then flow into a dissolved air flotation (DAF) to separate suspended matter such as fats, oils and grease (FOG) from the wastewater stream. The DAF is a tank that allows the suspended and dissolved particles to float to the surface and be removed with a time controlled skimmer. It also allows for solids to settle in the bottom of the tank, and these solids are removed.

This pre-treatment stage is important to prevent FOG stratification and odour generation throughout the process. The recovered FOG is pumped to a storage tank and then used as a fluid for mixing manure and paunch, and as a feedstock for the UASB process.

3.4.2.2 Green Stream

The green waste stream comprises of:

- Manure that has been removed from the holding yards during cleaning; and
- Paunch material (predominantly undigested grass and a small amount of inorganic material, such as plastics, synthetic baling twine, pebbles, wire etc) from the animals' stomach after processing.

The green waste stream will be screened using a trommel. The trommel is a stainless steel, wire screen with slots to allow the liquid waste to flow through and capture the solid material.



The trommels will operate via a variable speed drive controlled by a level indicator in the flow receival tank. The speed of the trommel will adjust in relation to the flow of liquid in the receival tank. The paunch screenings and other solid material will be conveyed to a storage tank for maceration treatment.

3.4.2.3 Manure Stream

The manure waste stream comprises of wash-down water from the abattoir processing areas. It contains largely waste paunch and manure flushed from the animal following the stomach and intestines removal process.

This waste stream will enter the in-feed tank for maceration of solid particles. This will reduce the particle size of the solids to enable effective breakdown in the continuous stirred tank reactor digester.

3.4.3 Upflow Anaerobic Sludge Blanket (UASB) Digester

The Upflow Anaerobic Sludge Blanket (UASB) process will be used to treat the red and green stream wastewater. This stream has a low solids concentration of 0.66%, and a high volume of wastewater.

The red and green streams enter reception tanks where they are agitated before entering the trommels. Any solids from the trommels are fed via conveyor into the CSTR infeed tank. From the trommels, the streams are mixed and enter the DAF reception tank, and are directed to either the DAF or become the red/green liquid bypass. The DAF is used to remove any FOG or additional solids, which again feed into the CSTR solids conveyor.

Liquid from the DAF is pumped into the UASB substrate tank, with the option of emergency bypass. After agitation in the UASB substrate tank, the wastewater is fed into the two UASB tanks at a continuous rate via a series of perforated pipes mounted on the bottom of the tank.

The UASB technology uses an anaerobic process where a suspended sludge blanket of granular sludge filters and treats the wastewater. Wastewater enters the tank from the bottom, flowing upward and through the sludge blanket. The sludge blanket is comprised of small aggregations of bacteria, and with the aid of flocculants, reached maturity after 3 months. The sludge blanket is suspended by the upflow of the infeed wastewater coming through the perforated pipes. Eventually the aggregates form dense compact biofilms referred to as 'granules'.

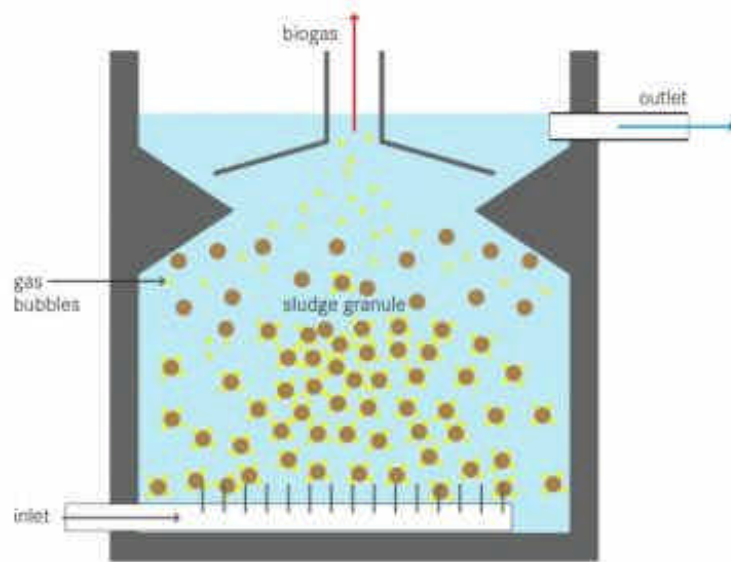
The granules in the sludge layer degrade the incoming organic compounds and as a result bio-gas is released. Blanketing of the sludge enables a dual solid and liquid hydraulic retention time, and allows dilute wastewater streams (total suspended solids less than 3%) to be processed quickly.



At the top of each UASB tank is a three-phase separator, which deflects any larger solids back into the tank for further digestion, collects the bio-gas, and allows any clarified effluent to flow out of the tank.

The clarified effluent is extracted from the top of the tank and the bio-gas rises to the top of the tank and is collected in a gas collection dome. The effluent will be stored temporarily in a storage tank, and then pumped to the effluent holding ponds for reuse onto land. Figure 13 details the cross-section view of the UASB tank.

This process has been chosen for the treatment of the high volume/low solids concentration for its efficient removal of COD, and its simplicity to operate.



Ref.: www.sswm.info

Figure 13: Upflow Anaerobic Sludge Blanket Process Cross Section

3.4.4 Continuous Stirred Tank Reactor (CSTR)

The Continuous Stirred Tank Reactor (CSTR) process will be used to treat the blood and manure stream wastewater. This stream comprises of blood, render solids, paunch, manure and fats, oils and grease (FOG). This waste stream has a high solids concentration of 20% but relatively low volume.

CSTR provides greater uniformity of system parameters, such as temperature, mixing, chemical concentration, and effluent concentration. The waste stream is fed into the reactor and effluent is removed simultaneously. The effluent is mechanically stirred to maintain uniform composition, and temperature and pH control.



This technology has been chosen for its ease of control, simplicity of construction, and low operating costs. This form of anaerobic digester is optimised by maintaining a constant temperature. A heat exchanger will be used in series to ensure temperature is controlled to 37° to maximise bio-gas production.

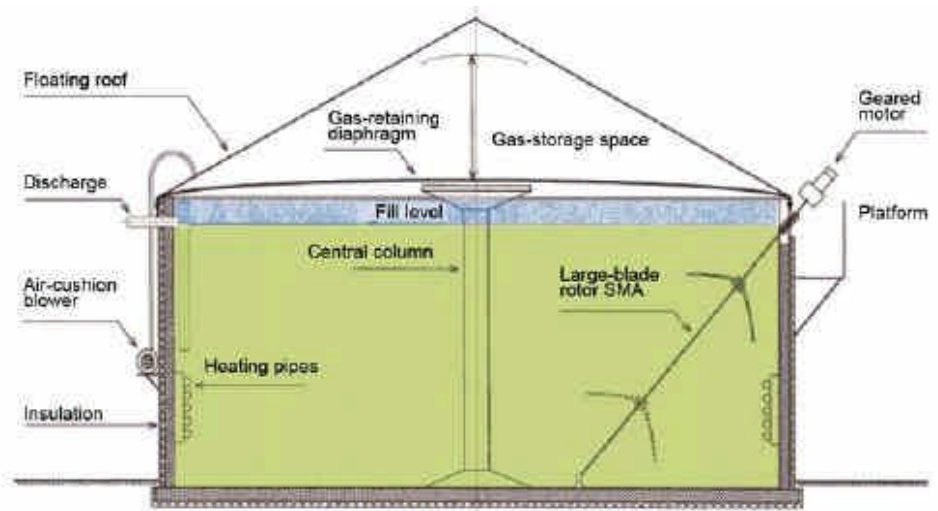
Blood and any solid waste streams from the trommels are collected in a compartmentalised infeed tank, with the blood section being agitated as to reduce potential for coagulation. From here, any solids are screened through the infeed pump and diluted with UASB digestate liquid, or red/green liquid bypass, to the optimal total solids content. The digestate then enters the CSTR substrate tank, which acts as a buffer to the main CSTR tanks. As the bio-gas plant works 7 days a week, buffer tanks are needed to even out flow from 5 day a week production.

Before the substrate tank, an emergency overflow line exists to facilitate the unlikely event of excessive over-production of waste, or to bypass the system during maintenance. The CSTR substrate tank is agitated in order to maintain a homogeneous mix, and any gas produced by this initial reaction is captured.

From here the wastewater enters a valve bank and is directed into the CSTR tanks in a batch process, via a heat exchanger. It is important for the tanks to maintain a constant temperature, as to ensure the gas-producing bacteria reaction is maintained. The tanks are stirred, either by mechanical agitators, or pumping system, to maintain a homogeneous mix, and gas captured and stored in domes atop the tanks. Figure 14 details the cross-section of a CSTR tank.

The digestate is pumped out of the top of the main CSTR tanks and into the CSTR digestate storage tank. The digestate is the consistency of slurry at this point, and will require further processing to dewater the slurry and remove the solid component. The digestate is pumped to a solids separation, dewatering and drying system. The liquid fraction from this separation system is fed into the UASB effluent storage tank, and to the effluent holding ponds for irrigation onto land. The solid component will be potentially sold offsite or used on land as an organic fertiliser.

The CSTR technology is best suited to treating waste streams with a high solids concentration as it has a long retention time, allowing the solids to breakdown and maximise bio-gas production.



Ref.: www.energypedia.info

Figure 14: Continuous Stirred Tank Reactor Process Cross Section

Based on the current capacity of 1000 head of cattle per day, Utilitas have predicted a combined total of 955m³ liquid wastewater outputs from the digesters per day as shown in Table 5.

Table 5: Process and Predicted Volumes

PROCESS	VOLUME (M ³ /D)
UASB	700
CSTR	255
Total	955



3.4.5 Bio-gas Pre-Treatment and Storage

3.4.5.1 Pre-Treatment

Bio-gas at this stage has a concentration of:

1. Methane (up to 73%)
2. Carbon Dioxide (up to 25%)
3. Oxygen (approximately 0.5%)
4. Hydrogen Sulfide (approximately 450 ppm); and
5. Residual gases such as Nitrogen and Water vapour.

Bio-gas requires pre-treatment prior to use to remove hydrogen sulphide from the gas. Hydrogen sulphide can cause corrosion within the boiler combustion chamber and boiler pipes. Warm bio-gas from the anaerobic digester cools as it travels through pipes. This condenses the small amount of water vapour and this must be removed by condensate traps prior to use.

The pre-treatment system includes pressure, vacuum release and shut-off valves, and gas regulators for gas pressure control and safety.

3.4.5.2 Storage

Bio-gas will be produced and contained on the top of each of the UASB and CSTR tanks. The bio-gas will be siphoned off for use as required and as the storage membrane approaches capacity.

The bio-gas will be stored in one storage tank of 9,000 m³. These domed shaped tanks will be approximately 27m in diameter and 23m high. The tanks use a double membrane system, where an external membrane encloses an internal membrane which holds the bio-gas.

Figure 15 shows a cross-section of the proposed bio-gas storage tank. This dual membrane system uses fans to pressurise the air space between the membranes. This provides a consistent positive pressure to the gas contained within the inner membrane. The inner membrane is free to inflate and deflate, depending on the amount of gas stored, however the outer membrane remains fully inflated to give the tank structure. The membrane material is a PVC-coated polyester fabric suitable for outdoor application.

An emergency flare will be installed as a safety feature to flare off excess gas if required. It is anticipated that the bio-gas flare will be a “shield type” flare with a largely hidden flame and overall height of approximately 6m.



The bio-digester will operate 24 hours a day, 7 days per week. The storage tanks are likely to decrease in bio-gas volume over the working week, then return to full capacity over the weekend.

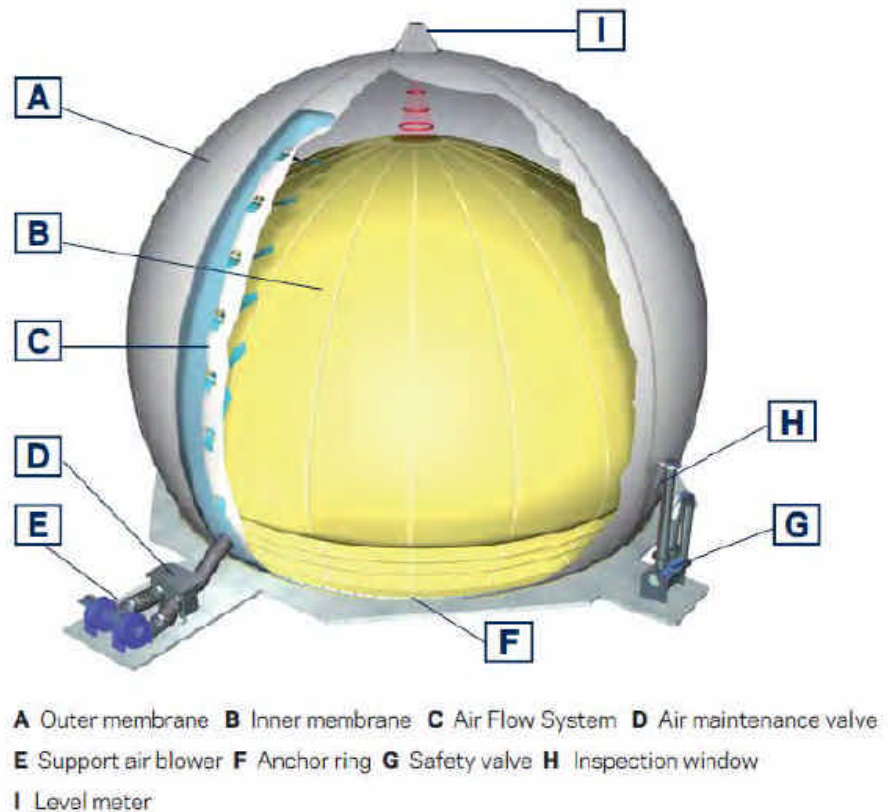


Figure 15: Bio-gas Storage Tank Cross Section

3.4.6 Bio-gas Utilisation

The stored bio-gas will be utilised on both the electrical generation system and the gas-fired boilers system simultaneously. The boiler system consists of a 10 MW gas-fired steam boiler. It has been sized to operate at 33,750 MJ/hr of bio-gas, 12 hours per day, five days per week.

The remaining bio-gas will be utilised in up to three (3) cogeneration (combined heat and power) units to generate electricity (around 1.6MW) and heat for the new bio-digester and rendering plants. Two units will be operational at any one time, with one unit on standby in case of mechanical breakdown. The heat captured will be used to heat water for the anaerobic digesters for temperature control.



3.4.7 Discharge from the Bio-digester

Digestate (or bio-fertiliser) is a nutrient-rich material produced as a result of the Anaerobic Digestion that is ideally suited for use as an organic fertiliser. All the nitrogen, phosphorous and potassium present in the feedstock (abattoir waste streams) remains in the digestate, however, the nutrients are passed through the process of digestion, and are made considerably more bio-available, making it easier for plants to make use of them.

Digestate can be used as fertiliser without any further treatment after its removal from the digester, or alternatively can be further treated to enhance its quality and marketability and to produce standardised bio-fertilisers (solid or liquid) that are commonly sold in hardware stores and nurseries.

With limited bio-gas plants operating in Australia, examples of the use of digestate as a fertiliser as standard practice are given throughout the world, including, but not limited to Austria, Canada, Denmark, Germany, Netherlands, Sweden, Switzerland and the United Kingdom.

While climatic and soil conditions in the above examples may vary somewhat from those at Inverell, comparison data, including data from the Bindaree Beef pilot plant, and local examples such as the Berrybank Bio-digester case example show that similar results would be achieved.

The design proposed for Bindaree Beef will have a digestate output of 955m³/day over seven days (equivalent to approx. 1.3Ml per day over the five plant operating days), some or all of which will potentially be used as fertilizer for the Alsace farm.

Water balance calculations will be used to determine the maximum volume of digestate that can be sustainably used on average each year and to ensure the requisite amount is applied at the right times to meet the crop requirements while ensuring increases in runoff and percolation are minimised.

Further analysis is required to determine an accurate picture of the digestate coming from the bio-digester plant. The *NSW Environmental Guidelines – 'Use of Effluent by Irrigation'* should be used as a starting point to classify the digestate streams and as a basis for assessing and managing their use. These Guidelines however acknowledge that they may not provide guidance in all circumstances and that the onus is on the producer to discuss likely impacts with DEC or the local council so that appropriate 'strength' classification.

Appendix O contains a copy of the Digestate Management Plan prepared by Utilitas.



3.5 Proposed Rendering Plant Development

3.5.1 Current Plant Operation

The current rendering plant is located within the existing abattoir facility, and comprises of a cooker used to heat the inedible meat and solid waste products from the animal. This includes the head, feet, bone, off-cuts and offal not sold to the overseas or domestic markets. These waste materials are cooked and transformed into saleable by-products of meat meal and tallow.

The cooker is powered by a coal-fired boiler used to provide steam and hot water for the process. The plant was built in the 1970's and the aging technology has long cooking times, inefficient use of steam and inefficient electric motors. Black smoke emissions from the coal-fired boiler occur during shut-down and start-up of the plant have negative environmental impacts. This has flow on effects with the extended cooking times occasionally incurring infrequent odour and air quality complaints from neighbours issued to the NSW EPA. Yolarno Pty Ltd has investigated replacing the boiler with a LPG-fired boiler, but the increasing costs of fuel makes this option unviable.

3.5.2 Proposed Rendering Plant

The proposed render plant is a new plant design with a fully enclosed building to meet the NSW EPA and Australian Renders Association requirements for rendering. It will incorporate the latest equipment and design layouts to maximise energy efficiency and ease of operation. With the new cookers, presses and process equipment utilising energy efficient motors the amount of energy usage will be significantly reduced.

The proposed rendering plant will be located on a greenfield site adjacent to the existing abattoir facility. Figure 4 shows the site layout plan for the proposed development.

The existing render plant electrical demand is 818 kW over 18 operating hours per day, with an electrical demand of 14,722 kWh/day. The new render plant electrical demand is expected to be 600 kW over 12 hours per day, with a total demand of 7,196 kWh/day. The proposed development will result in an electrical energy saving of 7,526 kWh/day, and over the 51 week operating year, results in a saving of 1.9 MWh.



The new rendering plant will receive render solids from the boning room and kill floor. The render solids are pre-treated by crushing the material in a Pre-hog bone crusher to ensure a uniform material size. This crushed material is transferred to a surge bin for direct feeding into the new cooker. Figure 16 shows the process flow diagram of the proposed plant.

The proposed cooker has improved efficiencies and is able to produce hot water at 80-90°C, whereas the existing cooker can only produce water to 60°C. The new cooker will have shorter cooking times and provide a waste heat recovery system where water will be heated from the waste heat from the cooking process in a condenser.

The proposed cooker has high efficiencies in amount of raw material that can be processed per day and the expected product yields. It is estimated that 184 tonne/day can be processed, with a 50% yield from the raw material.

The cooked product (crax) will discharge from the cooker over a separation auger (drain screw) to remove the bulk of the tallow before feeding the two new meat meal presses. The extracted tallow will flow over two rotating shaker screens to remove the small meal particles before mixing with the rest of the tallow. The tallow is then pumped to two tallow decanters for further purification, and then pumped to a polisher for further processing. The tallow product is pumped to storage tanks, which are kept at 65°C, for loading out.

The cake (pressed product prior to milling) will be conveyed over a meal shaker screen that removes about 30% of the meat meal, then into a receiving bin for cooling. The unscreened cake is then conveyed to the hammer mill for crushing. From the hammer mill, the product is passed over the shaker screen again and is now known as meat meal. The meat meal is conveyed to storage bin for loading out.

Table 6 shows the comparison between the existing and proposed rendering plants.



Table 6: Existing and Proposed Rendering Plant Comparison

EXISTING RENDERING PLANT	PROPOSED RENDERING PLANT	EFFICIENCY GAIN
2 x 1200 series cookers	1 x 220U Super Cooker	Less steam, and less electricity
4 x 1038 meal presses	2 x Duke Presses	Less electricity
4 x older style Pre-Hog	2 x new style Pre-Hog	Less electricity
1 x Pre-breaker	Not required for new plant	Less electricity
3 x raw material bins	1 x raw material bin	Less electricity
Interconnecting augers for material movement	Not required for new plant	Less electricity
2 x coal-fired boilers	1 x bio-gas-fired boiler (1 x coal-fired boiler for emergency)	Renewable energy source

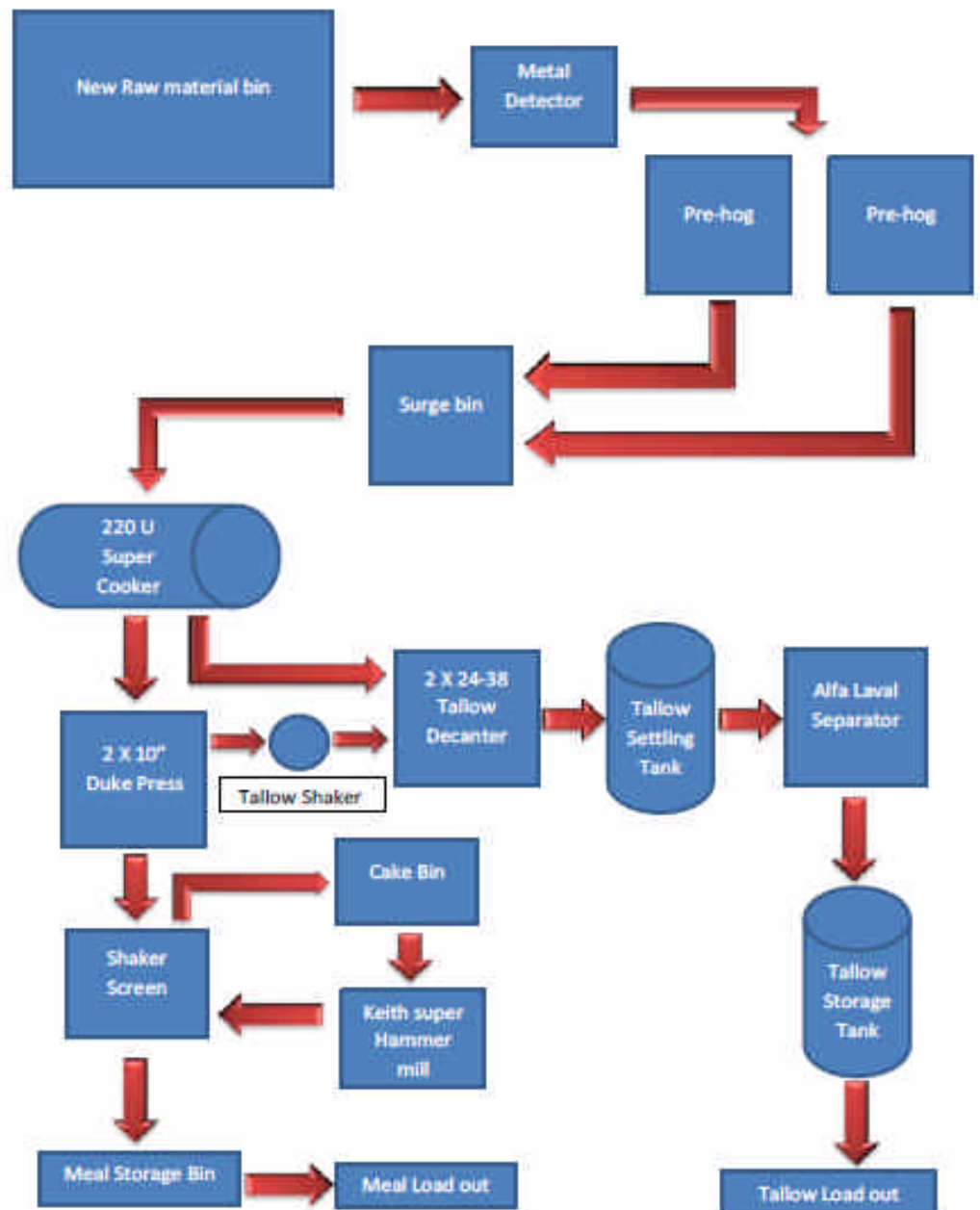


Figure 16: Proposed Rendering Plant Process Flow Diagram

The rendering plant odours will be directed to a bio-filter located to the north of the rendering plant. The bio-filter uses moist organic materials to absorb and biologically degrade odours.

Point source stainless steel ducting will connect to the individual equipment and then a suction fan will pull the odour into the main line. These odours will be pumped to a humidifier then blown through a grid of perforated pipe into a gravel layer at the base of the bio-filter.



The odorous air filters up through a 1-1.5 m layer of woodchips or compost mixed with gravel to maintain porosity. The odorous compounds are captured within the water layer surrounding the organic material and are treated by active bacteria. Bio-filters are effective in treating most odorous compounds and are a low maintenance option for odour reduction.

The key benefits of the rendering plant replacement include:

- Reduced steam and electrical consumption due to shorter cooking times;
- Elimination of coal as an energy source; and
- Reduction of greenhouse gas emissions and lower electricity consumption due to the use of bio-gas renewable energy.



3.6 Construction

3.6.1 Building Code of Australia 2013 Compliance

The proposed buildings as part of the proposed development have been subject to a Building Code of Australia (BCA) 2013 compliance assessment. The full report undertaken by Boyce Environment Consulting is included in Appendix L.

The proposed buildings have been assessed against the Deemed to Satisfy (DTS) provisions of the BCA with specific regard to Section C (Fire Resistance), Section D (Access and Egress), Section E (Services and Equipment), Section F (Health and Amenity), and Section J (Energy Efficiency).

The proposed rendering building, bio-digester drying building and bio-digester control and switch room were the focus of this assessment.

The buildings will comply with the DTS provisions of the BCA subject to additional detailing that will be incorporated into the construction drawings for lodgement with the Construction Certificate.

The proposed buildings currently do not comply with the BCA performance requirements DP1 and DP8 relating to access and car-parking for people with a disability. Due to the nature of the proposed development, it is seen that a potential employee would need to be physically fit and able to undertake the manual components of the job. Due to the nature of the development, there is an inability to provide a safe work environment for people with a disability. Therefore, Yolarno Pty Ltd has not proposed to provide services and access for the disabled as part of this development.

3.6.2 Construction Management

The construction phase of the development will be managed by MeatEng, a project management company based in Melbourne. The construction phase is expected to commence late 2014, and be commissioned by late 2015.

The bio-digester tanks and infrastructure will be largely pre-fabricated offsite and assembled onsite by the provider. The bio-digester will be commissioned by trained and experienced staff to minimise the risks during the start-up procedure and initial mixing of oxygen and methane gases.

The rendering plant infrastructure will be pre-fabricated offsite by the manufacturer. The equipment will be transported to site and commissioned by trained and experienced personnel. The buildings will be constructed onsite using local and regional construction companies.



3.7 Decommissioning

3.7.1 Rendering Plant

The existing rendering plant will be decommissioned once the new plant is operational. One of the coal fired boilers and associated infrastructure will remain and serve as a backup plant for annual servicing of the bio-gas-fired boiler and for emergency situations.

The existing rendering plant has two coal-fired boilers. One will be decommissioned completely. The remaining boiler was commissioned in 1980 and will remain operational as a standby boiler. This boiler is required to be maintained as per the Protection of the Environment Operations (Clean Air) Regulation 2010 and meet the emission criteria for Group 3 equipment.

3.7.2 Anaerobic and Aerobic Ponds

The existing anaerobic pond will be maintained as such to provide a bacteria source for the anaerobic digester. A starting bacteria source will be required to initialise the digester both when it's commissioned, and in the event of an emergency.

The three aerobic ponds will be decommissioned as aerobic treatment ponds, and be purely used for storage of the wastewater prior to irrigation onto cropping land.

No raw wastewater will enter the anaerobic or aerobic ponds for treatment once the anaerobic digester is operational.

3.7.3 Paunch and Manure Stockpile Area

The existing paunch and manure stockpile area will be decommissioned as part of the proposed development. Paunch and manure material will be transported directly into the bio-digester for processing. This material will not be spread onto land once the bio-digester project is operational.



3.8 Conclusion

The proposed development of an anaerobic digester wastewater treatment plant and a new rendering plant creates a number of key benefits for Yolarno Pty Ltd including:

- A state-of-the-art wastewater treatment plant to effectively utilise wastewater and produce bio-gas, effluent and solid fertiliser by-products;
- Providing a renewable energy source of bio-gas for the anaerobic digester and rendering plant electricity and steam needs;
- Improve rendering efficiencies on the site by reducing cooking times, improving electrical and steam consumption and removing the use of coal as an energy source;
- Reduction in energy consumption of the site by 79% due to the removal of coal as an energy source and reduced electricity requirements; and
- Reduction of the greenhouse gas emissions from the site due to the elimination of coal burning and decommissioning of the anaerobic and aerobic treatment ponds.

This type of development is a first for the abattoir industry in Australia and will exceed current best practice for abattoir wastewater treatment. The development will enhance the environmental and economic performance of the facility and demonstrate considerable innovation for the abattoir industry.



4.0 Planning Regulatory Framework

4.1 Background

This section outlines the environmental and planning legislative framework relevant to the proposed development. This section describes the environmental assessment process under the *Environmental Planning and Assessment Act 1979* (EP&A Act) and other relevant environmental planning instruments pertaining to the development.

The project is classified as a State Significant Development (SSD) as per the SEPP (*State and Regional Development*) 2011. The approval pathway is identified under Part 4 of the EP&A Act and is outlined in more detail in Section 4.4. For SSD, an Environmental Impact Statement is required to be lodged with the development application to demonstrate the potential environmental risks of the project and ensure mitigation measures are implemented.

The Environmental Impact Statement (EIS) for the development must meet the requirements in Clauses 6 and 7 of Schedule 2 of the *Environmental Planning and Assessment Regulation 2000*. The EIS must also address the requirements of the Director-General's Environmental Assessment Requirements as per Section 78A (8A) of the *Environmental Planning and Assessment Act 1979*.



4.2 Project Definition

4.2.1 Rendering Plant

The existing beef abattoir operation at Bindaree Beef is defined as “*Rural Industry – Livestock Processing Industry*” under the Inverell Local Environmental Plan 2012 (LEP 2012). The site that Bindaree Beef operates from is zoned *RU1 – Primary Production* under the Inverell LEP 2012. *Rural Industry* is a permitted use with consent within the RU1 zone.

Rural industry is defined as:

Rural industry means the handling, treating, production, processing, storage or packing of animal or plant agricultural products for commercial purposes, and includes any of the following:

- (a) agricultural produce industries,
- (b) livestock processing industries,
- (c) composting facilities and works (including the production of mushroom substrate),
- (d) sawmill or log processing works,
- (e) stock and sale yards,
- (f) the regular servicing or repairing of plant or equipment used for the purposes of a rural enterprise.

Livestock processing industry is defined as:

Livestock processing industry means a building or place used for the commercial production of products derived from the slaughter of animals (including poultry) or the processing of skins or wool of animals, derived principally from surrounding districts, and includes abattoirs, knackeries, tanneries, wool scours and rendering plants.

The proposed new rendering plant falls within the land use definition of *Rural Industry – Livestock Processing Industry*.

4.2.2 Bio-digester

The proposed bio-digester plant is defined as “*Electricity generating works and heat or co-generation*” under the State and Regional Development State Environmental Planning Policy (SRD SEPP). This land use is defined as a State Significant Development in Schedule 1 of the SRD SEPP if the development has a capital investment value of more than \$30 million. The proposed development meets this criterion and will be assessed with regards to the SRD SEPP. This definition is discussed further in Section 4.7.1.



4.3 Environment Protection and Biodiversity Conservation Act 1999

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

The existing site has been subject to an ecological assessment to determine the presence of MNES within both the highly modified development area, and associated cropping and grazing irrigation areas (refer to Section 5.18 Biodiversity). It has been determined that impacts on MNES resulting from the development are deemed to be unlikely. Subsequently, referral of the project under the EPBC Act is not required.



4.4 Environmental Planning and Assessment Act 1979

The *Environmental Planning & Assessment Act 1979* (EP&A Act) is the NSW Government's key piece of legislation for the management of our environment and resource use, in relation to planning and development.

Approval is sort under Division 4.1 of Part 4 of the EP&A Act for State Significant Development (SSD) consent for the proposed development.

4.4.1 Objectives of the EP&A Act 1979

The objects of the EP&A Act are:

(a) To encourage:

(i) the proper management, development and conservation of natural and artificial resources, including agricultural land, natural areas, forests, minerals, water, cities, towns and villages for the purpose of promoting the social and economic welfare of the community and a better environment,

(ii) the promotion and co-ordination of the orderly and economic use and development of land,

(iii) the protection, provision and co-ordination of communication and utility services,

(iv) the provision of land for public purposes,

(v) the provision and co-ordination of community services and facilities, and

(vi) the protection of the environment, including the protection and conservation of native animals and plants, including threatened species, populations and ecological communities, and their habitats, and

(vii) ecologically sustainable development, and

(viii) the provision and maintenance of affordable housing, and

(b) to promote the sharing of the responsibility for environmental planning between the different levels of government in the State, and

(c) to provide increased opportunity for public involvement and participation in environmental planning and assessment.

Through the preparation of this Environmental Impact Statement, the projects' consistency with the objectives of the Act has been clearly demonstrated.



4.4.2 Applicability of Division 4.1 of Part 4

Division 4.1 of Part 4 of the EP&A Act governs development that is classified as 'State Significant Development' (SSD). Under Section 89C of the Act, a development is a SSD if it is outlined by any State Environmental Planning Policy (SEPP) to be a SSD.

The relevant SEPP for this development is the SEPP (State and Regional Development) 2011 (SRD SEPP). Part 2 clause 8(1) provides the definition of a SSD:

Development is declared to be State significant development for the purposes of the Act if:

(a) the development on the land concerned is, by the operation of an environmental planning instrument, not permissible without development consent under Part 4 of the Act, and

(b) the development is specified in Schedule 1 or 2.

The proposed development meets both the criteria and is therefore defined as a State Significant Development. Figure 17 shows the planning process for SSD.

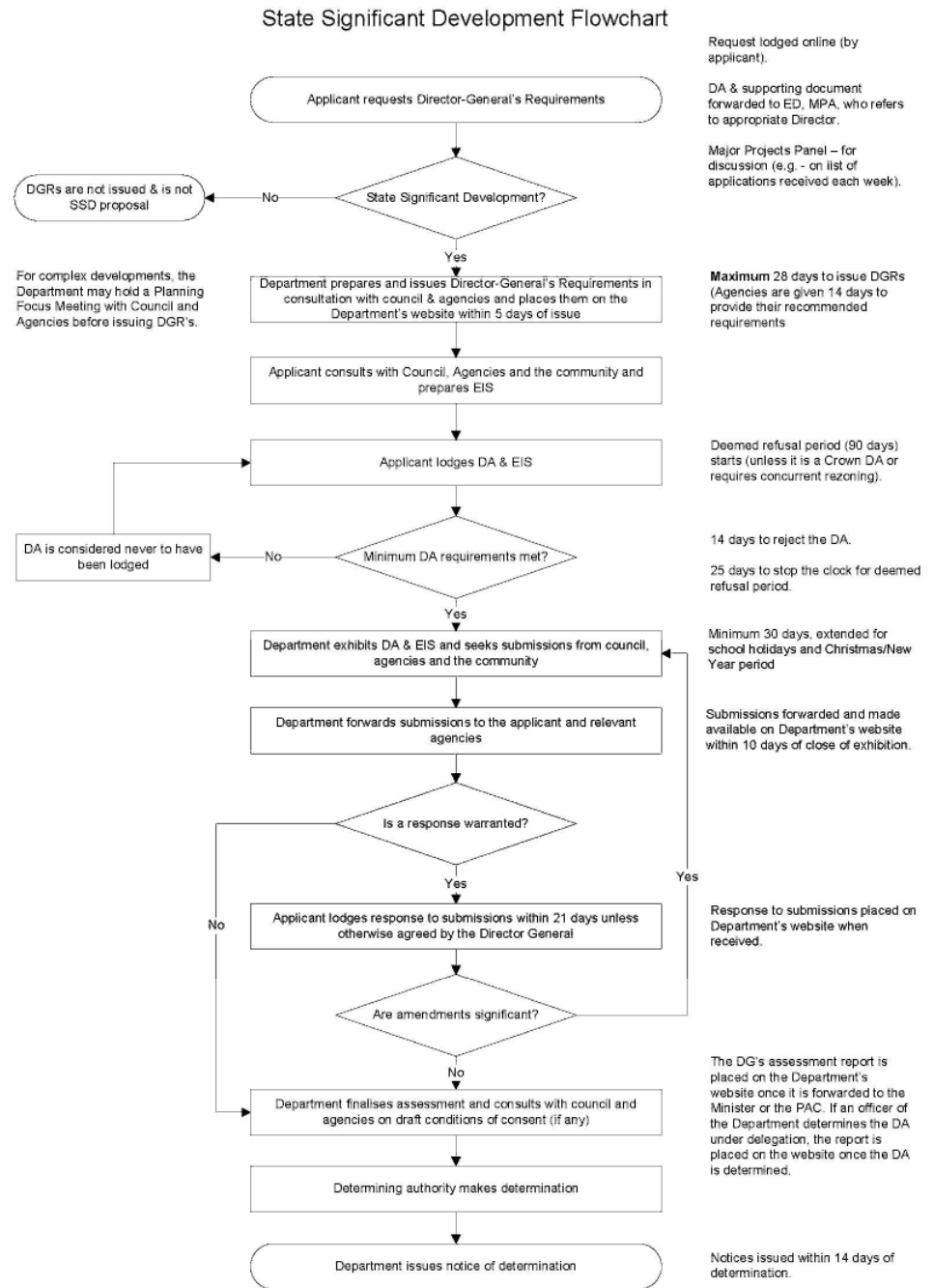


Figure 17: State Significant Development Flow Chart



4.5 Environmental Planning and Assessment Regulation 2000

The *Environmental Planning and Assessment Regulation 2000* (as amended) require that a formal request be lodged with the Director-General of the Department of Planning and Infrastructure prior to preparing an Environmental Impact Statement (EIS).

Section 78(8A) of the EP&A Regulation 2000 states that any development application for State Significant Development must be accompanied by an EIS. The EIS must be prepared in accordance with Clauses 6 and 7 of Schedule 2 of the EP&A Regulation.

Prior to preparing an EIS, the applicant must make a written application to the Director-General under Clause 3, Schedule 2 of the EP&A Regulation 2000. Director-General Requirements are issued in response to the application and outline the important matters that need to be addressed in the EIS.

Mitchel Hanlon Consulting made the written request to the Director-General on the 14th August 2013 on behalf of Yolarno Pty Ltd. The request was accompanied by the 'Preliminary Environmental Assessment' (MHC, 2013) supporting document outlining the key environmental issues. Consultation with the relevant NSW agencies was undertaken and DGR's were issued by the Director-General on the 13th September 2013.



4.6 Permissibility & Consent

Under the Inverell Local Environmental Plan 2012 (LEP 2012) the site is zoned RU1 Primary Production. The proposed rendering plant is defined as a *Rural Industry – Livestock Processing Industry* and is permitted with consent under the Inverell LEP 2012 within this zone.

The proposed bio-digester activity is defined as an *Electricity generating works and heat or co-generation*. This land use is not listed as a permissible activity with consent within the RU1 Primary Production zoning under the Inverell LEP 2012.

However, this land use is provided for within the State Environmental Planning Policy (SEPP) (*Infrastructure*) 2007. Part 3, Division 4, clause 34 of this SEPP discusses electricity generating works and permissibility. Clause 34(1) outlines:

Development for the purpose of electricity generating works may be carried out by any persons with consent on any land in a prescribed rural, industrial or special use zone.

Clause 33 of the SEPP lists the land use zones that are defined as 'prescribed rural, industrial or special use zones'. The *RU1 Primary Production* land use zone is listed as a 'prescribed rural, industrial or special use zones'. The SEPP (*Infrastructure*) 2007 policy overrides the Inverell LEP 2012 in this instance, and allows for electricity generating works within the *RU1 Primary Production* zone with consent.

Therefore, the proposed bio-digester activity is permitted with consent within the *RU1 Primary Production* zone.

Under section 89D of the EP&A Act, the Minister of Planning and Infrastructure (the Minister) is the consent authority for State Significant Development.



4.7 NSW Environmental Planning Instruments

There is a number of State Environmental Planning Policies (SEPP) that are considered relevant to the project which includes:-

- *SEPP (State and Regional Development) 2011;*
- *SEPP – Infrastructure 2007;*
- *SEPP – Rural Lands 2008;*
- *SEPP 33 – Hazardous and Offensive Development;*
- *SEPP 44 – Koala Habitat; and*
- *SEPP 55 – Remediation of Land.*

4.7.1 SEPP (State and Regional Development) 2011

While the assessment and determination of development applications in New South Wales is undertaken by local government, there are a small number of projects whose large scale, significance or potential impacts require that they are assessed and determined by regional or state authorities.

The State's planning system allows for projects of this nature to be dealt with by the NSW Government.

For these projects of this nature, the planning system consists of two separate assessment frameworks, State significant development (SSD) and State significant infrastructure (SSI).

The aims of the State Environmental Planning Policy (*State and Regional Development*) 2011 (SRD SEPP) are as follows:-

- a) to identify development that is State significant development;
- b) to identify development that is State significant infrastructure and critical State significant infrastructure;
- c) to confer functions on joint regional planning panels to determine development applications.

The Bindaree Beef project falls into the land use class *Electricity generating works and heat or co-generation* in Schedule 1 of the SRD SEPP. It is defined as:-



20 Electricity generating works and heat or co-generation

Development for the purpose of electricity generating works or heat or their co-generation (using any energy source, including gas, coal, bio-fuel, distillate, waste, hydro, wave, solar or wind power) that:

- a) has a capital investment value of more than \$30 million, or
- b) has a capital investment value of more than \$10 million and is located in an environmentally sensitive area of State significance.

The Bindaree Beef project does not fall within an environmentally sensitive area of State significance but has a capital investment of \$43.9 million and therefore falls under section 20(a) of the electricity generating works and heat or co-generation definition under Schedule 1 of the SRD SEPP.

4.7.2 SEPP (Infrastructure) 2007

SEPP (*Infrastructure*) 2007 provides a consistent planning regime for the infrastructure and the provision of services across NSW. The SEPP supports greater flexibility in the location of infrastructure and service facilities along with improved regulatory certainty and efficiency.

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

- a) improving regulatory certainty and efficiency through a consistent planning regime for infrastructure and the provision of services, and
- b) providing greater flexibility in the location of infrastructure and service facilities, and
- c) allowing for the efficient development, redevelopment or disposal of surplus government owned land, and
- d) 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), and
- e) identifying matters to be considered in the assessment of development adjacent to particular types of infrastructure development, and
- f) providing for consultation with relevant public authorities about certain development during the assessment process or prior to development commencing.

The SEPP (*Infrastructure*) 2007 provides for the development of electricity generating works or solar systems in Part 3, Division 4 of the SEPP. It defines which electricity generating activities are permissible with and without consent. It also outlines the land use zones that these activities are permissible within.



Part 3, Division 4, clause 34 of this SEPP discusses electricity generating works and where they are permitted with consent. Clause 34(1) outlines:

Development for the purpose of electricity generating works may be carried out by any persons with consent on any land in a prescribed rural, industrial or special use zone.

Clause 33 of the SEPP lists the land use zones that are defined as 'prescribed rural, industrial or special use zones'. The *RU1 Primary Production* land use zone is listed as a 'prescribed rural, industrial or special use zones'. The SEPP (*Infrastructure*) 2007 policy overrides the Inverell LEP 2012 in this instance, and allows for electricity generating works within the *RU1 Primary Production* zone with consent.

4.7.3 SEPP – Rural Lands 2008

The aim of this policy is to facilitate the orderly and economic use and development of rural lands for rural and related purposes. The policy applies to the Inverell Shire Council local government area.

The rural planning principles in the SEPP identify the range of matters that should be considered when preparing LEPs for rural areas. Planned outcomes for rural lands should enabled economic opportunity, protection of resources and environmental values, opportunities for a range of housing types in appropriately planned locations and the efficient provision of infrastructure.

The subject site is not identified as State significant agricultural land, and the proposed development appropriately complies with the provisions of the LEP. The proposed development is a complementary expansion to the existing abattoir operation and is a suitable development within the rural land use zoning. The proposed development is considered to comply with the State Environmental Planning Policy (Rural Lands) 2008.

4.7.4 SEPP No. 33 – Hazardous and Offensive Development

The SEPP No. 33 – *Hazardous and Offensive Development* provides the framework for determining whether a development is hazardous or offensive and any measures to reduce the impact of the development on the surrounding environment.

SEPP No. 33 applies to any proposal which falls under the policy's definition of "hazardous industry" or "offensive industry".

A 'hazardous industry' under SEPP 33 is one which, when all location, technical, operational and organisational safeguards are employed, the activity continues to pose a significant risk.



A Preliminary Risk Screening and Preliminary Hazard Analysis have been undertaken as part of this EIS as per the requirements of the SEPP No 33. A summary of this assessment is included in Section 5.6 Hazards and Risk Assessment and the full report is included as Appendix J

4.7.5 SEPP No. 44 – Koala Habitat

SEPP No. 44 *Koala Habitat* seeks to encourage the conservation and management of areas of natural vegetation that provide habitat for koalas.

Schedule 1 of SEPP No 44 identifies Inverell LGA as containing potential koala habitat. Potential koala habitat is defined as native vegetation where the trees outlined in Schedule 2 of the SEPP constitute at least 15% of the total number of trees in the upper or lower strata. SEPP No. 44 only applies to land where a development application has been made and the land area is greater than 1 hectare.

A flora and fauna assessment has been undertaken of the proposed development site. The immediate development area is comprised of exotic pasturelands lacking any form of overstorey. Feed tree species listed in Schedule 2 of the SEPP were not present in the proposed development site and do not constitute 15% of the total number of trees.

Therefore issues relating to koala habitat are not considered to be applicable. Potential impacts on flora and fauna are discussed further in Section 5.18 Biodiversity.

4.7.6 SEPP No. 55 – Remediation of Land

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

Clauses 7(2) and 7(4) of the SEPP outline that a preliminary contamination investigation must be carried out on land that has previously been used for agriculture and where there is a proposed change of land use. The proposed development site has been previously used for grazing agricultural activities. The proposed development does not propose a change in land use.

A preliminary site contamination assessment has been performed on the proposed development site. This assessment is included as Section 5.10 Site Contamination Review. The section addresses potential land contamination from previous agricultural activities.



4.8 Regional Environmental Plans

There are no Regional Environmental Plans applicable to the Site.

4.9 Inverell Shire Council Local Environmental Plan 2012

The proposed development site is zoned RU1 Primary Production under the Inverell Local Environmental Plan 2012 (LEP 2012). The zone is defined as follows:-

Zone RU1 Primary Production

1 Objectives of zone

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

2 Permitted without consent

Environmental protection works; Extensive agriculture; Flood mitigation works; Forestry; Home-based child care; Home occupations; Moorings; Roads

3 Permitted with consent

Air transport facilities; Airstrips; Animal boarding or training establishments; Aquaculture; Backpackers' accommodation; Bed and breakfast accommodation; Boat launching ramps; Boat sheds; Camping grounds; Caravan parks; Cellar door premises; Cemeteries; Community facilities; Correctional centres; Dual occupancies (attached); Dwelling houses; Eco-tourist facilities; Environmental facilities; Extractive industries; Farm buildings; Farm stay accommodation; Function centres; Helipads; Home businesses; Home industries; Information and education facilities; Intensive livestock agriculture; Intensive plant agriculture; Jetties; Kiosks; Landscaping material supplies; Mooring pens; Open cut mining; Plant nurseries; Recreation areas; Recreation facilities (outdoor); Roadside stalls; Rural industries; Rural supplies; Rural workers' dwellings; Signage; Vehicle repair stations; Waste or resource management facilities; Water recreation structures; Wharf or boating facilities

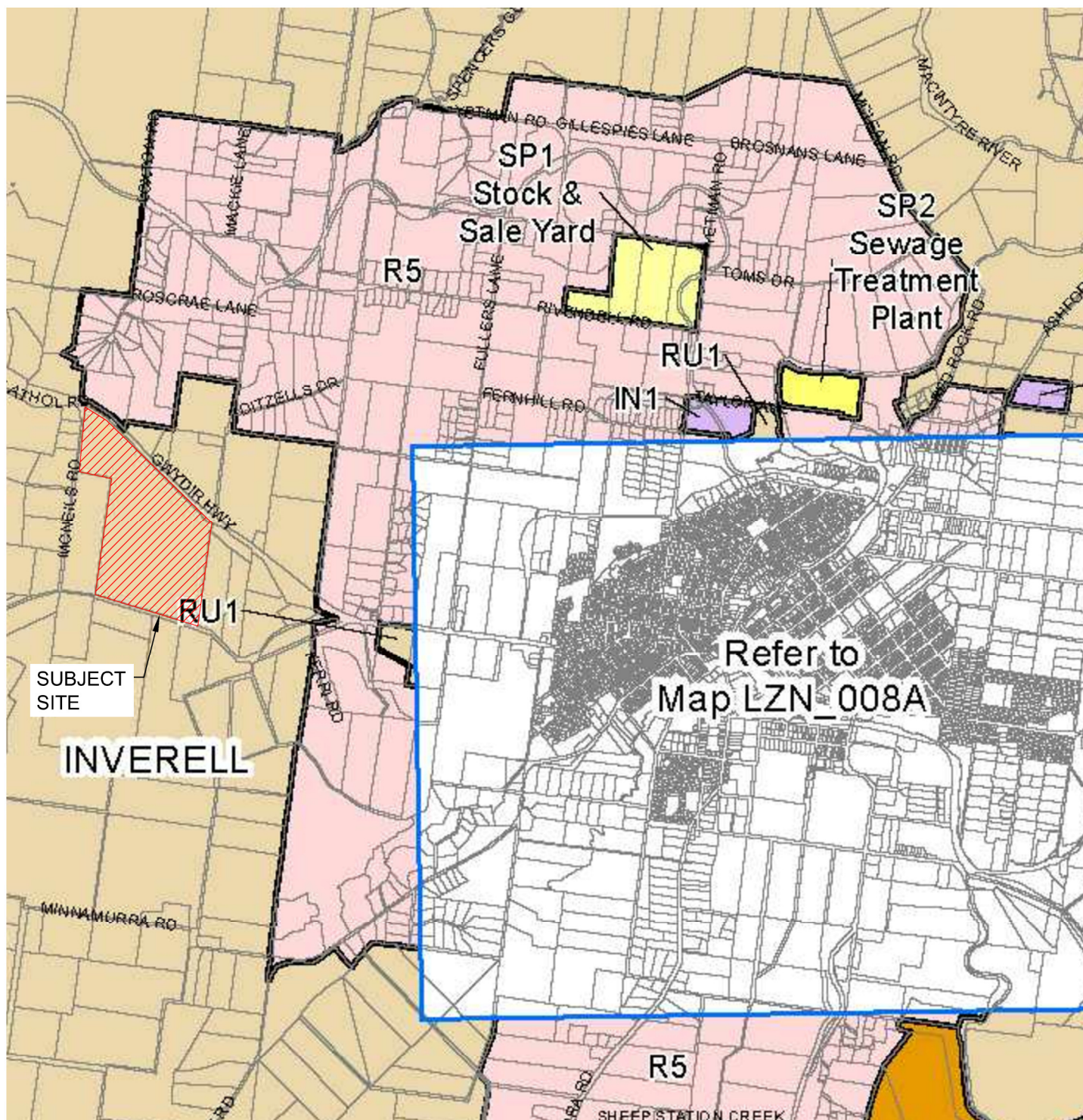


4 Prohibited

Any development not specified in item 2 or 3

Figure 18 shows the LEP 2012 zoning for the site.

- Zone**
- B1 Neighbourhood Centre
 - B2 Local Centre
 - B5 Business Development
 - E1 National Parks and Nature Reserves
 - E3 Environmental Management
 - E4 Environmental Living
 - IN1 General Industrial
 - R1 General Residential
 - R5 Large Lot Residential
 - RE1 Public Recreation
 - RE2 Private Recreation
 - RU1 Primary Production
 - RU5 Village
 - SP1 Special Activities
 - SP2 Infrastructure





Clause 6.5 'Development within a designated buffer area' of the LEP 2012 also affects the site. This clause states:-

6.5 Development within a designated buffer area

- i. The objective of this clause is to protect the operational environment of a livestock processing industry, a stock and sale yard, a sewage treatment plant and a waste or resource management facility.
- ii. This clause applies to the land identified as "Livestock processing industry", "Stock and sale yards", "Sewage treatment plant" and "Waste or resource management facility" on the Designated Buffer Map.
- iii. Before granting development consent for development on land to which this clause applies, the consent authority must consider the following matters:
- iv. the impact that any noise and other emissions associated with existing land uses would have on the proposed development,
- v. any proposed measures incorporated into the development that limit the impact of such noise and other emissions associated with the existing land use,
- vi. any opportunities to relocate the proposed development outside the land to which this clause applies,
- vii. whether the proposed development would adversely affect the operational environment of any existing development on the land to which this clause applies.

Figure 19 shows the designated buffer area map and the abattoir's location within the buffer zone.

As the objective of this clause of the LEP 2012 states, the buffer area has been established to protect the operational environment of the existing abattoir activities. It is also designed to ensure any proposed development within the buffer is considered in terms of adversely affecting the existing operations and minimises land use conflict.

The project will not impact upon the designated buffer area, complies with the objective of clause 6.5 and enhances the long term viability of the Yolaro Pty Ltd operation.



4.10 Inverell Shire Council Development Control Plans

Development Control Plans (DCP's) do not apply to State Significant Development (SSD). This is as a result of DCP's being generally concerned with local or specific issues and do not provide appropriate planning controls for large, complex developments of importance to the State or region. However, a local council can identify controls within a DCP that relate to a proposed SSD DA and request that they be addressed in the EIS.

A review of Inverell's DCP's reveals that it is considered that none of the DCP's are applicable to this project.



4.11 Requirements under other NSW Legislation

4.11.1 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) establishes the environmental licensing framework for pollution and waste management control. An Environmental Protection Licence (EPL) is required for all scheduled activities under Section 48 of the Act.

Yolarno Pty Ltd are currently licensed under the POEO Act for the Scheduled activity of Livestock Processing Activities, and for the Fee-Based activities of Rendering or Fat Extraction (>4000 tonnes) and Slaughtering or Processing Animals (>30,000 tonnes) (Environmental Protection Licence no 809). These activities will remain at the site and the revised EPL will include these existing activities.

'Electricity generation' is a scheduled activity under Schedule 1 of the POEO Act. However, the proposed development does not meet the licensing criteria of the Scheduled activity. For the activity of 'General electricity works' the licensing criteria is the 'capacity to generate more than 30 megawatts of electrical power'. The proposed development does not have the capacity to produce this amount of electricity and subsequently will not be licensed for this activity.

Yolarno Pty Ltd will apply for an updated EPL prior to commencement of the development. Pursuant to Section 89K(1)(e) of the EP&A Act, an EPL must be granted if it is necessary for the carrying out of the activity that has been granted development consent. The EPL must be issued under the terms consistent with the development consent.

4.11.2 Water Management Act 2000 and Water Act 1912

The *Water Management Act 2000* is gradually phasing out the *Water Act 1912* as relevant Water Sharing Plans are prepared for water sources. The water sources present on the site are covered by Water Sharing Plans.

The Inverell area surface water is managed under the Water Sharing Plan for the Border Rivers Unregulated and Alluvial Water Sources 2012. There are no surface water entitlements current for the subject site under this Plan. There are no proposed entitlements for the proposed development.



Groundwater resources within the Inverell region are managed under the Water Sharing Plan for the NSW Murray-Darling Basin Fractured Rock Groundwater Sources. The subject site is located within the Inverell Basalt Groundwater Source, part of the New England Fractured Rock and Northern Basalts Water Resource Plan Area.

There are no identified high priority groundwater dependant ecosystems located on the subject property as outlined by this document. The groundwater entitlements for the subject property are for stock and domestic use. There are no groundwater irrigation licenses current for the property. There are no proposed entitlements for the proposed development.

4.11.2.1 Controlled Activity on Waterfront Land

A 'Controlled Activity' approval will be sort for the proposed development site. Waterfront land is defined as the bed of any river, lake, and any land within 40 m of the river banks, lake shore or estuary under the Water Management Act 2000. This includes any drainage line defined on a topographic map.

A 'controlled activity' is defined as:

1. the erection of a building or the carrying out of a work (within the meaning of the *Environmental Planning and Assessment Act 1979*); or
2. the removal of material (whether or not extractive material) or vegetation from land, whether by way of excavation or otherwise; or
3. the deposition of material (whether or not extractive material) on land, whether by way of landfill operations or otherwise; or
4. the carrying out of any other activity that affects the quantity or flow of water in a water source.

The proposed development is defined as 'the erection of a building or the carrying out of a work (within the meaning of the *Environmental Planning and Assessment Act 1979*). The proposed development is located within 40 m of a watercourse as marked on topographic maps provided by the NSW Land and Property Information SIX Maps online mapping tool.

The impacted watercourses are ephemeral drainage lines and classified as 1st order streams as per the Strahler System of ordering watercourses. Due to the upstream nature of the drainage lines, there are no defined channels or banks, and no defined vegetated riparian zones adjacent to the drainage lines.

The relevant approval process with the Office of Water will be undertaken once development consent has been received.



4.11.3 Native Vegetation Act 2003

The *Native Vegetation Act 2003* (NV Act) aims to promote the protection of native vegetation of high conservation value and manage the clearing of native vegetation. Clearing of vegetation is permissible under the NV Act with development consent or with the preparation of a Property Vegetation Plan. It is not proposed as part of this development to clear native vegetation and development consent for native vegetation clearing is not requested.

4.11.4 Threatened Species Conservation Act 1995

Part 5A of the EP&A Act 1979 highlights components to be considered when assessing the 'impact of significance' on threatened species, populations or ecological communities or their habitats.

If an 'impact of significance' is likely, a test of significance must be completed on all relevant species and communities to determine the significance of the impact. If a 'significant impact' is likely, a Species Impact Statement (SIS) may be requested.

The Proposal is unlikely to have a significant effect on any species or communities listed under the TSC Act. It is not required that further assessment be undertaken.

4.11.5 National Parks and Wildlife Act 1974

The *National Parks and Wildlife Act (NPWS) Act 1974* is administered by the Department of Environment and Heritage and provides legislation for the protection of Aboriginal cultural heritage in NSW. The NPWS Act 1974 promotes and regulates the management of national parks and relevant historic Study Areas or places of cultural value within the landscape.

NPWS Act 1974 also seeks to conserve fauna, flora and Aboriginal cultural heritage. Items of Aboriginal cultural heritage or declared Aboriginal cultural heritage places are protected and regulated under the Act.

Under the definition of the NPWS Act 1974 'objects' are confined to physical evidence and are commonly referred to as Aboriginal sites. Disturbance of Aboriginal sites would require an Aboriginal Heritage Impact Permit issued with permission from the Director General of the Department under Section 90 of the NPWS Act 1974.



A desktop assessment of the proposed development site was undertaken. A search of the AHIMS Web Services (Aboriginal Heritage Information Management System) database was undertaken on the 9th September 2013. The search resulted in no Aboriginal sites or Aboriginal places recorded in the proposed development site area. No further field assessment was deemed necessary. More information is outlined in Section 5.17.3.3.



4.12 Summary of Required Licences and Approvals

Table 7 outlines the approvals and licenses required for the proposed development.

Table 7: Summary of Required Approvals

APPROVAL	LEGISLATION	AUTHORITY	COMMENTS
Development Consent for the construction and operation of the proposal	Section 89E of Division 4.1 of Part 4 of the EP&A Act	Minister for Planning and Infrastructure	The Minister can delegate their consent authority to the Planning and Assessment Commission
Environmental Protection Licence	Chapter 3 of the POEO Act	Office of Environment and Heritage	Section 89K of the EP&A Act outlines that an EPL must be granted following the granting of development consent
Construction and Occupation Certificate	Division 1 of Part 4A of the EP&A Act	Inverell Shire Council or Certified Accreditor	Will be obtained when required
Notification of Dangerous Goods	Work Health and Safety Regulation 2011	WorkCover NSW	Will be obtained when required
Environmental Management Plans	Conditions of Development Consent	DP&I	Will be prepared following the granting of development consent



5.0 Environmental Impacts

5.1 Scoping and Risk Assessment

An initial Scoping Study was undertaken, as part of the request for DGRs, to identify the key environmental issues associated with the project. The Scoping Study was based on a desktop review of available information.

After the site assessment, a risk assessment was undertaken to characterise the likely environmental risks associated with the construction and operation of the bio-digester and associated infrastructure. The aim of the risk assessment was to ensure that all relevant risks were investigated and mitigated as part of the project submission, relative to the degree of environmental risk they represent.

The risk rating is a factor of the consequence of an impact occurring and the likelihood of the impact occurring. Depending on the combination of consequence and likelihood [Refer to Table 8], the overall risk rating could be low to extreme. High to extreme risks (termed ‘key risks’) have warranted a higher level of investigation. Risks identified as low or highly manageable are discussed in less detail.

Table 8: Risk Assessment Rating Matrix

LIKELIHOOD	CONSEQUENCE				
	NEGLIGIBLE	MINOR	MODERATE	MAJOR	CATASTROPHIC
Remote	Low	Low	Low	Medium	Medium
Unlikely	Low	Low	Medium	Medium	High
Possible	Low	Medium	Medium	High	High
Likely	Medium	Medium	High	High	Very High
Almost Certain / Inevitable	Medium	High	High	Very High	Very High

This Scoping Assessment was revised following the community engagement process as some of the risks may have been perceived but not reinforced during community engagement.



Table 9 summarises the results of the risk assessment. Four key risks were investigated in detail in Section 6, by way of specialist assessments:

- Air Quality and Odour;
- Noise;
- Hazard and Risk; and
- Traffic and Parking.

Fourteen lower risk issues were investigated, primarily using desktop assessment, in Section 6 of this EIS:

- | | |
|---------------------------------|---------------------------------|
| • Liquid Fertiliser Management; | • Extractive Industries; |
| • Hydraulic Modelling; | • Waste Management; |
| • Surface Water; | • Visual Amenity & Landscaping; |
| • Groundwater; | • Cultural Heritage; |
| • Greenhouse Gas Emissions; | • Biodiversity; |
| • Soil and Land Capability; | • Bushfire Management; and |
| • Site Contamination; | • Socio-Economic. |



Table 9: Risk Analysis of Environmental Issues

RELEVANT EIS SECTION	ENVIRONMENTAL RISK	CONSEQUENCE	LIKELIHOOD	RISK RATING
5.4	Air Quality and Odour	Likely	Moderate	High
5.5	Noise	Almost certain	Minor	High
5.6	Hazard and Risk	Possible	Major	High
5.14	Traffic and Parking	Likely	Moderate	High
5.9	Hydraulic Modelling	Possible	Minor	Medium
5.11	Surface Water	Possible	Minor	Medium
5.12	Groundwater	Possible	Minor	Medium
5.7	Greenhouse Gas Emissions	Unlikely	Minor	Low
5.8	Soil and Land Capability	Remote	Minor	Low
5.10	Site Contamination	Remote	Minor	Low
5.13	Extractive Industries	Remote	Negligible	Low
5.15	Waste Management	Unlikely	Minor	Low
5.16	Visual Amenity & Landscaping	Remote	Negligible	Low
5.17	Cultural Heritage	Remote	Minor	Low
5.18	Biodiversity	Unlikely	Minor	Low
5.19	Bushfire Risk	Remote	Moderate	Low
5.3	Surrounding Land Value	Remote	Minor	Low
5.2	Socio-Economic	Remote	Negligible	Low



5.2 Socio – Economic Assessment

5.2.1 Introduction

Bindaree Beef is a significant contributor to the economic and social fabric of the Inverell Local Government Area (LGA) and is of strategic importance to the on-going growth and vitality of the region. To remain viable Bindaree Beef must seek continuous improvement and look for opportunities to enhance productivity. The new bio-digester and rendering plant project is one such significant opportunity.

However, in order for the project to proceed it must demonstrate a net benefit for the community specifically as a result of the development.

From a socio-economic perspective there are three important aspects for assessing the project:

- a) Direct economic outcomes of the project.
- b) Broader regional economic impacts.
- c) Social and community effects.

Each of the key aspects is elaborated below. All data and conclusions are drawn from the more detailed and comprehensive report *Bindaree Beef: Economic and Social Impact Statement* prepared by Doublj Consulting, John Jones, January 2014 (Refer Appendix Q).

Note: *This report was written prior to the Utilitas design implementation and may contain information and data not specific to this design and process.*

5.2.2 Economic Outcomes of Project

5.2.2.1 Quantitative Impacts

In the first year of operation the investment in the new bio-digester and rendering plant is predicted to deliver a total benefit of \$4.2 million to Bindaree Beef. The total project investment required to achieve this is estimated at \$43.9 million.

A considerable component of the project investment is expenditure required during the construction phase, during which the region will realise sizeable economic gains.



5.2.2.1.1 Construction

It is anticipated that during the construction phase of the project an estimated \$13 million will be spent on good and services from Australian suppliers. A significant amount of this \$13 million will be injected into the regional economy particularly through labour which will be sourced locally as much as possible.

During the construction phase up to 60 jobs are likely to be generated. This will create employment opportunities within the region during the estimated 12 months of construction.

An estimated \$1.65 - \$5.1 million is expected to be spent directly within the Inverell LGA. Bindaree Beef anticipates spending at least \$1.65 million during the construction phase of the project regionally across the following inputs:

- Labour \$700,000
- Good \$600,000
- Services \$350,000

5.2.2.1.2 Post-construction

Whilst only one new person will be employed to manage fertiliser sales once the project is commissioned due to the cost savings and new revenue streams arising from the bio-digester plant in particular, Bindaree Beef will be able to plan for further future upgrades to the abattoir.

5.2.2.2 Qualitative Impact

The new bio-digester and render plant facilities will substantially enhance the productivity of Bindaree Beef. The project investment will deliver to Bindaree Beef significant cost savings and enable new revenue streams totalling \$4.2 million in the first year of operation [Refer to Table 10].



Table 10: Cost Benefits

CATEGORIES OF COST SAVINGS/ADDITIONAL INCOME	PROJECTED OPERATION COST SAVINGS	ADDITIONAL INCOME	TOTAL BENEFIT
	AUD	AUD	AUD
Reduction in coal costs	1,072,282		1,072,282
Reduction in electricity costs	325,872		325,827
Reduction in paunch cartage costs	46,669		46,669
Reduction in repairs and maintenance costs	313,220		313,220
Reduction in carbon tax costs	685,501		684,501
Increase in fertilizer revenue *		1,752,000	1,752,000
Increased in Large-scale Generation Certificates (LGCs) revenue		44,150	45,150
Total	2,442,544	1,796,150	4,238,694

** Potential fertilizer options are continuing to be investigated*

The subsequent improvements in operating costs and revenues will greatly improve the efficiency and operating performance of the company. The investment in new world-class technology will also enable Bindaree Beef to promote their commitment to innovation and social and environmental priorities, enhancing the attractiveness of their products. Altogether these improvements will secure substantial economic gains and deliver competitive advantage to the company.

Although such gains are privately retained and are not directly allocable to the assessment of Net Community Benefit, it is important to recognise and acknowledge the significance the on-flow of Bindaree Beef's enhanced operational performance will have for the community.

Due to the high inter-dependency the region has with Bindaree Beef, the company's ongoing viability and sustainability is critical. Improvements that aid the competitiveness of the company help ensure its continued viability and secure the company's ongoing contribution as an employer, purchaser and supplier.



In preparing the Economic and Social Impact Statement for this project, Doublej Consulting confirmed with Bindaree Beef that in 2012/13 the following contributions were made to Inverell LGA:

- Employed 11.4% of the Inverell LGA's total workforce, approximately 760-780 people (full time and casual) of which 25% were female. They consequently employed more than twice number of staff as the next 3 largest employers in the region, combined.
- Total salary and wages (including on costs) were approximately \$41.7 million while \$5.5 million was paid to labour hire companies.
- Purchased total cattle costs of \$213.2 million. Local grower farms supplied 70% (\$149.2 million).
- Goods and services expenditure totalled \$30.4 million of which 60% (\$18.2 million) was spent on suppliers from within the Inverell LGA (excludes salaries and wages but includes labour recruitment firms).
- Transport costs totalled \$11.3 million of which 80% (\$9 million) was contracted to local businesses.
- Supplied \$36.3 million of total sales consumed in the Inverell LGA.

The estimated total net disposable income for employees and Inverell LGA businesses that supplied goods and services to Bindaree Beef in 2012/13 was \$182.3 million.

In addition to the initial direct expenditure, the multiplier effect resulted in a further estimated \$221.9 million in indirect spending on locally supplied goods and services in 2012/13.

Doublej conclude that if Bindaree Beef was to cease operation a loss to the region's economy as high as \$404.2 million (based on the 2012/13 year) could be expected.

Clearly Bindaree Beef is of significant strategic economic importance to the Inverell LGA. The company is the region's major employer and expends millions in purchasing local goods and services.

Thus it is critical to ensure Bindaree Beef continues in its role as a key employer and contributor to the economic viability of the region and township of Inverell. The company must remain competitive to cement its future.



5.2.3 Competition and Market Outlook

To safeguard the longevity of Bindaree Beef the company must be in a position to compete effectively. The Australian beef processors industry is characterised by low profit margins and increasing competition from competitor countries and from other meat substitutes.

The domestic beef processing market is intensely competitive with a 33.6% share controlled by major processing companies. Bindaree Beef competes within the remaining 66.4% of the domestic processor market for a share of both domestic and export trade. A detailed summary of the Australian Beef Processing Industry can be found in Doublj Consulting Report contained in Appendix Q.

In summary, to be successful longer-term companies such as Bindaree Beef need to improve productivity and become more efficient by reducing such things as wages and other input costs. This can be achieved through things like increasing economies of scale, automating plant and equipment and improving customer relationships.

Investment in the new bio-digester and rendering plants will facilitate the achievement of most of these critical success factors and help secure Bindaree Beef's continued operation well into the future.

5.2.4 Regional Economic Impacts

5.2.4.1 Quantitative Impacts

As described in 5.2.2.2 Bindaree Beef already provides significant economic stimulus to the Inverell LGA, predominately as the major manufacturer and employer for the region.

As a result of the project, Doublj Consulting have identified that not only will an estimated \$1.65 - \$5.1 million be spent directly within the Inverell LGA, due to the multiplier effect a further \$2 - \$6.3 million could be directed into the Inverell LGA regional economy. In total, the project could increase consumer spending and consumption in 2015 within the range of \$3.66 - \$11.53 million.

5.2.4.2 Qualitative Impacts

Sustainable economic growth is critical to Inverell LGA's prosperity. Consumer and business confidence is dramatically improved when a region has a vibrant and secure economic outlook, which then attracts further investment in capital and labour.



Doublj Consulting Report contains a comprehensive assessment of the attractiveness of the Inverell LGA in terms of key competitiveness factors. The reviewed themes and rankings “capture a LGA’s intrinsic capacity to attract and efficiently use labour and capital to sustain and develop economic and social prosperity” (Jones 2014, p.10).

As shown in Table 11 Inverell LGA key competitiveness was assessed and rankings determined across 10 different.

Table 11: Inverell LGA Key Competitiveness Ranking

THEME		RANKING
		(NATIONALLY ACROSS LGAS)
1.	Institutions	Top 30%
2.	Infrastructure and Services	Top 50%
3.	Economic Fundamentals	Bottom 40%
4.	Human Capital	Top 40%
5.	Labour Markey Efficiency	Bottom 20%
6.	Technological Readiness	Bottom 40%
7.	Business Sophistication	Bottom 10%
8.	Natural Resources	Top 10%
9.	Innovation	Bottom 40%
10.	Market Size*	Top 50%

Note: * Guide only as assessment includes Inverell LGA as part of a broader LGA cluster:

Overall, the Inverell LGA has sufficient competitiveness in key areas to support the project. However, the assessment also identifies several key themes of concern for the region. If progressed, the project would assist in addressing certain elements within each of these themes and further enhance the competitiveness of the region.

Further detailed analysis of the Inverell LGA and its competitiveness can be found in Doublj Consulting Report contained in Appendix Q.



5.2.5 Social and Community Impacts

Economic growth and social development are inextricably linked as capital is needed to improve living conditions.

The regional profile of the Inverell LGA has the following demographic characteristics (ABS 2011 census):

- Population: 16,075
- Total available workforce: 6833 (71.4%)
- Of the Total available workforce:
 - o 5.4% not working
 - o 7.3% unemployed
- Median personal income: \$430 per week (NSW median \$561 per week)

Bindaree Beef is already a major regional employer and significant economic contributor. The Bindaree Beef project will provide additional significant stimulus to the local economy – it is estimated the proposed project would increase consumer spending and consumption in 2015 in the range of \$3.66 – 11.53 million.

5.2.5.1 Community and business confidence

Community and business confidence encourages investment and spending and helps drive economic growth. In 2010, a survey by Ritchie Business Solutions of 56 local small businesses in Inverell revealed a number of issues of concern. Three are relevant to economic growth: a weak economy; lack of customers and slow customer payments.

Anecdotally, it was perceived that in 2013 the same adverse economic conditions prevailed as the local business community raised that its important the Bindaree Beef maintain its share of the manufacturing industries currently operating in the Inverell LGA.

The Bindaree Beef project should alleviate some local business concerns by financially stimulating the local economy. Both business and household confidence should also be boosted as the project should secure long term employment for Bindaree Beef workers and local spending into future.



5.2.5.2 Employment

One of the main drivers for impacts on community fundamentals is employment. Once commissioned, the new bio-digester and rendering plant will enhance Bindaree Beef's competitiveness and help secure its continued operation longer-term. This in turn delivers sustainable employment. For most employees, working for a stable company and job security are the two most important aspects of the work environment.

Skill levels, the type of jobs and roles, gaining of qualifications and potential career paths are other important employment factors crucial to the overall social and financial well-being of a rural region.

In addition to providing employment opportunities across mixed categories (full/time, casual) and various roles (skilled and unskilled), Bindaree Beef provides training for new and existing employees and career pathway opportunities. Career pathways are available for those who wish to pursue qualifications to enhance their knowledge and skills.

Apart from any additional employment opportunities created by the project there are also the benefits resulting from creating additional training opportunities and enhanced career pathways for existing staff at Bindaree Beef. More importantly, the project facilitates the company's long-term sustainability and future employment growth.

Value cannot be placed on job security and tenure of employment with the most significant employer in the Inverell LGA, and the flow-on this should have for economic stability in the region.

5.2.5.3 Other Effects

The project will also deliver a number of other benefits to the region:

- Substantially less carbon emissions by eliminating burning coal in the process.
- Coal trucks will be eliminated, reducing associated pollution and heavy vehicle traffic on regional roads.
- The bio-digester process will convert methane gas to energy to generate onsite electricity. This creates the opportunity for reallocation of mains electricity to other businesses/industries when near self-sufficient.

Additionally, the new bio-digester project may lift local pride in the region as Bindaree Beef promotes its investment in world-class innovative technologies and becoming a leader in energy efficiency and environmentally responsible processing.



5.2.6 Conclusion

The *Bindaree Beef: Economic and Social Impact Statement* prepared by Doublj Consulting, John Jones, January 2014 (Appendix Q) has exposed the considerable value to the Inverell LGA regional community of Bindaree Beef's past and current beef production operations and proposed future construction of the new rendering and bio-digester plants.

Most importantly the Report demonstrates the loss of economic consumer activity that would result if Bindaree Beef were to cease production. Doublj conclude that if Bindaree Beef was to cease operation a loss to the region's economy as high as \$404.2 million (based on the 2012/13 year) could be expected.

Conversely, Bindaree Beef has the opportunity to deploy the bio-digester technology and employee skill sets acquired during the construction stage. Added to this are increased savings from significant reductions in energy inputs to production, environmental sustainability and the absorption of knowledge and expertise in world first meat production efficiency.

The most important outcome from this project is the likely long-term employment opportunities and the social and economic benefits that it will afford the Inverell LGA and its community.



5.3 Surrounding Land Values

During the community consultation and stakeholder engagement process the issue of the impact the proposal may have on surrounding land values was raised.

The proposal involves the addition of significant infrastructure to the existing Bindaree Beef abattoir facility. The potential for the addition of this infrastructure to impact on neighbouring land values has subsequently been addressed.

Factors related to abattoir activity which would be expected to impact most heavily on the value of adjacent land have been identified as visual amenity and odour. The existing site has no exceptional aesthetic value, with the proposed infrastructure being consistent with existing abattoir infrastructure. The aesthetic values of neighbouring land are largely protected by existing topography and vegetation which will maximise screening of the proposed infrastructure.

Visual impacts of the proposal are detailed further in Section 5.16. An assessment of air quality impacts undertaken by ViPAC Engineers and Scientists found that waste management utilising the proposed infrastructure will reduce existing odour and particulate matter generation, benefiting neighbouring landowners. The proposal's impacts on air quality are detailed further in Section 5.4.

The existing abattoir facility is surrounded by a landuse buffer contained within the Inverell Local Environmental Plan 2012. This buffer limits the potential for development of areas immediately surrounding the abattoir. The location and extent of the existing buffer is expected to remain unchanged with the addition of the bio-digester and rendering plant. Subsequently, landuse of surrounding properties will not be impacted in this regard.

Modifications to the existing environment as a result of the proposal is anticipated to be minimal, and in many cases even beneficial (such as odour reduction). Subsequently, it is deemed unlikely that the proposed development will result in the reduction of value for adjacent land.



5.4 Air Quality and Odour

5.4.1 Odour Assessment

Mitchel Hanlon Consulting engaged the services of ViPAC Engineers and Scientists Ltd (ViPAC) to prepare an Air Quality and Odour Assessment to comply with the DGRs issued by the NSW Department of Planning and Infrastructure.

The purpose of the Air Quality and Odour Assessment is to evaluate the potential air quality impacts, including odour, generated from various activities associated with the bio-digester and rendering plants and to provide recommendations to mitigate and minimise any potential impacts that might have an effect on the surrounding Inverell community.

A copy of the report can be found in Appendix G.

Air quality and odour impacts are considered to be the biggest issue for the Inverell community from the current Bindaree Beef operations. As a result, and to not only protect the Inverell community but also the operations at Bindaree Beef (and other industries) Inverell Shire Council have been proactive and included a buffer surrounding the site under the Inverell Local Environmental Plan 2012.

5.4.2 Introduction

Odours can affect public amenity and community quality of life. Within the community, there is a large range of reactions to odour. On the one hand there are people who are very sensitive to odour and on the other hand there are people within the community who are more tolerant to higher odour levels.

The 2006 New South Wales (NSW) document *Assessment and management of odour from stationary sources in NSW* aims to provide an effective framework to set out procedures to help minimize odour impacts on the community from activities such as the Bindaree Beef abattoir whilst, at the same time, promote fair and equitable outcomes for activities that emit odour and people affected by odour emissions.



5.4.3 Topography and climate

The surrounding landform and local climate will have an impact on how air in the locality will move, which direction it will travel and disperse pollution, particularly during the night, when wind speeds are low and air tends to drain toward low lying areas.

The topography surround the Bindaree Beef site is gently undulating pasture land. The land is higher than the site to the west and east, and lower to the north and south. As a result of the topography, impacts are expected to extend further to the north and south during the night in calm conditions.

Long term climate data was used to characterise the local climatic conditions using meteorological data generated by CSIRO's The Air Pollution Model (TAPM). Wind roses generated for five years from 2002 to 2006 show that the dominant wind directions are north-easterly during the day and shift westerly to north-westerly during the afternoon. The most common wind speed at Bindaree Beef is 5-8m/s.

Figure 20 shows the site specific annual wind rose 2002-2006 determined by TAPM. The figure has been extracted from the ViPAC report as Figure 5-1.

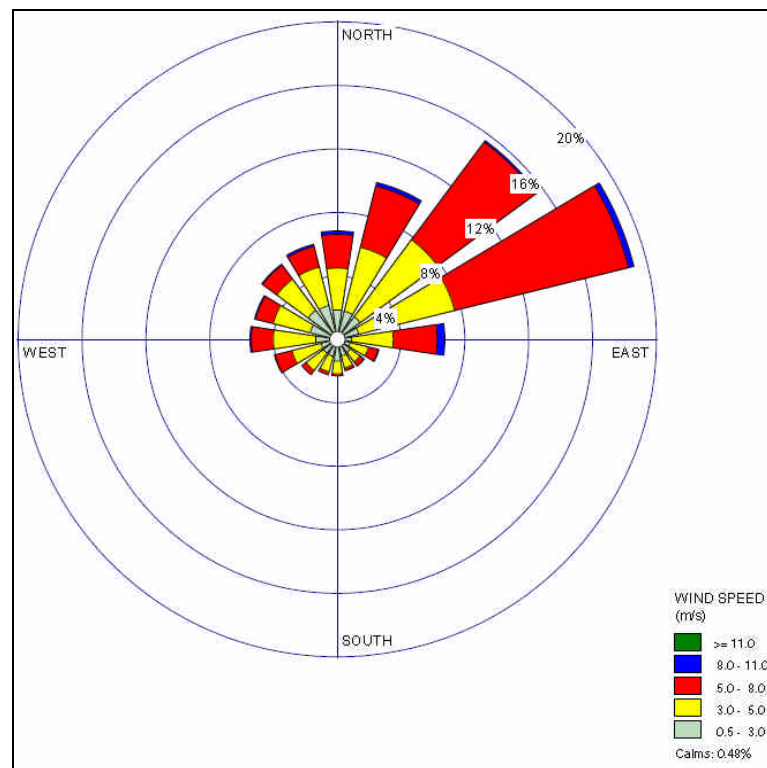


Figure 20: Wind Rose

The seasonal wind roses can be found in the ViPAC report in Appendix G.



5.4.4 Methodology and Legislative Framework

Figure 21 shows the main stages and information required by ViPAC to carry out the Air Quality and Odour Assessment.

The Assessment was prepared in accordance with the New South Wales (NSW) document *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* and subsequently released “Technical Notes” which sets out the applicable criteria, and detailed guidelines on how to conduct an air quality impact assessment.

Odour samples were taken by ViPAC on site on the 10th October 2013 and included both area (flux hood) and volume (point) source sampling. These samples were then analysed by Airlabs Environmental Pty on 11th October 2013.

ViPAC also identified forty four (44) sensitive receptors surrounding the site, of which the majority of them are residential premises. Figure 22 shows the identified sensitive receptors.

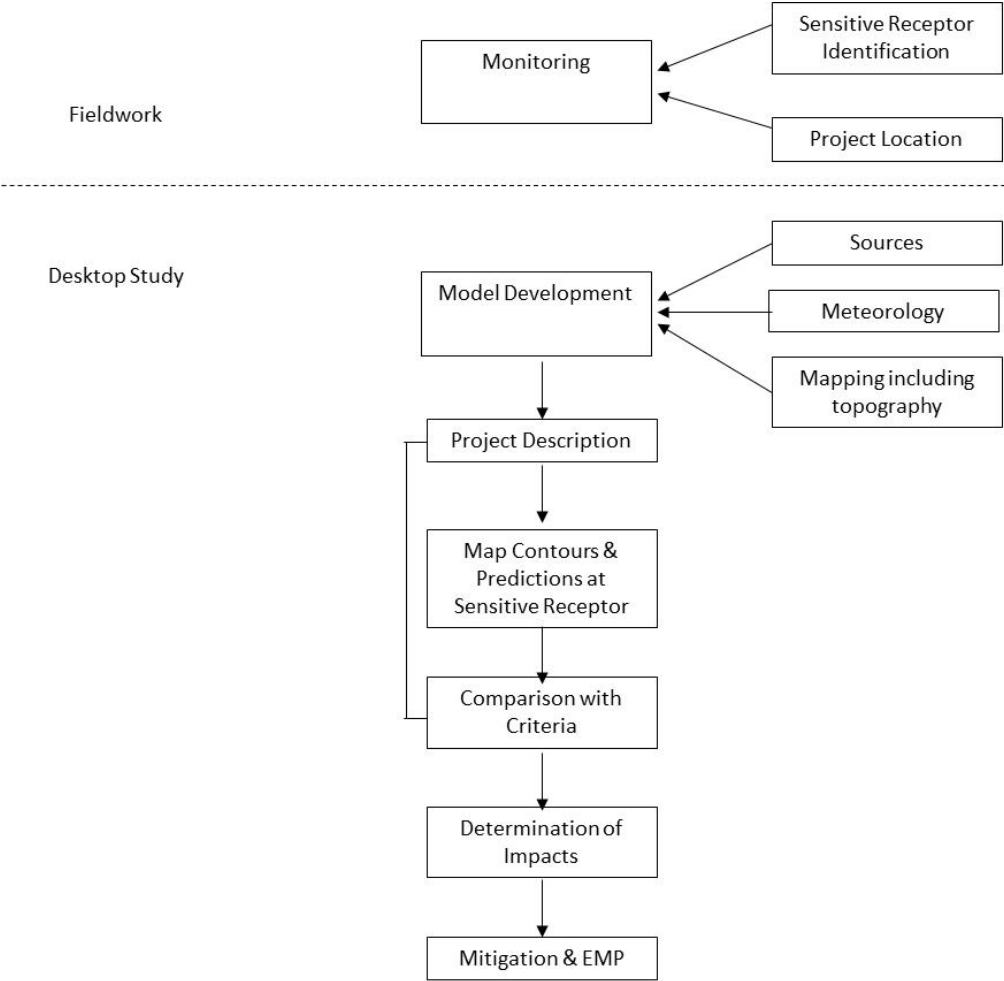
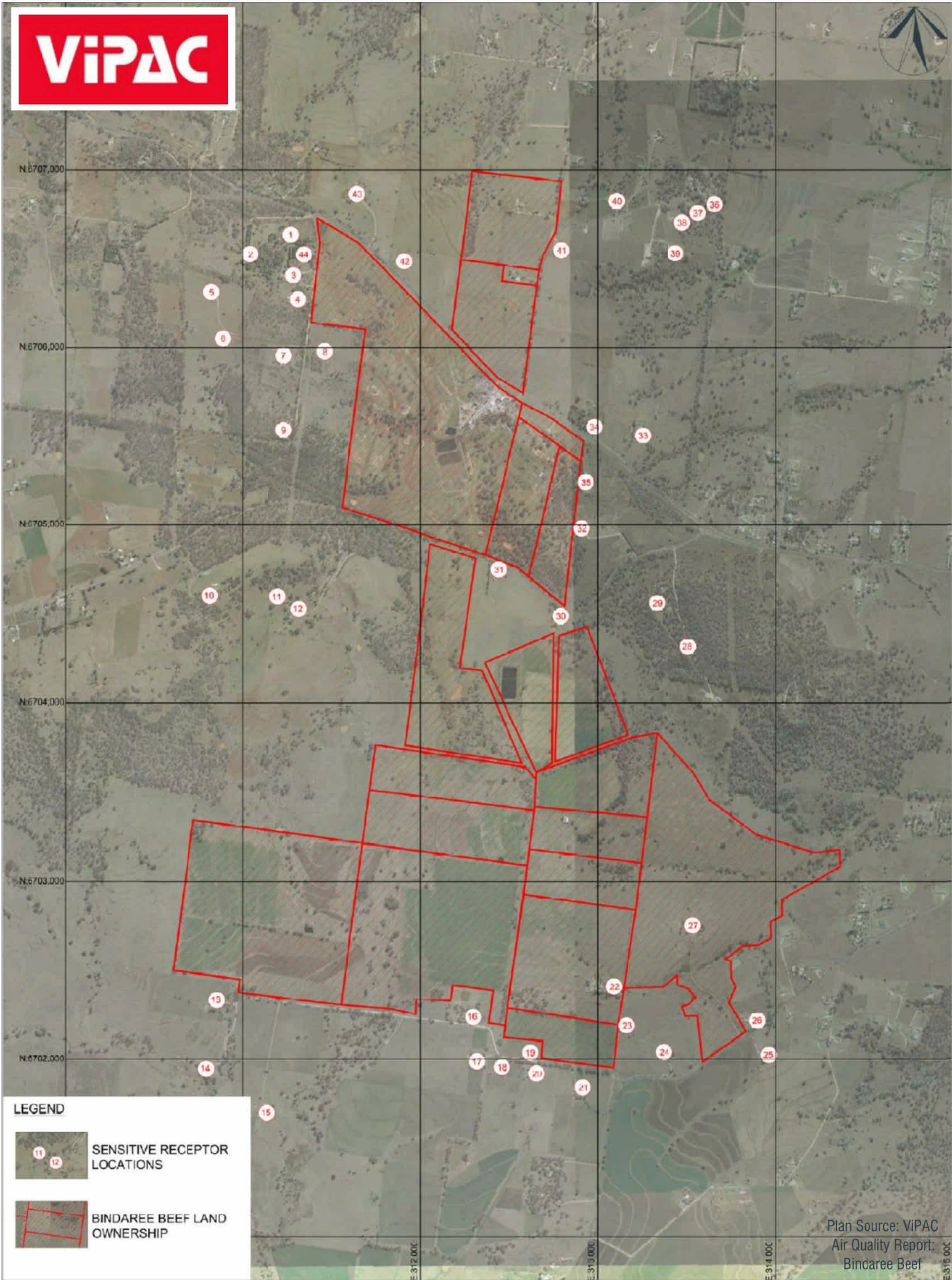


Figure 21: Air Quality and Odour Assessment Methodology and Inputs





5.4.5 Inverell Studies and Designated Buffer

In 2008 Inverell Shire Council had a desktop Odour Assessment undertaken by Collie Pty Ltd for the Bindaree Beef abattoir. The outcome of this Assessment was the designation of a 1.5 km buffer in diameter from the centre of the abattoir under the Inverell LEP 2008

Upon the introduction of the Inverell LEP 2012, the 1.5k m designated buffer was renewed. This buffer is primarily to protect the operational environment of a livestock processing industry, a stock and sale yard, a sewage treatment plant and a waste or resource management facility in Inverell.

Any development application within this buffer must take into consideration whether any development would be adversely impacted by the existing uses, thereby affecting their operational environment of the abattoir. Figure 19 shows the designated buffer map under LEP 2012

5.4.6 Existing Operations Odour Sources

Based on the site inspection undertaken by ViPAC and detailed plans for the bio-digester and rendering plants the significant odour sources were identified for the current and future operation.

The significant air emission sources that are at the existing facility are:-

- Anaerobic and secondary pond;
- Irrigation area;
- Holding pens;
- Bio-filter; and
- Rendering building.

The attributes for each of the current odour sources are shown in Table 12.

The location of these sources is shown in Figure 23.



Table 12: Current Odour Sources and their Attributes

SOURCE	TIMING	INTENSITY	CHARACTER
Rendering Building Vents	During operating hours	High	Cooking odour
Bio-filter	During operating Hours	Moderate	Musty odour
Ponds	All of the time	High	Rancid
Holding Pens	All of the time	Low	Manure
Irrigation Area	When irrigating - depending on water availability	Low	Musty odour

To quantify ambient air quality near the site, odour samples were collected using the 'lung-in-the-box' technique in accordance with the *Australian/New Zealand Standard 4323.3:2001 'Stationary Source Emissions – Part 3: Determination of Odour Concentration by Dynamic Olfactometry'*.

ViPAC took six samples on site on the 10th October 2013. Samples were taken from the following locations:-

1. Freshly irrigation Area;
2. Two samples from the bio-filter surface;
3. One sample from the feed air to the bio-filter; and
4. Two samples were taken inside the rendering building.

The samples show that the measured concentration and rate of flow of odour (flux rates) within the rendering plant are low compared to most rendering plants and that bio-filter is removing 85% of the odour.



Figure 23: Existing Significant Air Emission Sources



5.4.7 Future Operations Odour Sources

The significant future air emission sources that will result from the proposed bio-digester and rendering plants are:-

- Irrigation area;
- Bio-filter;
- Dried product (fibre);
- Trommels (green and red waste streams);
- Dissolved Air Floatation Tanks (DAF);
- Holding pens; and
- Rendering building (process emissions to bio-filter and fugitive building emissions captured and exhausted from roof vents).

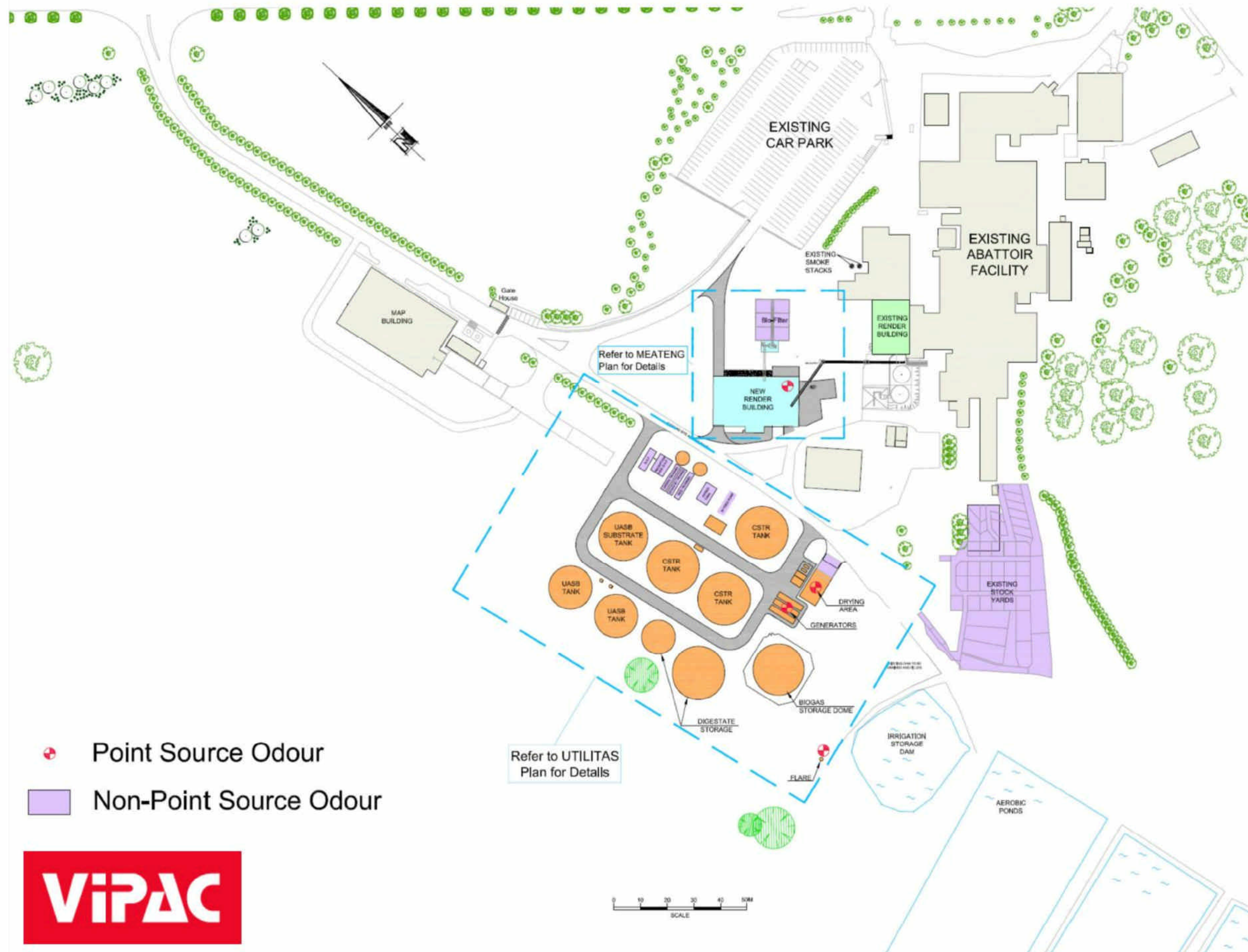
The attributes for each of the future odour sources are shown in Table 13.

The location of these sources is shown in Figure 24.



Table 13: Future Odour Sources and their Attributes

SOURCE	TIMING	INTENSITY	CHARACTER
Rendering Building Vents	During operating hours	Moderate	Cooking odour
Bio-filter	During operating Hours	Moderate	Musty odour
Holding Pens	Continuous (24 hours, seven days per week)	Low	Manure
Dried Product (fibre) in day storage	Continuous (24 hours, seven days per week)	Low	Compost
Irrigation Area	When irrigating - depending on water availability	Low	Musty odour
Trommels – Green Waste Stream	Continuous (24 hours, seven days per week)	Low	Manure
Trommels – Red Waste Stream	Continuous (24 hours, seven days per week)	Low	Blood
DAF Tanks	Continuous (24 hours, seven days per week)	Low	Sewer



Plan Source: ViPAC
Air Quality Report:
Bindaree Beef

Bindaree Beef Pty Ltd

Inverell NSW

FIGURE 24: Future
Significant Air Emission
Sources



5.4.8 Odour Impacts

Following the determination of the locations, sampling and analysis of the existing and future operations of the Bindaree Beef operations a summary of odour emission rates was produced by ViPAC

Following the determination of the locations, sampling and analysis of the existing and future operations of the Bindaree Beef operations a summary of odour emission rates was produced by ViPAC. These rates are shown in Table 14 and Table 15 below.

Table 14: Derived Odour Emission Rates – Current Operations

ODOUR SOURCE	WORKING AREAS		ODOURS			
	AREA (M ²)	VOLUME (M ³)	CONCENTRATION (OU)	UNIT RATE (OU/M ² /S)	TOTAL EMISSIONS (OU/S)	BASIS OF EMISSIONS
Irrigation Area	3,850			0.356	1,370	Onsite Measurements
Anaerobic Pond	8,400			1.10	9,240	Literature Review
Secondary Pond	8,400			0.55	4,620	Literature
Bio-filter	480			1.075	520	Onsite Measurements
Rendering Building		3,650	4,463		45,299	Onsite Measurements
Holding Pens	6,000			0.95	5,700	Literature Review
Total Emissions					66,752	



Table 15: Derived Odour Emission Rates – Future Operations

ODOUR SOURCE	WORKING AREAS		ODOURS			
	AREA (M ²)	VOLUME (M ³)	CONCENTRATION (OU)	UNIT RATE (OU/M ² /S)	TOTAL EMISSIONS (OU/S)	BASIS OF EMISSIONS
Irrigation Area	3,850			0.356	1,370	Onsite Measurements
Bio-filter	360			1.075	390	Onsite Measurements
Rotary Screen	144			1.1	158	Literature Review
Sanitary Plant	48			1.1	53	Literature Review
Rendering Building		6,280	2,232		38,920*	Onsite Measurements
Holding Pens	6,000			0.95	5,700	Literature Review
Dried Product	100			0.44	44	Literature Review
Drying Area	100			0.44	44	Literature Review
Trommel – Green Stream	45			1.62	73	Literature Review
Trommel – Red Stream	45			1.68	76	Literature Review
DAF Tank	48			1.68	81	Literature Review
DAF Reception Tank	75			1.68	126	Literature Review
Total Emissions					46,991	

* The rendering building emissions were calculated as a volume source but modelled as three point sources representing the vents in the roof of the rendering building.



Table 14 and Table 15 show that in both the existing and future operating scenarios, the rendering building is the greatest source of odour, however the new rendering building shows a 15% reduction in odour emissions. Whilst the new rendering building is over 2,500m³ larger in area, significantly improved technology:

- Stainless steel ducting with a suction fan extracting odour from each point source of individual equipment;
- Pumping of odours through a humidifier and then blown through a grid of perforated pipe into a gravel layer at the base of the bio-filter; and
- A bio-filter located to the north of the rendering plant that uses moist organic materials to absorb and biologically degrade odours. The bio-filter contains a 1-1.5 m layer of woodchips or compost mixed with gravel that captures the odours compounds which are then treated by active bacteria.

The removal of the anaerobic and secondary ponds from the future operations of the site also contribute to a significant reduction in the total odour emissions from the site.

Overall, the current operation emits 66,752 OU/s and the future operations are modelled to emit 46,991 OU/s. This represents 30% less odour than the current operations.

5.4.9 Current Operations

Based on the NSW *Assessment and management of odour from stationary sources in NSW*, the level at which an odour is perceived to be of nuisance can range from 2 OU to 10 OU depending on a combination of a number of factors including:-

- Odour quality;
- Odour intensity;
- Odour frequency, timing and duration;
- Population sensitivity;
- Background level;
- Public expectation;
- Source characteristics; and
- Health effects.



Due to the existing rural setting that Bindaree Beef is located within, the 2006 New South Wales (NSW) document *Assessment and management of odour from stationary sources in NSW* recommends that no individual be exposed to ambient odour levels greater than 7 OU.

5.4.10 Results

Anecdotal evidence is that the existing facility generally does not cause nuisance under normal operating conditions. The few recent complaints have generally been when there have been system failures. This would suggest that the facility operates within compliance of the odour objectives, but not by a large margin.

To be conservative, ViPAC have assumed that all potential odour emitting sources operate 24 hours a day, seven days a week. These emissions were simulated for every hour for five years.

Figure 25 shows the peak odour contours for the existing operation with the red shading indicating the 7 OU/m³ contour.

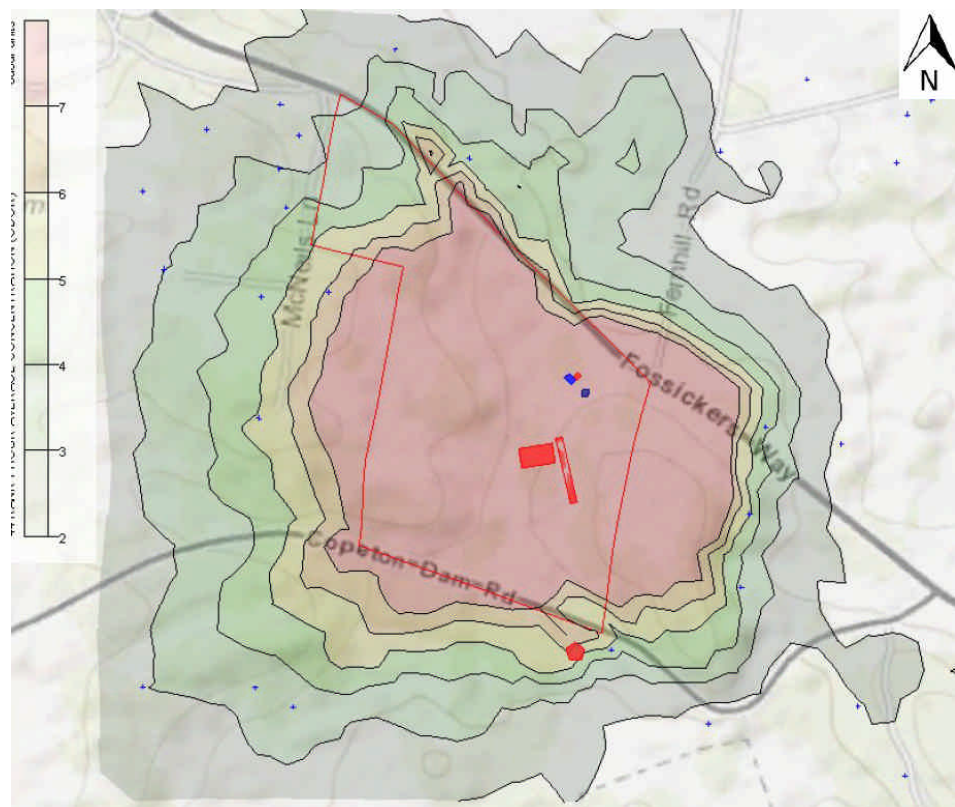


Figure 25: Peak Odour Contours for the Existing Operation [Criteria 7 OU/m³]

As shown in Figure 25 and Table 16, the modelling results indicate that two properties (sensitive receptors) are above 5 OU/m³ but below 7 OU/m³, Receptor 8 (77 McNeils Road) and Receptor 9 (118 McNeils Road).

Table 16 also shows a comparison with the future odour concentrations once the new rendering plant and bio-digester plant are in operation.



Table 16: Odour Comparison – Existing and Future Plant Operations

RECEPTOR NO	PROPERTY ADDRESS	CURRENT ODOUR CONCENTRATION	FUTURE ODOUR CONCENTRATION	DIFFERENCE
		OU/m ³	OU/m ³	OU/m ³
1	13 Blair Athol Rd	2.4	1.3	-1.0
2	37 Blair Athol Rd	2.4	1.7	-0.7
3	32 McNeils Rd	3.1	2.4	-0.7
4	42 McNeils Rd	3.7	2.6	-1.1
5	42 Wattle Hill Rd	2.5	2.1	-0.4
6	41 Wattle Hill Rd	3.0	2.3	-0.6
7	11 Wattle Hill Rd	4.6	3.6	-1.0
8	77 McNeils Rd	6.3	4.7	-1.6
9	118 McNeils Rd	5.0	3.6	-1.4
10	345 Copeton Dam Rd	2.9	1.9	-1.0
11	221 Copeton Dam Rd	3.4	2.2	-1.2
12	183 Copeton Dam Rd	3.6	2.3	-1.4
13	216 Minnamurra Rd	0.6	0.4	-0.1
14	226 Minnamurra Rd	0.5	0.3	-0.1
15	209 Minnamurra Rd	0.3	0.2	-0.1
16	98 Minnamurra Rd	0.5	0.3	-0.2
17	71 Minnamurra Rd	0.4	0.3	-0.1
18	67 Minnamurra Rd	0.4	0.3	-0.1
19	54 Minnamurra Rd	0.4	0.3	-0.1
20	55 Minnamurra Rd	0.3	0.2	-0.1
21	31 Minnamurra Rd	0.3	0.2	-0.1
22	51 Penola Lane	0.4	0.3	-0.1
23	24 Penola Lane	0.4	0.3	-0.1
24	448 Auburn Vale Rd	0.4	0.3	-0.1



RECEPTOR NO	PROPERTY ADDRESS	CURRENT ODOUR CONCENTRATION	FUTURE ODOUR CONCENTRATION	DIFFERENCE
		OU/m ³	OU/m ³	OU/m ³
25	391 Auburn Vale Rd	0.3	0.2	-0.1
26	390 Auburn Vale Rd	0.3	0.2	-0.1
27	396 Auburn Vale Rd	0.3	0.3	-0.1
28	60 Kerri Rd	1.5	1.0	-0.5
29	36 Kerri Rd	2.0	1.3	-0.7
30	95 Copeton Dam Rd	1.7	1.3	-0.4
31	143 Copeton Dam Rd	4.3	3.6	-0.8
32	7209 Gwydir H/way	4.0	2.7	-1.4
33	7186 Gwydir H/way	1.6	1.5	-0.1
34	7204 Gwydir H/way	4.4	2.9	-1.5
35	44 Copeton Dam Rd	4.7	3.1	-1.6
36	84 Ditzells Drive	0.8	0.6	-0.2
37	76 Ditzells Drive	0.9	0.7	-0.2
38	64 Ditzells Drive	1.0	0.7	-0.3
39	60 Ditzells Drive	1.1	0.7	-0.3
40	35 Ditzells Drive	1.0	0.8	-0.2
41	581 Fernhill Road	2.0	1.4	-0.6
42	7360 Gwydir Hwy	4.6	2.7	-1.9
43	7374 Gwydir Hwy	2.4	1.3	-1.0
44	McNeils Road	2.4	1.7	-0.7

The ViPAC Assessment indicate that the 7 OU/m³ contour extends to a maximum of 900 metres which correlates and is within the designated buffer under the Inverell LEP 2012.



5.4.11 Future Operations

As shown in Figure 26, the future odour impacts are significantly improved over the current impacts.

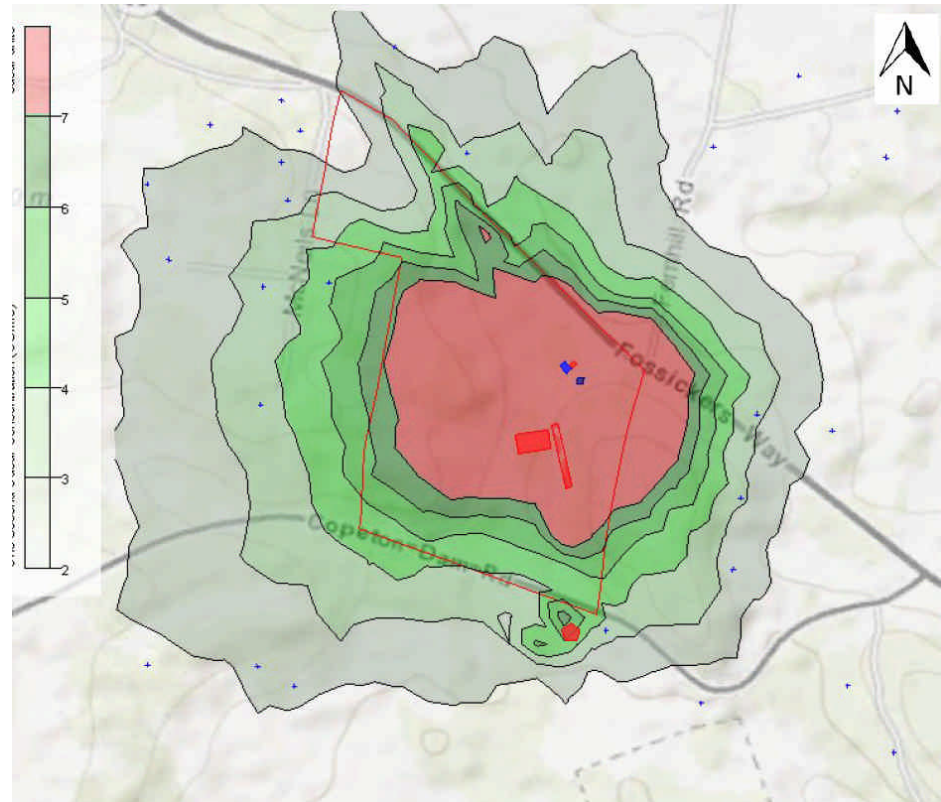


Figure 26: Peak Odour Contours for the Future Operation [Criteria 7 OU/m³]

As indicated in Table 16, under the future operations of the site, no sensitive receptors have an odour level above 5 OU/m³, with all receptors experiencing a reduction in odour concentrations. Of the 44 sensitive receptors, 10 will see at least a one (1) OU/m³ reduction with Receptor 42 (7360 Gwydir Highway) having the most reduction of 1.9 OU/m³.

ViPAC's Assessment concludes that as such no nuisance is expected from the proposed plant and in fact represents a significant improvement over the current situation



5.4.12 Dust Assessment

The Air Quality Assessment prepared by ViPAC also determined the impact of 'particulate matter' (or PM) including dust from the future operation (Section 8.2 of the ViPAC report) of the site. A copy of the ViPAC Assessment can be found in Appendix G.

Particular pollution is a complex combination of extremely small particles and liquid droplets, that includes such things as nitrates, sulfates, organic chemicals, metals, and soil or dust particles. Some particles are emitted directly from their source while others are formed in the atmosphere through chemical reactions.

Exposure to particles is a health concern because they can pass through the throat and nose and enter the lungs where they can cause respiratory and circulation problems.

PM₁₀ pollution comprises tiny particles of less than 10 micrometres (µm) in diameter. As an indicator of how small these particles are, a human hair is around 70 micrometres in diameter. Particles can be from vehicles on dirt roads and dusty industries such as mining, crushing and grinding.

The National Environment Protection Measures for Ambient Air Quality sets the PM₁₀ ambient air quality at 50 µg/m³. This level may be exceeded on a maximum of five days each year to account for extreme weather, such as dust storms which temporarily raise levels of PM₁₀ pollution.

Historical reporting on PM₁₀ for the Bindaree Beef site has not been undertaken however at the time of the site inspection in October 2013, ViPAC undertook sampling.

Due to minimal vehicle movements on site combined with mainly sealed roads, on site vehicles movements generating dust have not been modelled.

The PM₁₀ pollutants at the site is dust, primarily from the holding pen area and to a lesser extent the boiler emissions.

ViPAC determined that the highest predicted levels, including background concentrations, at the eastern boundary of the Bindaree Beef abattoir site, the boundary closest to sensitive receptors, would be a maximum concentration of 20 µg/m³, which complies with the 50 µg/m³ criterion.

ViPAC's modelling shows that the concentrations of dust at sensitive receptors are well within the 50 µg/m³ criterion and concluded that the impacts at all sensitive receptors will be negligible as shown in Figure 27.

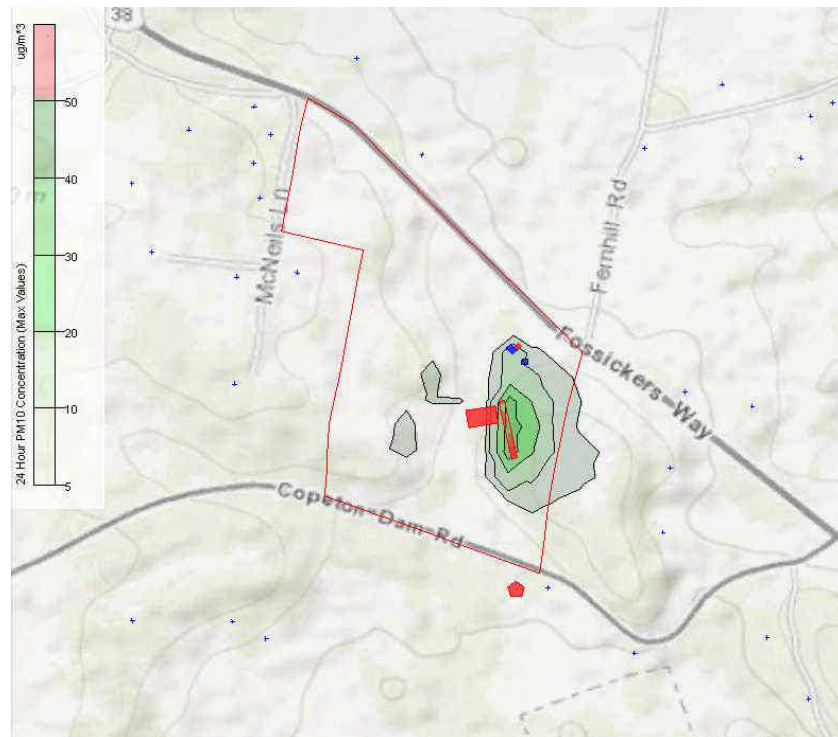


Figure 27: PM10 Contours for Future Operation Excluding Background Concentration [Criteria 50 $\mu\text{g}/\text{m}^3$]

Predictions for pollutant and toxic pollutants were also provided by ViPAC in accordance with *NSW EPA (2005) Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*. As required these pollutants included:-

- Sulfur Dioxide (SO_2);
- Nitrogen Dioxide (NO_2);
- Carbon Monoxide (CO);
- Acrolein;
- Acetone;
- 1, 3 – Butadiene; and
- Polycyclic Aromatic Hydrocarbons (PAH).

These pollutants are primarily from fuel combustion in the biogas boilers and generators.

ViPAC's predications show that the future operations on the site all fall well within the criteria set for the above pollutants



5.4.13 Cumulative Impacts

There are no other significant air emission sources in the immediate area except for passing vehicle traffic on the highway (which are only minor) and miscellaneous agricultural activities. Apart from some odour impacts from the current facility, the existing air quality at the project location is considered to be good.

The assessment undertaken by ViPAC incorporated conservative background concentrations in the modelling to account for other emission sources.

Normal natural and agricultural sources were accounted for through the selection of the conservative background concentrations. These may include localised natural and agricultural sources that, for short periods of time, contribute to the impacts such as increased dust generation and emissions from agricultural cropping or high wind speeds over cleared land.

The proposed development, with the appropriate mitigation measures in place, is not predicted to exceed the relevant criteria outlined in the NSW legislation and guidelines.

5.4.14 Mitigation Measures

The following measures will be implemented by Bindaree Beef to ensure the ongoing maintenance of acceptable odour and air quality impacts:

- Ensure the retention of the Inverell Council LEP separation buffer that protects the site from changes in land use around the site;
- Decommission the wastewater lagoons as soon as practical;
- Where practical, plant trees on the site boundary to foster an 'out of sight – out of mind' philosophy for surrounding residents;
- Implement a complaints hotline and make residents aware of it;
- Establish a complaints register containing as a minimum the following elements:
 - Complainant name and address;
 - Time and date of complaint;
 - Duration of event;
 - Name of person taking the call;
 - Description of the complaint nature (e.g., cooking odours);
- Perform daily inspections of the site to ensure no waste material is left outside the buildings; and



- Establish a maintenance protocol to ensure the bio-filter is running properly. For example, this will contain measures such as methods to ensure the moisture content of the filter media is at its optimum.

In addition to mitigating operational dust emissions, Bindaree Beef has provided measures to ensure dust emissions during construction are mitigated. It is proposed to utilise the following measures to mitigate against dust generation as a result of construction activities:

5.4.15 Construction Dust

Dust generated from within the site shall be managed to prevent degradation of air quality or nuisance to adjacent residential dwellings.

The proposed development will therefore require the implementation of dust control mitigation measures for the construction phase of the development. The requirements for the construction of the development have been considered below.

5.4.16 Construction Dust Management

Dust will potentially be a problem for the site as the peak period for deliveries will be in summer.

A dust management procedure will be implemented during the construction phase and will be communicated to all employees and contractors onsite.

Like operational dust generation, it is proposed that dust mitigation or containment performance be measured by ensuring complaints received from nearby businesses or residential areas. Ideally complaints regarding site dust generation should be maintained at less than one per week.

A number of other mitigation measures will be implemented during the site construction including:

- Limit the disturbed areas to the minimum required;
- Limit traffic on disturbed areas;
- Cover stockpiles with anchored geo-fabric where practical;
- Dust covers provided on trucks and dumpers where necessary;
- Surfaces shall be left in a rough cloddy condition to increase surface irregularity resulting in slower wind surface speed;
- Limit the removal of site groundcover to the immediate area required;
- Rehabilitate disturbed areas as soon as possible;



- Dust suppression using a watering cart and sprays.
- Where wind speed exceeds approximately 10 m/s (36 km/hr), or a watering spray/truck is not available, site activities generating dust shall cease. Site activities will resume when the Site Manager is satisfied that dust controls are operating effectively and air quality is not causing a nuisance.

In the event that dust control is unsatisfactory then some of the following measures may be utilised:

- Inspect existing controls and clean, upgrade or improve as required;
- Open weave barrier fencing is to be provided on the windward side perpendicular to the prevailing wind direction in accordance with the Landcom '*Managing Urban Stormwater: Soils and Construction*' guideline (2004);
- Disturbed areas are to be covered with geotextile fabric;
- Temporary access, haul roads, and parking areas, shall be sealed with a gravel layer;
- Construction activities to stop, the disturbed areas stabilised and the dust control measures reviewed.

The Site Manager is responsible for visually monitoring air quality and the adequacies of dust control measures at least daily, and as required to ensure that the above requirements are satisfied. In the event of unsatisfactory dust control as indicated by excessive complaints, the Site Manager is responsible for initiating a review of the dust management procedure and dust monitoring as required.



5.4.17 Conclusion

The proposed new rendering plant and bio-digester plant will see a positive impact on odour emissions from the Bindaree Beef abattoir site.

The current main sources of emissions from the site are the coal fired boiler, anaerobic and aerobic lagoons and fugitive releases from the existing rendering building, bio-filter and holding pens.

The most significant reduction in odour emissions will be with the replacement of the rendering plant. This is due to significantly improved technology that includes point source extraction fans that pump the odour through a humidifier and then into a new bio-filter.

All forty four sensitive receptors surrounding Bindaree Beef will enjoy a reduction in odour impacts and in particular Receptor 42 (7360 Gwydir Highway) and Receptor 8 (77 McNeils Road) receiving the biggest reductions of 1.9 and 1.6 odour units respectively

Dust and combustion emissions will remain a non-issue on the site with predictions for all pollutant and toxic pollution concentrations being well under the *NSW EPA (2005) Approved Methods for the Modelling and Assessment of Air Pollutants in NSW*.

Overall, ViPAC's Assessment has shown that the proposed development will have a positive impact on the air quality of the surrounding area.



5.5 Noise

5.5.1 Introduction

One of the issues identified through the community consultation process was the impact of noise. Though not listed as the major concern, it nevertheless requires assessment for the current abattoir operation and the proposed and bio-digester plant and rendering plant.

Section 6.0 details the preliminary neighbour landowner and community consultation process undertaken in November 2013 where the matter of potential noise impacts was raised as a concern. The Armidale branch of the EPA have advised that no complaints have been received regarding noise pollution from the site.

The purpose of the Noise Assessment is to evaluate the potential impacts of noise generated from various activities associated with the bio-digester plant and to provide recommendations to mitigate and minimise any potential impacts that might have an effect on the surrounding community.

The DGRs requires the assessment of a number of specific matters to be addressed. In regards to noise, the following is stated:

- Noise – including:
 - A quantitative assessment of potential construction, operational, and transport noise impacts, including potential impacts on nearby sensitive receivers; and
 - Details of the proposed noise management and monitoring measures.

Attachment 1 of the DGRs refers to guidelines that may assist in the preparation of the EIS. A statement that the list is not exhaustive and not all of the guidelines may be relevant to the proposal. For noise, the following technical documents are listed:

- NSW Industrial Noise Policy (DECC)
- NSW Road Noise Policy (EPA)
- Environmental Noise Control Manual (DECC)

ViPAC Engineers and Scientists Ltd (ViPAC) were engaged to undertake a noise impact assessment and to prepare a report on their assessment.



The report was required to assess the noise levels from the existing plant and to determine the noise levels expected to be generated once the new plants were operational. The assessment was required to undertake this assessment using approved methodologies and software in accordance to the NSW legislation and guidelines. It was also required to provide recommendations to mitigate and minimise any potential impacts that might have an effect on the surrounding community.

A copy of the report can be found in Appendix H.

5.5.2 Existing Environment

Comprehensive noise modelling and assessment has been undertaken with noise measurements undertaken at the existing abattoir site on the 10th and 18th October 2013 by ViPAC. These measurements along with information from ViPAC's own database of onsite measurements from previous projects, the Australian Standards AS 2436 (2010) *'Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Site'* and British Standards BS 5228:1 (2009) *'Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise'* have all been considered as part of the Noise Assessment.

The existing noise environment was determined through ambient noise monitoring between 10th October and 18th October 2013 at three representative locations close to the existing abattoir plant. These locations were determined in consultation with Bindaree Beef and were selected on the basis of proximity to the facility, dominant wind direction and all traffic noise influences (not just Bindaree Beef) in the vicinity of the closest sensitive receptors.

Figure 28 shows the noise monitoring locations.

Monitoring location 1 is within the property boundary of a property owned by Bindaree Beef and is the closest property east of the existing plant. This monitoring location is approximately 280m south east from the plant.

Monitoring location 2 is at the fence line adjacent to sensitive receptor 31 (143 Copeton Dam Road) and represents the closest property south of the existing plant. This monitoring location is approximately 800m south of the plant.

Monitoring location 3 is at the fence line of McNeil's Lane and is representative of the closest properties west of the existing plant. This monitoring location is approximately 1km west of the plant.



Image Source: Google Earth

Figure 28: Noise Monitoring Locations



Image Source: Google 2014

Figure 29: Existing Noise Source Locations



5.5.3 Local Meteorology

Noise propagation over long distances can be significantly affected by the weather conditions, mainly source-to-receiver winds and temperature inversions as both these conditions can enhance noise levels at sensitive receivers.

An assessment of the metrological data was conducted to ascertain the metrological conditions surrounding the Bindaree Beef site. A site specific annual wind rose for 2002-2006 was modelled by ViPAC which determined that the dominant wind directions at the site are East-North-East and North-East with the most common wind speed being 5-8 metres per second.

The other weather condition that can significantly affect noise propagation is that of temperature inversion. A temperature inversion is a situation where a layer of warmer air overlies a layer of cool air at the surface of the Earth. Under normal conditions air temperature usually decreases with height. Under conditions of a temperature inversion, sound waves will be refracted downwards, and therefore may be heard over large distances.

To determine the frequency of inversion, the weather conditions at Bindaree Beef were obtained from The Air Pollution Model (TAPM), which is a three dimensional prognostic model developed by and verified by the Commonwealth Scientific and Industrial Research (CSIRO).

The TAPM generated meteorology determined the frequency of temperature inversions occur generally more than 30% of the night-time hours during the winter months and therefore inversions are considered for prevailing and worst case conditions for the noise predictions.

5.5.4 Methodology

Figure 30 below provides a flow chart representation of the main stages and inputs required as part of the Noise Assessment undertaken by ViPAC.

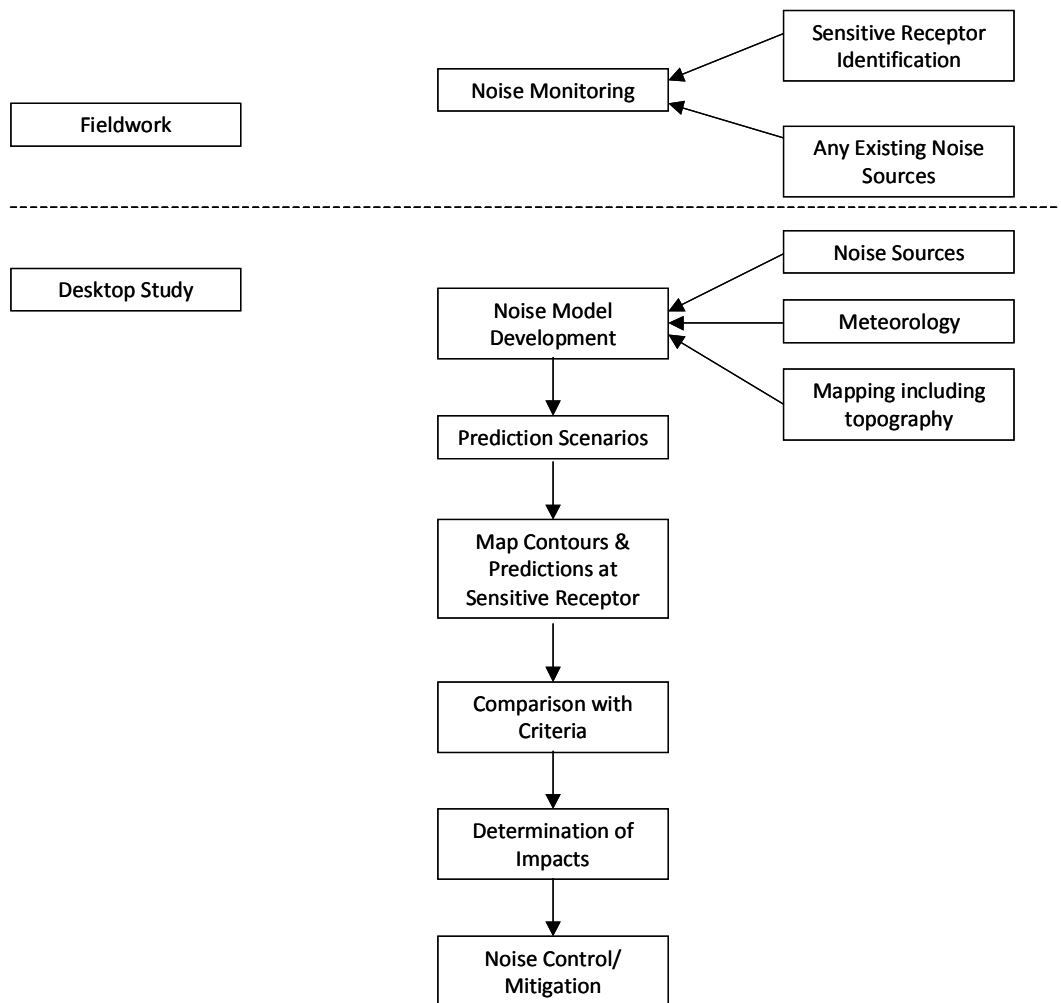
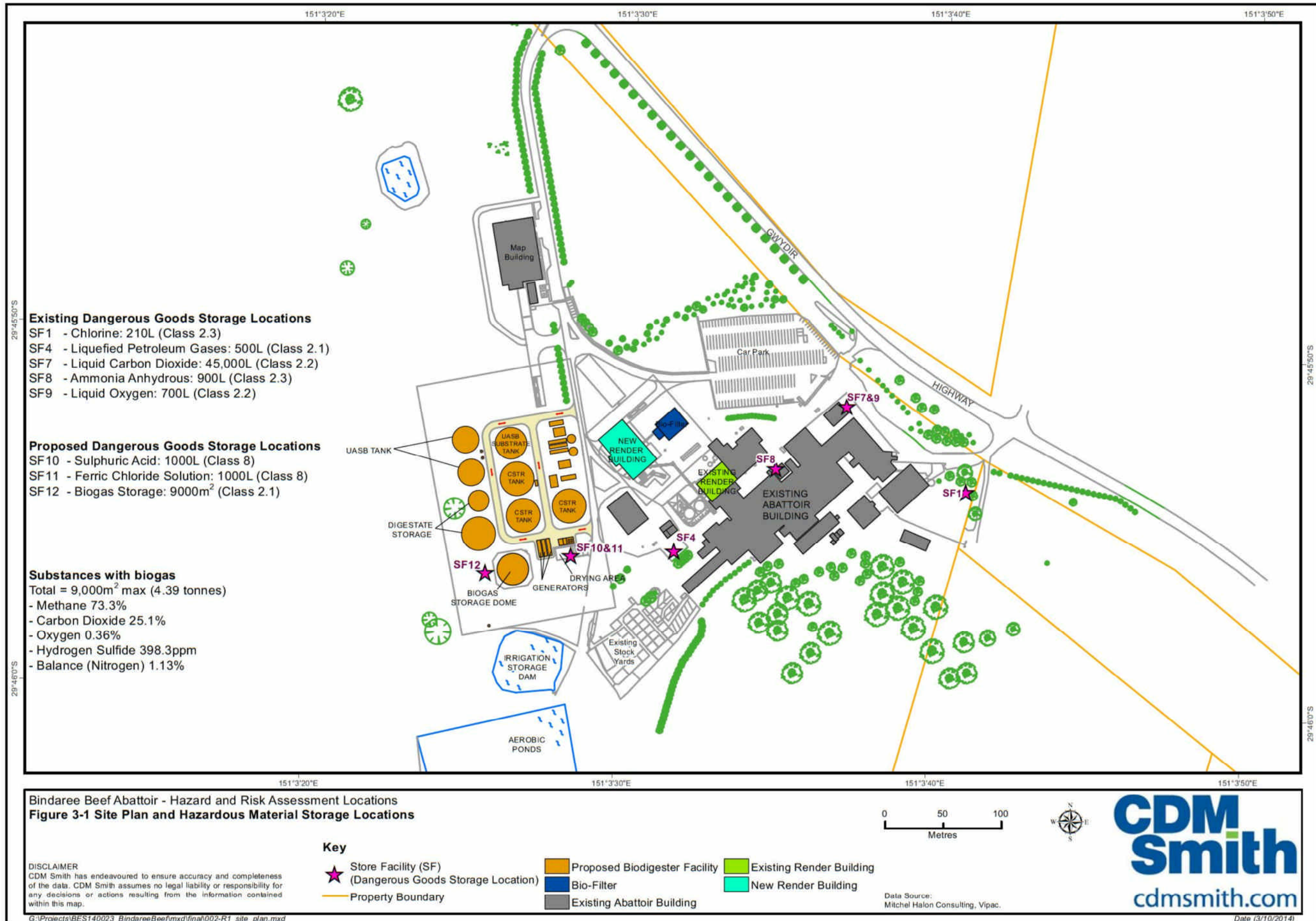


Figure 30: Noise Assessment Methodology and Inputs

As part of the Noise Assessment, the prediction of noise emissions in the environment requires the definition of each noise source. The potential noise propagation is calculated for a number of environmental parameters:

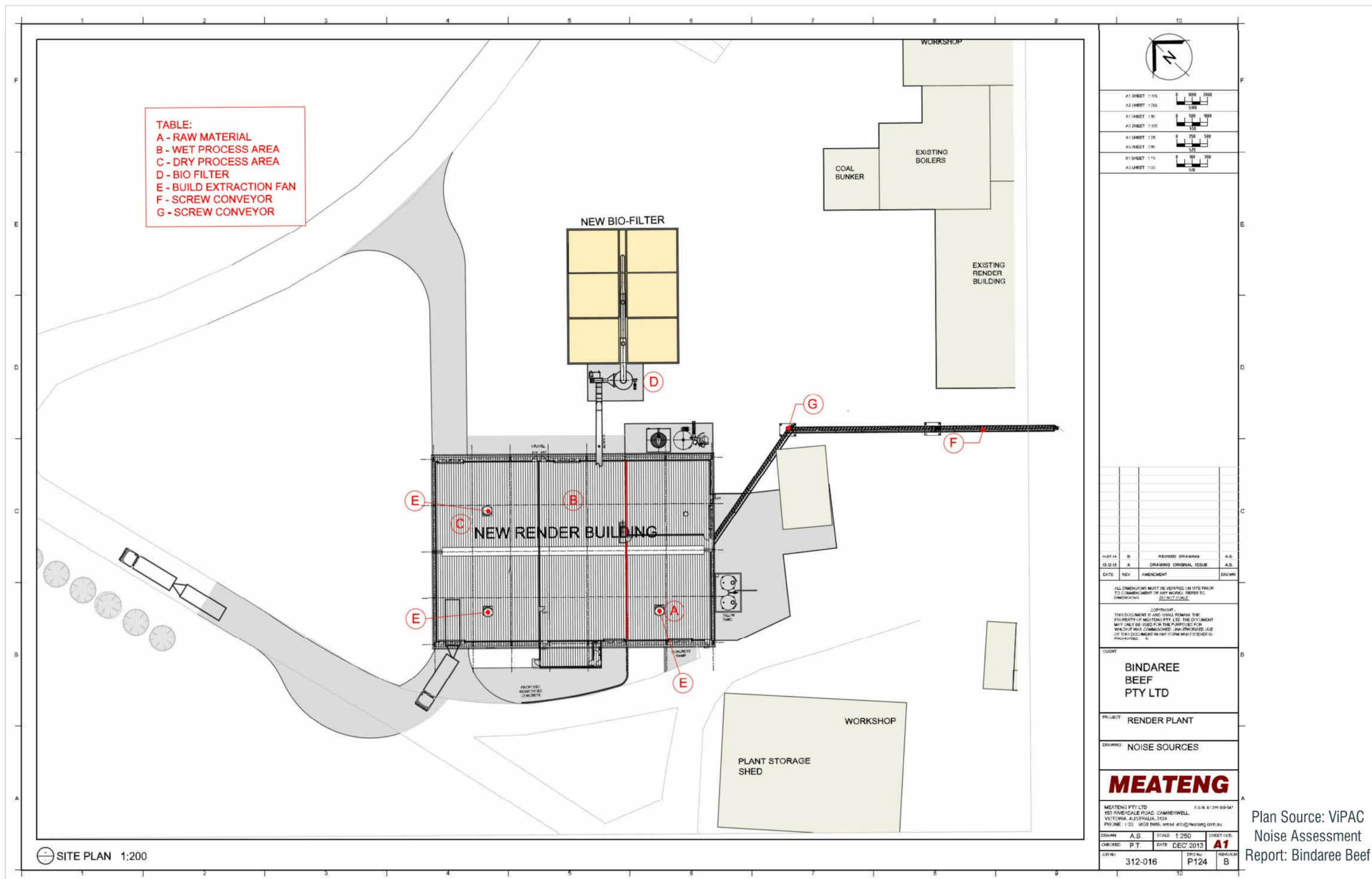
- Geometric spreading; this refers to the distribution of the acoustic energy over a large area as the distance from the noise source increases, resulting in a noise reduction.
- Obstacles; such as enclosures, barriers, and buildings;
- Meteorological conditions; such as air absorption, wind effects and temperature gradient effects; and
- Ground effects; such as the sound absorption of the terrain.

SoundPLAN noise modelling software was used for this analysis which is approved for NSW for noise prediction purposes.



Plan Source: CDM
 Smith: Bindaree Beef
 SEPP 33 Hazard and
 Risk Assessment
 Report

**FIGURE 30: Existing &
 Proposed Hazardous
 Material Storage
 Locations**



Plan Source: ViPAC
Noise Assessment
Report: Bindaree Beef



5.5.5 Modelling Scenarios

In order to determine the impact of the new facility at the nearest sensitive receptors, the existing noise environment from the plant at each receptor needs to be modelled and validated against noise monitoring data. The following scenarios were modelled:

- Existing operations of the plant as determined by a site visit on 10th October 2013. This scenario is also considered representative of current background noise levels as measured at the noise monitoring locations;
- Construction activities undertaken during the construction of the proposed plant. The construction activities will be carried out during the current operations but will be temporary in duration; and
- Future operations of the plant.

5.5.5.1 Noise Sources

The significant operational noise sources used for Noise Assessment were identified. The noise sources have been obtained from:

- Noise measurements undertaken at the Bindaree Beef site on the 10th October and 18th October 2013;
- ViPAC's own database of onsite measurements during previous projects;
- Australian Standard AS 2436 (2010) '*Guide to Noise and Vibration Control on Construction, Demolition and Maintenance Site*'; and
- British Standard BS 5228:1 (2009) '*Code of Practice for Noise and Vibration Control on Construction and Open Sites – Part 1: Noise*'.

Examples of existing noise sources on the site range from exhaust fans, pumps, boiler fan, conveyors, cooker extraction fans, cattle truck unloading, forklifts and irrigation pumps.

Future noise sources relating to the new rendering plant and bio-digester plant include:

- Shredder contained within the raw materials receival area;
- Hammer mill within the wet process area;
- Shaker screen within the dry process area;
- Building extraction fans;
- Screw conveyor; and



- Pumps and generators.

In order to present a worst-case scenario, all pumps, fans and generators associated with the bio-digester have been modelled as operating 24 hours per day. Each generator will be enclosed and the noise level at 1 m will be 60 dB(A).

5.5.6 Regulatory Framework

As previously discussed in Section 5.5.1, the DGRs referenced guidelines that may be applicable. The following have been identified as being the relevant noise and vibration criteria for this project:

- *Industrial Noise Policy* (INP) (published in 2000);
- *Interim Construction Noise Guidelines* (published in 2009);
- *Environmental Criteria for Road Traffic Noise* (published in 1999); and
- *Assessing Vibration: A Technical Guideline* (published by DEC in 2006).

Due to the nature of the proposed development, vibration is not considered to be an issue and no assessment is necessary.

5.5.6.1 Industrial Noise Policy 2000

In accordance with the Industrial Noise Policy (INP) (DECC 2000), a Rating Background Level (RBL) was determined for the areas surrounding Bindaree Beef, to form the basis of the assessment of noise impacts associated with the Project.

The INP defines background noise level as:

“the underlying level of noise present in ambient noise when all unusual extraneous noise is removed.”

Additionally, the INP states that:-

“sound levels contributing to background levels can include some from nearby traffic, birds, insects, animals, machinery and similar sources if these sounds are a normal feature of the location”.

No change to this shift work pattern will occur with the development of the new rendering plant and new bio-digester plant.

When determining the monitoring locations, the audibility of the existing plant was minimal above the ambient noise environment and is not considered to be dominant nor intrusive in noise level or character.



Table 17 represents the operational project specific criteria based on the noise monitoring for the site including the determined appropriate noise criteria for each sensitive receptor during the day and night time period.

Table 17: Determining Operational Project Specific Criteria based on Noise Monitoring

RECEPTOR	TIME OF DAY	EXISTING NOISE LEVEL		OPERATIONAL NOISE GOALS			
		L _{Aeq}	RBL	AMENITY CRITERIA (L _{Aeq})	INTRUSIVENESS CRITERIA (L _{Aeq})	INP PROJECT LEVEL (L _{Aeq})	SLEEP DISTURBANCE (RBL + 15 dB(A))
Location 1	Day	54	44	44	49	44	-
	Evening	52	39	42	44	42	-
	Night	51	36	41	41	41	51
Location 2	Day	50	41	42	46	42	-
	Evening	49	38	39	43	39	-
	Night	45	33	35	38	35	48
Location 3	Day	45	39	48	44	44	-
	Evening	41	31	43	36	36	-
	Night	44	34	34	39	34	49

5.5.7 Sensitive Receptors

Bindaree Beef is largely surrounded by rural land with a number of smaller rural holdings to the western side of the subject property on McNeils Lane and Wattle Hill Road. Forty-four sensitive receptors were identified, the majority of which are residential premises.

Figure 22 shows the sensitive receptors. The figure groups or classifies the receptors into groups and assigns the representative monitoring location to each group.



5.5.8 Noise Assessment Findings

In order to assess the impacts of the existing and future operations of the abattoir, three meteorological conditions were used in the model, neutral conditions (occur between 45-51% of annual hours), prevailing conditions (occur between 27-34% of night time hours during the winter season and 11-13% during annual hours) and worst case conditions (occur infrequently). These metrological conditions were determined from the analysis of the weather.

The following scenarios were modelled for daytime and night time periods:

- Existing Environment (night time predictions – 22:00-07:00 hours):
 - Ambient Noise ($L_{Aeq,T}$) for neutral, prevailing and worst-case weather conditions; and
 - Maximum Noise ($L_{AMax,T}$) for neutral, prevailing and worst-case weather conditions.
- Existing Environment and Construction Phase (daytime predictions – 07:00-18:00 hours):
 - Ambient Noise ($L_{Aeq,T}$) for neutral, prevailing and worst-case weather conditions; and
 - Maximum Noise ($L_{AMax,T}$) for neutral, prevailing and worst-case weather conditions.
- Future Environment (night time predictions – 22:00-07:00 hours):
 - Ambient Noise ($L_{Aeq,T}$) for neutral, prevailing and worst-case weather conditions; and
 - Maximum Noise ($L_{AMax,T}$) for neutral, prevailing and worst-case weather conditions.

5.5.8.1 Scenario 1 – Existing Plant Operation

The noise sources modelled were measured at Bindaree Beef in October 2013 during the day time shift under normal operating conditions. The noise sources were modelled to represent realistic conditions of cattle deliveries during a typical day as discussed with staff at Bindaree Beef. All plant except cattle deliveries have been modelled as constant noise sources. The cattle deliveries have been modelled mainly during the early evening and night time periods with three deliveries (B-double truck) per hour.

The predicted night time noise levels ($L_{Aeq, 22:00-07:00 \text{ hours}}$) can be reviewed in the ViPAC Noise Assessment Report contained in Appendix H.



The results identify that the highest noise level will be 33 dB(A) at 77 McNeils Lane during worst-case meteorological weather conditions. The night-time noise level at this receptor have been determined to be 34 dB.

A review of the data identifies that the difference in noise levels between the neutral weather conditions and the prevailing conditions is up to 6 dB(A) increase depending on the receptor distance from the source and topographical features between source and receptor.

The predicted L_{Amax} , 22:00-07:00 hours noise levels can be reviewed in the ViPAC Noise Assessment Report contained in Appendix H (Table 6.2).

The results identify that the maximum noise levels comply with the sleep disturbance criteria for each meteorological condition at all sensitive receptors. The highest predicted noise level is 38 dB(A) at two receptors, 77 McNeils Lane and 7360 Gwydir Highway, the high level at 7360 Gwydir Highway is a result of the road noise from the cattle deliveries during the night time period.

When the predicted L_{Aeq} noise levels are compared to the noise monitoring results, the levels are considerably lower than the L_{Amax} for the same period. This provides assurance that whilst the plant operations were audible during the site visit at the Monitoring Location 3, the noise was not very distinguishable as noise emanating from Bindaree Beef.

5.5.8.2 Scenario 2 – Existing Plant Operation and Construction Activities

Scenario 2 includes the noise sources modelled in Scenario 1 (existing operations at Bindaree Beef) and construction activities during the daytime (07:00-18:00 hours). The noise predictions for Scenario 2 will be the same as Scenario 1 during the night time period.

The recommended noise management level ($L_{Aeq,15 \text{ minute}}$) for standard construction hours (07:00-18:00) is the noise affected RBL + 10 decibels. This represents the point above which there may be strong community reaction to noise.

The RBL + 10 decibels criterion has also been adopted for the maximum noise level. As such, the $L_{Aeq,15 \text{ minute}}$ criterion as determined by the Industrial Noise Policy has been used to assess maximum noise levels.

The predicted daytime noise levels comply with the relevant criteria at all sensitive receptors. The results identify that the highest noise level will be 42 dB(A) at 7360 Gwydir Highway during worst-case meteorological weather conditions, which complies with the 54 dB(A) criteria during the construction phase.



Furthermore, a review of the data identifies that the difference in noise levels between the neutral weather conditions and the prevailing conditions is 4-5 dB(A) increase depending on the receptor.

The predicted (L_{Amax} , 07:00-18:00 hours) noise levels can be reviewed in the ViPAC Noise Assessment Report contained in Appendix H (Table 6.3).

The highest predicted noise level is 54 dB(A) at 7360 Gwydir Highway. The high level can be attributed to road noise from vehicle movements associated with Bindaree Beef operations during the daytime period. When the predicted L_{Amax} noise levels are compared to the noise monitoring results, the levels are up to 16 dB(A) higher than the L_{Aeq} , 15 minute for the same period.

The results identify that the L_{Amax} and L_{Aeq} noise levels comply with the criterion of RBL +10 dB under all meteorological conditions.

5.5.8.3 Scenario 3 – Future Operations

The future noise sources and their locations are identified in Figure 29.

The future noise sources were modelled for the operating hours of the plant and included some existing noise sources, specifically forklift and truck movements, dam pump, town water pump house, irrigation pump, manure store and cattle unloading activities.

As with the existing scenario, cattle deliveries were modelled to represent realistic conditions during a typical day as discussed with staff at Bindaree Beef. All plant except cattle deliveries have been modelled as constant noise sources. The cattle deliveries have been modelled mainly during the early evening and night time periods with three deliveries (B-double truck) per hour.

The difference between the night time noise levels for the predicted existing and predicted operational scenarios are reproduced here from the noise report as Table 18 for L_{Aeq} , 22:00-07:00 hours and as Table 19 for L_{Amax} , 22:00-07:00 hours.



Table 18: Noise Comparison – Existing and Future Plant Operations (L_{Aeq})

RECEPTOR ID	NIGHT TIME CRITERIA	EXISTING PREDICTED NOISE LEVEL (dB) L _{Aeq,22:00-07:00} hours			FUTURE PLANT PREDICTED NOISE LEVEL (dB) L _{Aeq,22:00-07:00} hours			CHANGE IN NOISE LEVEL (dB) L _{Aeq,22:00-07:00} hours		
		NEUTRAL	PREVAILING	WORST CASE	NEUTRAL	PREVAILING	WORST CASE	NEUTRAL	PREVAILING	WORST CASE
	L _{Aeq}									
1 – 13 Blair Athol Road	41	21	27	27	22	28	28	+1	+1	+2
2 – 37 Blair Athol Road	34	20	25	25	20	25	27	0	0	+2
3 – 32 McNeils Road	34	23	28	29	24	29	30	+1	+1	+1
4 – 42 McNeils Road	34	23	28	28	23	28	29	0	0	+1
5 – 42 Wattle Hill Road	34	18	23	24	19	25	26	+1	+2	+2
6 – 41 Wattle Hill Road	34	20	25	26	17	22	23	-3	-3	-3
7 – 11 Wattle Hill Road	34	23	28	29	21	26	27	-2	-2	-2
8 – 77 McNeils Road	34	27	32	33	24	28	29	-3	-4	-4
9 – 118 McNeils Road	34	26	31	32	19	24	25	-7	-7	-7
10 – 345 Copeton Dam Rd	35	19	24	25	11	17	18	-8	-7	-7
11 – 221 Copeton Dam Rd	35	16	21	22	6	11	12	-10	-10	-10
12 – 183 Copeton Dam Rd	35	18	23	24	13	18	19	-5	-5	-5
13 – 216 Minamurra Road	35	0	3	3	0	6	5	0	+3	+2



RECEPTOR ID	NIGHT TIME CRITERIA	EXISTING PREDICTED NOISE LEVEL (dB) L _{Aeq,22:00-07:00} hours			FUTURE PLANT PREDICTED NOISE LEVEL (dB) L _{Aeq,22:00-07:00} hours			CHANGE IN NOISE LEVEL (dB) L _{Aeq,22:00-07:00} hours		
		NEUTRAL	PREVAILING	WORST CASE	NEUTRAL	PREVAILING	WORST CASE	NEUTRAL	PREVAILING	WORST CASE
	L _{Aeq}									
14 – 226 Minamurra Road	35	0	2	1	0	4	4	0	+2	+3
15 – 209 Minamurra Road	35	0	0	0	0	4	3	0	+4	+3
16 – 98 Minamurra Road	35	0	5	5	1	8	7	+1	+3	+2
17 – 71 Minamurra Road	35	0	4	4	0	7	6	0	+3	+2
18 – 67 Minamurra Road	35	0	4	4	0	7	6	0	+3	+2
19 – 54 Minamurra Road	35	0	5	4	0	7	6	0	+2	+2
20 – 55 Minamurra Road	35	0	4	3	0	7	6	0	+3	+3
21 – 31 Minamurra Road	35	0	3	2	0	6	5	0	+3	+3
22 – 51 Penola Lane	35	0	5	5	1	8	7	+1	+3	+2
23 – 24 Penola Lane	35	0	4	4	0	7	6	0	+3	+2
24 – 448 Auburn Vale Road	35	0	3	2	0	6	5	0	+3	+3
25 – 391 Auburn Vale Road	35	0	2	2	0	5	4	0	+3	+2



RECEPTOR ID	NIGHT TIME CRITERIA	EXISTING PREDICTED NOISE LEVEL (dB) L _{Aeq,22:00-07:00} hours			FUTURE PLANT PREDICTED NOISE LEVEL (dB) L _{Aeq,22:00-07:00} hours			CHANGE IN NOISE LEVEL (dB) L _{Aeq,22:00-07:00} hours		
		NEUTRAL	PREVAILING	WORST CASE	NEUTRAL	PREVAILING	WORST CASE	NEUTRAL	PREVAILING	WORST CASE
	L _{Aeq}									
26 – 390 Auburn Vale Road	35	0	3	2	0	5	4	0	+2	+2
27 – 396 Auburn Vale Road	35	0	6	5	0	7	7	0	+1	+2
28 – 60 Kerri Road	35	9	15	15	12	18	18	+3	+3	+3
29 – 36 Kerri Road	35	11	16	17	12	17	18	+1	+1	+1
30 – 95 Copeton Dam Road	35	6	12	13	7	12	13	+1	0	0
31 – 143 Copeton Dam Rd	35	11	16	17	13	18	19	+2	+2	+2
32 – 7209 Gwydir Hwy	35	12	17	18	10	14	15	+2	+3	+3
33 – 7186 Gwydir Hwy	41	15	20	21	17	21	22	+2	+1	+1
34 – 7204 Gwydir Hwy	41	22	27	28	24	27	28	+2	0	0
35 – 44 Copeton Dam Road	41	13	18	19	12	16	17	+1	+2	+2
36 – 84 Ditzells Drive	35	11	16	17	19	25	26	+8	+9	+9
37 – 76 Ditzells Drive	35	12	17	18	20	26	27	+8	+9	+9



RECEPTOR ID	NIGHT TIME CRITERIA	EXISTING PREDICTED NOISE LEVEL (dB) L _{Aeq,22:00-07:00} hours			FUTURE PLANT PREDICTED NOISE LEVEL (dB) L _{Aeq,22:00-07:00} hours			CHANGE IN NOISE LEVEL (dB) L _{Aeq,22:00-07:00} hours		
	L _{Aeq}	NEUTRAL	PREVAILING	WORST CASE	NEUTRAL	PREVAILING	WORST CASE	NEUTRAL	PREVAILING	WORST CASE
38 – 64 Ditzells Drive	35	14	20	20	22	27	28	+8	+7	+8
39 – 60 Ditzells Drive	35	14	19	20	23	28	29	+9	+9	+9
40 – 35 Ditzells Drive	35	17	22	23	23	28	29	+6	+6	+6
41 – 581 Fernhill Road	35	20	25	26	27	32	33	+7	+7	+7
42 – 7360 Gwydir Hwy	41	26	31	32	28	32	34	+2	+1	+2
43 – 7374 Gwydir Hwy	41	21	26	27	23	28	29	+2	+2	+2
44 – McNeils Road	41	23	28	29	24	29	30	+1	+1	+1

Adapted from Table 6.1 and Table 6.5, ViPAC noise assessment report, 2014 (Refer to Appendix H).



Table 19: Noise Comparison – Existing and Future Plant Operations (L_{Amax})

RECEPTOR ID	NIGHT TIME CRITERIA L_{Aeq}	EXISTING PREDICTED NOISE LEVEL (dB) $L_{Amax,2200-07:00}$ hours			FUTURE PLANT PREDICTED NOISE LEVEL (dB) $L_{Amax,2200-07:00}$ hours			CHANGE IN NOISE LEVEL (dB) $L_{Amax,2200-07:00}$ hours		
		NEUTRAL	PREVAILING	WORST CASE	NEUTRAL	PREVAILING	WORST CASE	NEUTRAL	PREVAILING	WORST CASE
1 – 13 Blair Athol Road	51	26	31	32	26	31	32	0	0	0
2 – 37 Blair Athol Road	49	24	29	29	24	29	29	0	0	0
3 – 32 McNeils Road	49	28	33	33	28	33	33	0	0	0
4 – 42 McNeils Road	49	28	33	33	28	33	33	0	0	0
5 – 42 Wattle Hill Road	49	23	28	29	23	28	29	0	0	0
6 – 41 Wattle Hill Road	49	26	31	31	26	31	31	0	0	0
7 – 11 Wattle Hill Road	49	29	34	34	29	34	34	0	0	0
8 – 77 McNeils Road	49	33	37	38	33	37	38	0	0	0
9 – 118 McNeils Road	49	30	35	35	30	35	35	0	0	0
10 – 345 Copeton Dam Rd	48	22	27	28	22	27	28	0	0	0
11 – 221 Copeton Dam Rd	48	20	25	26	20	25	26	0	0	0
12 – 183 Copeton Dam Rd	48	23	28	29	18	23	23	-5	-5	-6
13 – 216 Minamurra Road	48	2	8	8	2	8	8	0	0	0



RECEPTOR ID	NIGHT TIME CRITERIA	EXISTING PREDICTED NOISE LEVEL (dB)			FUTURE PLANT PREDICTED NOISE LEVEL (dB)			CHANGE IN NOISE LEVEL (dB)		
		L _{Amax} 2200-07:00hours			L _{Amax} 22:00-07:00hours			L _{Amax} 22:00-07:00hours		
	L _{Aeq}	NEUTRAL	PREVAILING	WORST CASE	NEUTRAL	PREVAILING	WORST CASE	NEUTRAL	PREVAILING	WORST CASE
14 – 226 Minamurra Road	48	0	7	6	0	7	6	0	0	0
15 – 209 Minamurra Road	48	0	6	5	0	6	5	0	0	0
16 – 98 Minamurra Road	48	4	10	10	4	10	10	0	0	0
17 – 71 Minamurra Road	48	3	9	9	3	9	9	0	0	0
18 – 67 Minamurra Road	48	3	9	9	3	9	9	0	0	0
19 – 54 Minamurra Road	48	3	10	9	3	10	9	0	0	0
20 – 55 Minamurra Road	48	3	10	9	3	10	9	0	0	0
21 – 31 Minamurra Road	48	2	8	7	2	8	7	0	0	0
22 – 51 Penola Lane	48	5	11	10	5	11	10	0	0	0
23 – 24 Penola Lane	48	3	10	9	3	10	9	0	0	0
24 – 448 Auburn Vale Road	48	3	10	9	3	10	9	0	0	0
25 – 391 Auburn Vale Road	48	7	13	13	7	13	13	0	0	0
26 – 390Auburn Vale Road	48	6	13	12	6	13	12	0	0	0



RECEPTOR ID	NIGHT TIME CRITERIA L_{Aeq}	EXISTING PREDICTED NOISE LEVEL (dB) $L_{Amax,2200-07:00}hours$			FUTURE PLANT PREDICTED NOISE LEVEL (dB) $L_{Amax,2200-07:00}hours$			CHANGE IN NOISE LEVEL (dB) $L_{Amax,2200-07:00}hours$		
		NEUTRAL	PREVAILING	WORST CASE	NEUTRAL	PREVAILING	WORST CASE	NEUTRAL	PREVAILING	WORST CASE
27 – 396 Auburn Vale Road	48	7	13	12	7	13	12	0	0	0
28 – 60 Kerri Road	48	22	27	28	22	27	28	0	0	0
29 – 36 Kerri Road	48	25	29	30	25	29	30	0	0	0
30 – 95 Copeton Dam Road	48	17	22	23	17	22	23	0	0	0
31 – 143 Copeton Dam Rd	48	23	28	28	23	28	28	0	0	0
32 – 7209 Gwydir Hwy	48	19	23	24	19	23	24	0	0	0
33 – 7186 Gwydir Hwy	51	18	22	23	18	22	23	0	0	0
34 – 7204 Gwydir Hwy	51	22	26	26	22	26	26	0	0	0
35 – 44 Copeton Dam Road	51	17	21	22	17	21	22	0	0	0
36 – 84 Ditzells Drive	48	22	28	28	22	28	28	0	0	0
37 – 76 Ditzells Drive	48	23	28	29	23	28	29	0	0	0
38 – 64 Ditzells Drive	48	25	30	30	25	30	30	0	0	0



RECEPTOR ID	NIGHT TIME CRITERIA L_{Aeq}	EXISTING PREDICTED NOISE LEVEL (dB) $L_{Amax, 22:00-07:00 \text{ hours}}$			FUTURE PLANT PREDICTED NOISE LEVEL (dB) $L_{Amax, 22:00-07:00 \text{ hours}}$			CHANGE IN NOISE LEVEL (dB) $L_{Amax, 22:00-07:00 \text{ hours}}$		
		NEUTRAL	PREVAILING	WORST CASE	NEUTRAL	PREVAILING	WORST CASE	NEUTRAL	PREVAILING	WORST CASE
39 – 60 Ditzells Drive	48	26	31	32	26	31	32	0	0	0
40 – 35 Ditzells Drive	48	26	31	32	26	31	32	0	0	0
41 – 581 Fernhill Road	48	31	35	36	31	35	36	0	0	0
42 – 7360 Gwydir Hwy	51	32	37	38	32	37	38	0	0	0
43 – 7374 Gwydir Hwy	51	26	31	32	26	31	32	0	0	0
44 – McNeils Road	51	28	33	33	28	33	33	0	0	0

Adapted from Table 6.2 and Table 6.6, ViPAC Noise Assessment Report, 2014 (Refer to Appendix H).



The noise levels listed in Table 18 for L_{Aeq} , 22:00-07:00 hours show that during worst-case meteorological weather conditions the highest L_{Aeq} noise level at Receptor 42 (being 7360 Gwydir Highway) for the operational scenario will be 34 dB(A). This is a slight increase from the predicted existing noise level by 2 dB(A). The noise value increase is within the night time criterion of 41 dB(A).

Similarly for the operational scenario, there is an increase from the predicted existing noise levels for those receptors grouped at Ditzells Drive and Fernhill Road. The increase in noise for Receptors 36 through to 41 is 6 to 7 dB(A). For the worst-case meteorological weather conditions, the L_{Aeq} noise levels for these receptors are 26 to 33 dB(A). These noise levels are also below the adopted 35 dB(A) threshold.

The noise assessment indicated there are no receptors that exceed the night time criteria with the new facility in operation.

Table 19 shows that the L_{Amax} , 22:00-07:00 hours noise levels are generally the same except for Receptor 12 (183 Copeton Dam Road) where the noise level drops for the worst-case meteorological weather condition by 6 dB(A).

The highest predicted L_{Amax} noise level is 38 dB(A) at 77 McNeils Lane. This noise level is the same for both the predicted existing noise level and for the predicted operational scenario. This is attributed to the dominant winds that occur during the night time period.

The future L_{Amax} noise levels comply with the night time criteria at all receptors. Whilst they indicate that the operations from Bindaree Beef will be audible at some receptors, they are not expected to cause sleep disturbance.

5.5.8.4 Comparison of the Existing and Future Scenarios

Whilst all the criteria are met for all scenarios, the difference between the existing and future operations of the plant will become less audible for some sensitive receptors and more audible for other sensitive receptors. This change is due to the noise sources moving away from the main road therefore they are closer to different sensitive receptors.

The greatest change in noise level during worst case weather conditions is a 9 dB(A) increase in the L_{Aeq} noise levels at Receptor 39 (60 Ditzells Drive) from 20 dB(A) to 29 dB(A). Conversely, there is a 10 dB(A) reduction in noise levels from 22 dB(A) to 12 dB(A) at Receptor 11 (221 Copeton Dam Road).

To put this in context generally an increase or decrease of 10 decibels is equivalent to half or twice as loud.



For most of the sensitive receptors, an increase in noise can be classed as either just perceptible or perceptible increase in noise during prevailing weather conditions. For sensitive receptors along Ditzells Drive, the noise levels will be 7-10 dB(A) higher, which will be noticeable. By contrast sensitive receptors on Copeton Dam Road will have a decrease in noise level of 5-10 dB(A).

There is no change in the L_{Amax} noise levels except at 183 Copeton Dam Road where the noise reduces by 3 dB(A).

Overall, the noise levels from the future plant may increase noise at some receptors, however due to distances involved; this increase is unlikely to be intrusive. The ambient noise environment which includes a range of farming related activities, insects, birdsong or traffic are likely to continue being the dominant noise sources for the majority of the sensitive receptors.

5.5.9 Mitigation Measures

ViPAC's Noise Assessment identified that the noise levels comply with the noise criteria determined from the Industrial Noise Policy during the daytime, evening and night time periods. The impacts from the future operations of the plant will benefit some sensitive receptors and not others due to the change in location of noise sources and the installation of new technology.

Generally, the hierarchy preference of noise management is as follows:

1. Noise be avoided; however if this is not possible,
2. The minimisation of noise through either:
 - Re-orientation of an activity or
 - Use of Best Available Technology (BAT); and
3. Management of noise.

The new plant at Bindaree Beef utilises state-of-the-art technology and, as such, it is recommended that issues with noise should be managed through such things as noise complaints register.



In the event of noise complaints, a register should be established and the following elements should be recorded as a minimum:

- Complainant name and address;
- Time and date of complaint;
- Duration of event;
- Name of person taking the call; and
- Description of complaint nature (e.g. truck deliveries, pump etc.).

5.5.10 Conclusion

ViPAC Engineers & Scientists Ltd (ViPAC) was commissioned by Mitchel Hanlon Consulting Pty Ltd (Mitchel Hanlon) to prepare a Noise Assessment for the proposed bio-digester plant and new rendering plant at Bindaree Beef, Inverell, NSW.

This Assessment assessed the noise levels from the existing and future operational activities of Bindaree Beef using approved methodologies and software in accordance to the NSW legislation and guidelines.

Noise monitoring was carried out at site to determine the existing noise environment near three sensitive receptors and to obtain sound pressure levels of the external noise sources at the plant.

The background noise data obtained from site was used to determine the appropriate noise criteria for each sensitive receptor during the day time and night time period.

Three scenarios were modelled: the existing scenario; the existing scenario with construction works; and the future scenario. Terrain and weather conditions were incorporated into the noise model to allow for more accurate prediction.

The noise levels during the daytime and night time periods for the existing scenario comply with the project specific criteria.

The construction of the new plant will occur during the daytime, whilst the existing plant will be operational. The predicted noise levels during the construction phase are predicted to comply with the relevant criteria at all sensitive receptors.

The future noise sources were modelled to represent operating hours of the plant. In addition, some existing noise sources were also modelled, specifically forklift and truck movements, dam pump, town water pump house, irrigation pump, manure store and cattle unloading activities.



The noise levels at each sensitive receptor are predicted to comply with the appropriate night time criteria with the future plant in operation. The future noise levels are well below the night time criteria are not expected to cause sleep disturbance.

Whilst all the criteria are met for all scenarios, the difference between the existing and future operations of the plant will become less audible for some sensitive receptors and more audible for other sensitive receptors. This change is due to the noise sources moving away from the main road and closer to different sensitive receptors.

The greatest change in noise level is 10 dB(A) increase at 60 Ditzells during worst case weather conditions, whilst a reduction of 10 dB(A) in noise level is predicted to occur at 221 Copeton Dam Road during neutral and worst-case weather conditions.

Overall, the noise levels from the future plant may increase at some receptors, however due to distances involved; this increase is unlikely to be intrusive. The ambient noise environment is dominated by a range of farming related activities, insects, birdsong or traffic. These sources are likely to continue being the dominant noise sources for the majority of the sensitive receptors.



5.6 Hazards and Risk Assessment

Mitchel Hanlon Consulting engaged the services of CDM Smith Australia Pty Ltd (CDM Smith) to prepare a Preliminary Hazard Assessment (PHA) to comply with the DGRs issued by the NSW Department of Planning and Infrastructure.

A copy of the PHA can be found in Appendix J and summary of the assessment has been provided below.

5.6.1.1 Background

The PHA has been prepared with reference to SEPP 33, and in accordance with the NSW DP&I's *Hazardous Industry Planning Advisory Papers (HIPAPs) No 4 (Risk Criteria) and No 6 (Hazard Analysis)*.

The CDM Smith Report identifies and assesses hazards and risks associated with the operational activities of the bio-digester storage facility site.

The Report first provides a risk screening, conducted as per procedures outlined in the NSW Government *Hazardous and Offensive Development Application Guidelines - Applying SEPP 33* (Department of Planning 2011, hereafter referred to as the SEPP 33 Guidelines).

A PHA is provided subsequently, based on the positive outcome of the risk screening. The PHA was undertaken using industry best-practice methods as outlined in the Australian/New Zealand Standard AS/NZS 4360:2004 *Risk Management*.

5.6.2 Existing Facility

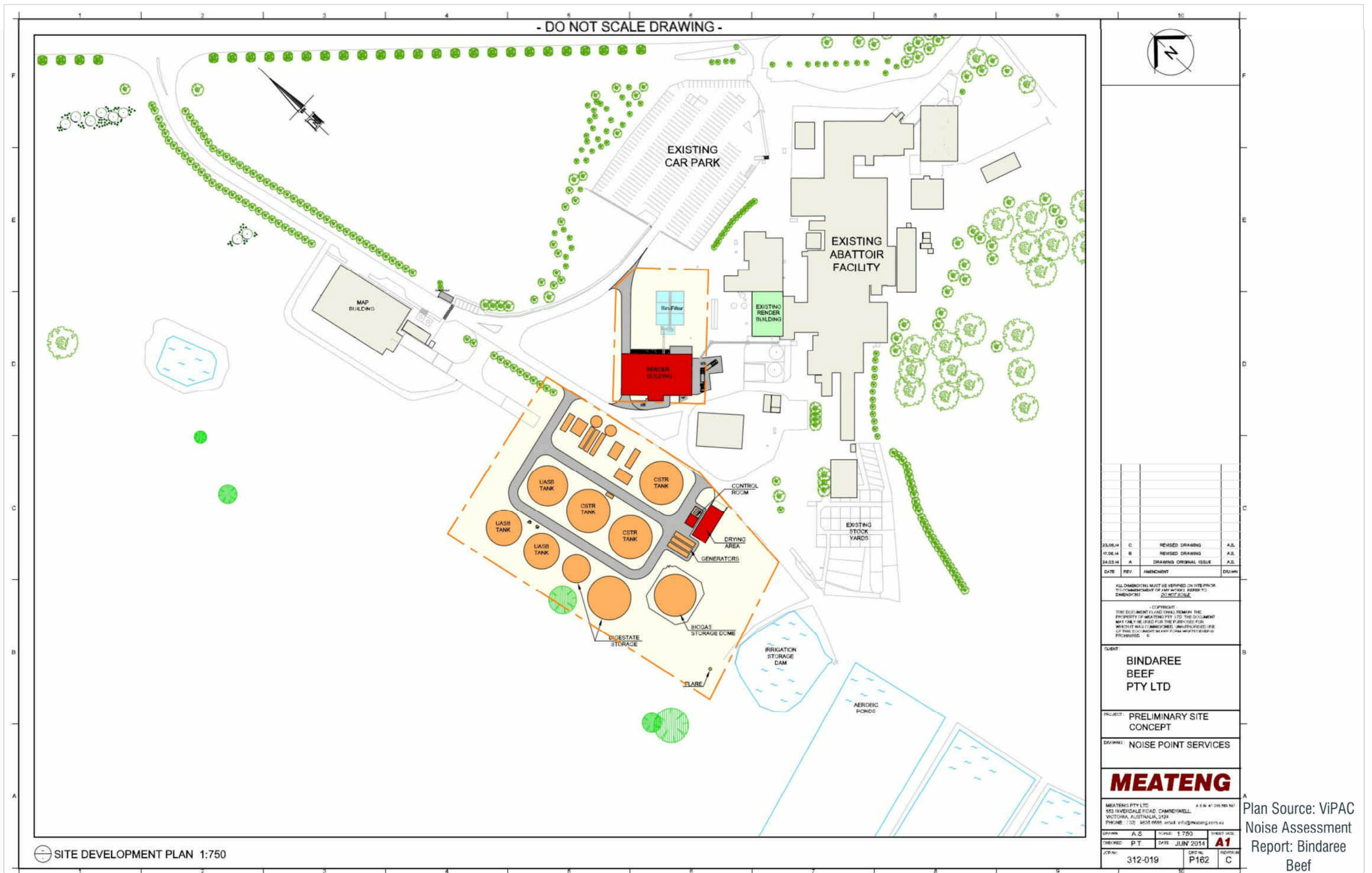
There are a number of existing hazardous substances located on the abattoir site. Table 20 shows the type, amount, distance from the site boundary and the distance from the biogas storage facility for each of these existing hazard substances.

The locations of the existing substances is shown in Figure 33.



Table 20: Existing Hazardous Substances On-site

HAZARDOUS SUBSTANCE	COMPOSITION	HAZARDOUS PROPERTIES	MAXIMUM QUANTITY AND STORAGE TYPE	DISTANCE TO SITE BOUNDARY (APPROX)	DISTANCE TO BIOGAS STORAGE FACILITY	LOCATION/ STORAGE ID
Chlorine	Assumed 100% pure	UN1017 Class/Division 2.3	2 X 70kg cylinders	15m	382m	1
Liquefied Petroleum Gases	Assumed 100% pure	UN1075 Class/Division 2.1	Above ground tank of 7,500L	128m	126m	4
Carbon Dioxide Refrigerated Liquid	Assumed 100% pure	UN2187 Class/Division 2.2	Above ground tank of 45,000L	22m	307m	7
Ammonia Anhydrous (Liquid)	Assumed 100% pure	UN1005 Class/Division 2.3	2 X 1000kg cylinders and 2 X 230kg cylinders	133m	230m	8
Oxygen, Refrigerated Liquid	Assumed 100% pure	Un1073 Class/Division 2.2	Above ground tank of 7,500L	22m	307m	9





5.6.3 Proposed Facility

The components of the project that have the potential to be of a hazard relate to the bio-digester plant and in particular the storage of the bio-gas.

The bio-gas produced by the bio-digester is proposed to be stored on site in a single 9,000m³ dome, at low pressure. The proposed double membrane biogas storage tank is shown in Figure 15.

The bio-gas is modelled to be 65-70% methane and is a Class 2.1 chemical under the Storage and handling of Dangerous Goods Code of Practice (ADG Code).

Given the potential hazard associated with storing methane on-site, there is the possibility that the proposed development could be within the definition of a “potentially hazardous industry” under State Environmental Planning Policy 33 – Hazardous and Offensive Development (SEPP 33). SEPP 33 requires the preparation of a Preliminary Hazard Analysis (PHA) for such establishments to accompany any application for development consent.

A 5-6m high emergency release flare (either partially or fully enclosed) for the biogas will be fixed to the facility. On the rare occasion that the flare will release an approximately 1.2m high flame could occur.

Table 21 shows the type, amount, distance from the site boundary and the distance from the biogas storage facility for each of these existing hazard substances.

The locations of the existing substances is shown in Figure 33.



Table 21: Proposed Additional Hazardous Substances On-site

HAZARDOUS SUBSTANCE	COMPOSITION	HAZARDOUS PROPERTIES	MAXIMUM QUANTITY AND STORAGE TYPE	DISTANCE TO SITE BOUNDARY (APPROX)	DISTANCE TO BIOGAS STORAGE FACILITY	LOCATION/ STORAGE ID
Sulphuric Acid ⁽²⁾	Assumed 100% pure	UN1830 Class/Division 8	Above Ground ICB of 1,000L	270m	25m	10
Ferric Chloride Solution	Assumed 100% pure	UN2582 Class/Division 8	Above Ground ICB of 1,000L	270m	25m	11
Biogas	Average % ⁽¹⁾					
Methane	73.3					
Carbon Dioxide	25.1					
Oxygen	0.36					
Hydrogen Sulfide	398.3ppm	UN1971 Flammable gas (LEL 5% - 15% v/v)	9,000m ³ at 10 millibar gauge pressure	317m	-	12
Balance (assumed to be Nitrogen)	1.13					



5.6.4 Preliminary Risk Screen

5.6.4.1 Hazardous Substances Storage Thresholds

The relevant hazardous substances onsite have been compared to SEPP 33 trigger thresholds in the hazard assessment.

It is noted from the CDM Smith Report that only the bio-gas storage triggers the assessment under SEPP 33 for the volume of methane content to be stored onsite.

According to Table 1 of the SEPP 33 Guidelines, the method to be used for risk screening of a Class 2.1 substance over 100 kg is through application of the graph provided within the SEPP 33 Guidelines, represented in Figure 34.

5.6.4.1.1 Methane Storage Thresholds

Figure 34 indicates that for the volume of methane proposed to be stored on-site, the potentially hazardous region would extend to approximately 85m for 'other uses' and 130m for 'sensitive uses'. The approximate distance between the proposed bio-gas tanks and the property boundary is 270m [see Figure 3-3 of Appendix J].

Sensitive land uses refers to residential or other more sensitive land uses (SEPP 33 Guideline) with all uses that are not sensitive uses are considered to be other uses. The surrounding land is rural agricultural (other use) and the closest resident to the bio-gas tank is 792 m to the northeast.

There is no trigger to undertake a potential hazard assessment under the preliminary screening, however, a voluntary PHA has been prepared to ensure the community that there is no offsite risk posed by the proposed development.

The 130 m threshold for 'sensitive uses' does not exceed the property boundary and currently does not contain 'sensitive uses' as shown in Figure 3-3 [Appendix J].

Accordingly, the bio-gas storage tanks at the Bindaree Beef facility should not be considered as 'potentially hazardous'. Nevertheless, a voluntary PHA including detailed impact modelling has been provided in Appendix J.



Figure 6: Class 2.1 Flammable Gases Pressurised (Excluding LPG)

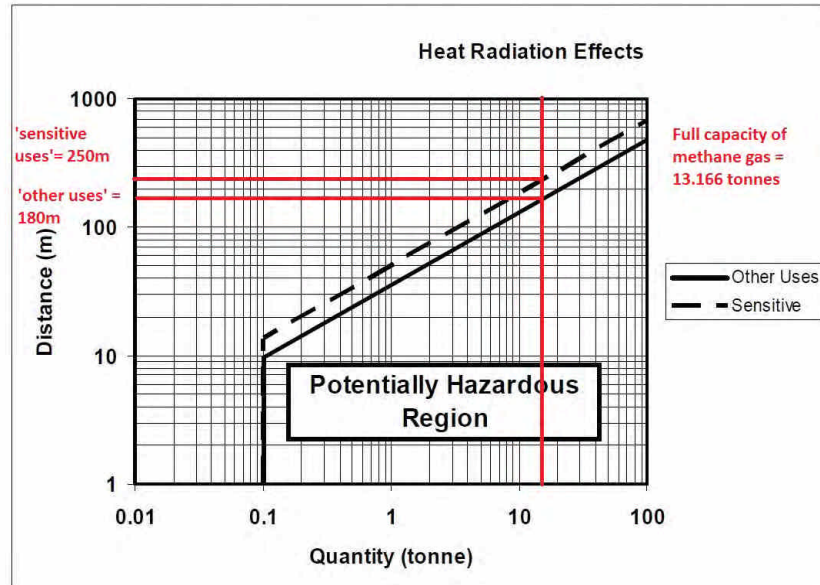


Figure 34: SEPP 33 Screening Method for Class 2.1 Flammable Gases Pressurised

5.6.5 Hazard Analysis Methodology

Part of the voluntary PHA a Hazard Analysis was carried out by CDM Smith.

This analysis was carried out in accordance with HIPAP No. 6 (Hazard Analysis) and included the following:

- Identification of the nature and scale of all hazards at the facility, and the selection of representative incident scenarios;
- Analysis of the consequences of these incidents on people, property and the biophysical environment;
- Evaluation of the likelihood of such events occurring and the adequacy of safeguards;
- Calculation of the resulting risk levels of the facility; and
- Comparison of these risk levels with established risk criteria and identification of opportunities for risk reduction.

Figure 35 illustrates how these elements are utilised in the hazard analysis process.

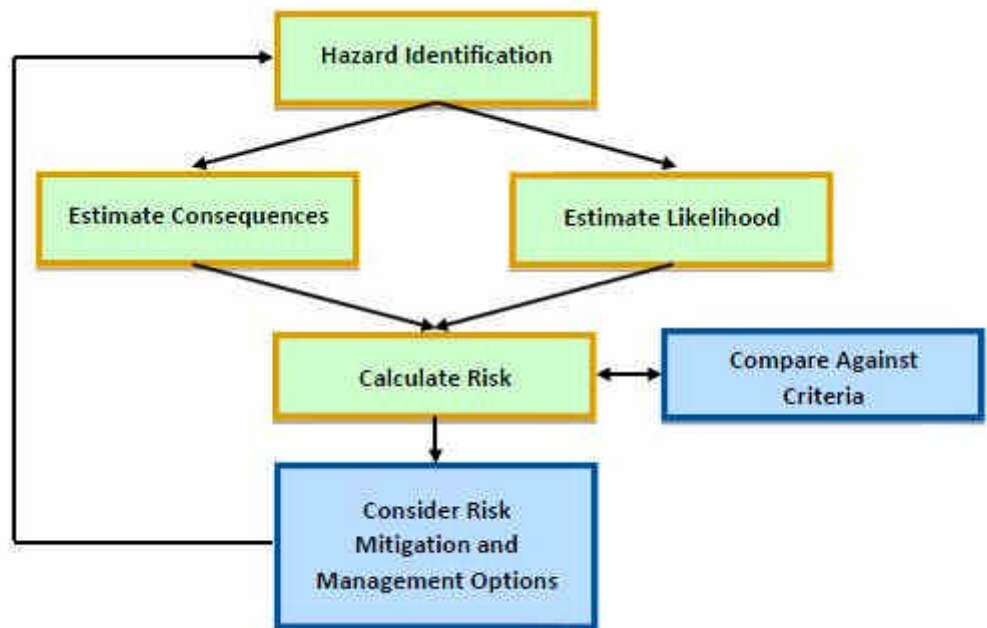


Figure 35: Methodology for Hazard Analysis

5.6.5.1.1 Hazard Identification and Scenarios

CDM Smith's Report identified and reviewed the potential hazards associated with the proposed biogas storage tanks and then modelled three (3) potential scenarios if an incident was to occur at the site being:

1. Event Scenario 1 – Puncture of biogas tank(s) causing vapour release and jet fire through ignition source (inclusive of heat hazard);
2. Event Scenario 2 – Puncture or failure of the biogas tank(s) causing vapour cloud explosion through ignition source (inclusive of blast pressure and heat hazard); and
3. Event Scenario 3 – Puncture or failure of the biogas tank(s) causing vapour cloud release and a localised anoxic environment.

These scenarios were modelled to identify the consequences of these incidents to public safety and the biophysical environment and the necessary safety controls to mitigate the likelihood of the hazardous events from occurring is also required. Possible impacts from off-site events on neighbouring sites were also considered.

Whilst highly unlikely, the hazards were modelled using a 1 m diameter hole (in both the internal and external layers) of the biogas storage tank as this produced the worst case event along with a methane content of 73% which is higher than the expected maximum of 70%.



5.6.5.2 Results and Impacts Assessment of Scenarios

5.6.5.2.1 Event Scenario 1

Puncture of Biogas Tank(s) Causing Vapour Release and Jet Fire through Ignition Source

Event Scenario 1 modelled the consequences of a large vapour release from a tank puncture of 1m in diameter with ignition would be a jet fire from the hole.

The consequence of Event Scenario 1 would be a flame to 20 m which would be potentially lethal to anyone remaining in the area downwind in the flame plume and may cause second degree burns to people within 44 m of the flame plume upon explosion. This 44 m plume is well within the Bindaree Beef site boundaries and does not extend off site.

The likelihood of this major event occurring is rare and may only occur in exceptional circumstances. As such the unmitigated risk is considered low and not of concern.

The general health and safety measures, such as impact protection and separation of ignition sources suggested in Section 5.6.6 would further reduce the likelihood of this impact onsite.

5.6.5.2.2 Event Scenario 2

Puncture or Failure of the Biogas Tank Causing Vapour Cloud Explosion through Ignition Source (Inclusive of Blast Pressure and Heat Hazard)

Event Scenario 2 modelled the impacts for a vapour cloud explosion including heat hazard and blast pressure.

A vapour cloud explosion could occur from a puncture or rupture of both the biogas tank membrane and outer layer or it could occur during the start up of the plant through the mixing of biogas with air. The impact of such a worst case explosion would be minor and contained within the site boundary, due to the low pressure of biogas storage and the biogas composition.

Onsite impacts from Even Scenario 2 could include:

- Damage to surrounding buildings (broken glass); and
- Thermal burns to personnel within 30 m of the storage tank. This would constitute a survivable explosion.



The blast force from such explosion would be felt to 94 m from the storage tank, but is unlikely to cause any pressure impacts to the human body and does not trigger the hazard criterion within the HIPAP No 4.

The best protection against the effects of an accidental explosion is increased distance between the explosion site and the potential receptors.

The modelling undertaken by CDM Smith indicates that there is sufficient distance to the Bindaree Beef site boundary and that there will be no impact beyond the site boundary.

Internally the facility can be managed to ensure the likelihood is reduced to as low as reasonable practicable through onsite safety design, operational controls and systems. The internal site layout complies with the German Agricultural Occupational Health and Safety Agency (2008) 'Safety Rules for Biogas Systems' guideline in the absence of a relevant Australian guideline for biogas safety.

5.6.5.2.3 Event Scenario 3

Puncture or Failure of the Biogas Tank Causing Vapour Cloud Release and a Localised Anoxic Environment

Event Scenario 3 modelled the hazards caused by a puncture or failure of the biogas tank with a 1m hole with a vapour cloud release that is the flammable gas hazard zone and the asphyxia hazards.

Methane can form an explosive mixture in air at levels as low as 5% which is known as the Lower Explosive Limit (LEL). HIPAP establishes that at 60% of the LEL for methane there is still a chance of explosion due to the potential localised pockets of methane which could ignite. The CDM Smith Report notes however, that methane rapidly dissipated into the atmosphere minimising the likelihood of explosion.

In the case of Event Scenario 3 the CDM Smith Report modelled both the hazard areas of the LEL and the 60% hazard.

Flammable Gas Hazard Summary

A large 1 m diameter hole or leak in the tank would create a 78 m plume from the hole at the LEL and 114 m plume area at 60% of the LEL which creates some localised pockets of gas which could ignite.

Both plumes modelled within Event Scenario 3 do not exceed the Bindaree Beef site boundary and as such does not pose a risk to the surrounding community.



Asphyxia Hazard Summary

A methane vapour release can cause asphyxia through displacement of oxygen and presence of the hydrogen sulphide. The modelling indicates that there is a potential threat zone however it is noted that dispersion predictions are less reliable for such short distances. Nevertheless, CDM Smith has conservatively indicated the immediate areas where asphyxia could occur in the unlikely event of a 1m hole in both the membrane and tank as being:

- Within a 14 m vapour plume from the hole downwind there could be enough methane to create a primarily oxygen deficient environment where breathing would not be capable; and
- Within a 20 m vapour plume from the hole downwind there could be enough hydrogen sulphide levels to cause illness if a person were to remain in this area.

Asphyxiation and Intoxication (Poisoning) Risk

The exposure to methane itself is not a significant health risk as it is not suspected of causing cancer, no long term health effects are currently associated with exposure to methane and it is rapidly eliminated from the body.

The only health effect of methane exposure is displacement of oxygen causing a risk of asphyxiation. Immediately or shortly after exposure to oxygen levels of less than 15% in air, a person may feel tired, dizzy, and have a headache. Asphyxiation can occur at 87% methane due to oxygen deficiency. This condition can occur within 14 m of the tank after a catastrophic release, this is well within the site boundary and poses no offsite risk of this hazard to the surrounding community or sensitive receptors.

In addition, biogas contains hydrogen sulphide which is a toxic gas that is heavier than air. At low levels, it has a characteristic odour similar to rotten eggs. It is produced during anaerobic decomposition of manure. Dangerous levels of the gas may be present during agitation and pumping of deep manure pits. Many deaths related to hydrogen sulphide exposure have occurred, one possible reason that fatalities occur so often is that olfactory senses are paralysed at high concentrations and so victims cannot detect odours.

An offensive odour is detectable at 3 to 5 ppm with eye irritation at 10 ppm. Irritation to mucous membranes and lungs occurs at 20 ppm. Olfactory-nerve paralysis occurs at 150 ppm, followed by headaches, dizziness and nervous system depression at 200 ppm. Nausea, excitement, insomnia and death may occur after 30 minutes of exposure at 500 to 600 ppm. It is rapidly fatal at 700 to 2000 ppm (Agricultural and Bio systems Engineering College, Iowa State University).



The biogas composition contains 398.3 ppm which may result in concentrations of 200 ppm may occur for 20 minutes at a distance of 19 m from the tank. A live and capable person would, however, move. It is unlikely to cause death but could cause headaches, dizziness and nervous system depression.

The likelihood of such a significant puncture in both tanks to release such a volume of gas is rare and as such poses a low risk onsite and no risk to areas beyond the boundary.

5.6.5.3 Cumulative Impacts

Analysis was also undertaken regarding the potential for cumulative impacts of storage of chemicals and dangerous goods on site. It has been determined that there is unlikely to be an impact due to the significant distance between the bio-gas storage facility and such things as chlorine and ammonia stored on site.

The chlorine is located 398 m away at the far eastern side of the site and the ammonia is located 238 m away. Both of these locations are outside the potential impact zone for any of the scenarios modelled within the CDM Smith Report which had a maximum impact area of 114 m where any such impact may be possible in a worst case event.



5.6.6 Mitigation Measures

A number of mitigation measures have been identified as part of the risk management for the project:

- Commissioning tests of all equipment undertaken prior to operation;
- Purging of oxygen from the bio-digester system prior to filling with bio-gas;
- Trained consultant overseeing bio-digester start-up;
- Bio-gas flare to comply with relevant Australian Standard (AS) be located away from any potential bio-gas release point;
- Setback distances from other infrastructure established;
- Assess explosive gas atmosphere zones in accordance with relevant AS;
- An Impact Protection Zone around bio-gas storage tanks;
- Security fencing and restricted access around the bio-digester plant;
- An appropriate separation distance exists from the site boundary;
- Installation of protective devices e.g. leak detection and emergency isolation valves;
- Gas safety regulations and AS to be met;
- Emergency Response Plan to be prepared and staff trained appropriately;
- Gas pipelines to comply with relevant AS and bio-gas pipelines to be clearly marked;
- Protective coatings to minimise corrosion; and
- Bio-gas conditioning to remove condensate.



5.6.7 Conclusion

The preliminary risk screen determined that the threshold for 'other uses' is 180m and 250m for 'sensitive uses'. As the approximate distance between the bio-gas tanks and the boundary is 270 m and none of the SEPP 33 preliminary thresholds are triggered to require a PHA. To ease community concerns and onsite health and safety considerations, a voluntary PHA was prepared.

The three major risk consequences from the storage of bio-gas at the Bindaree Beef Abattoir are:

1. The release of a jet fire from tank puncture;
2. A vapour cloud explosion from a tank rupture or start-up; and
3. The unignited release of a significant amount of bio-gas onsite.

These modelled events will not have offsite impacts and if developed within the limited area identified around the site in accordance with the SEPP 33 process, it is unlikely to pose any hazards to the surrounding community.

Bindaree Beef clearly understands the potential for incidents. The design of the proposed bio-gas storage facility and equipment minimises the probability of an incident occurring and mitigating measures will be put in place to address any consequences if an event was to occur.

CDM Smith's Report identified that the consequence of the modelled worst case scenarios are only considered to have a major impact with no catastrophic impacts predicted. The likelihood of these events are all low to rare and as such are not considered to be significant onsite risk provided that internal health and safety measures are implemented to mitigate and manage the risks.

The PHA meets the requirements of SEPP 33 and show that the overall risk associated with the proposed project is very low and does not introduce an excessive additional risk to the surrounding community.



5.7 Greenhouse Gas Emissions

Mitchel Hanlon Consulting engaged the services of ViPAC Engineers and Scientists Ltd (ViPAC) to prepare a Greenhouse Gas Assessment to comply with the DGRs issued by the NSW Department of Planning and Infrastructure.

The purpose of the Greenhouse Gas Assessment is to evaluate the current greenhouse gas emissions from the site. The report provides calculations of the greenhouse gas emissions of the construction and operation of the new facility over the 30 year life of the project.

A copy of the report can be found in Appendix I.

5.7.1 Introduction

Greenhouse gases are collectively identified as gases that absorb and emit radiation within the atmosphere. Carbon dioxide, methane, nitrous oxide and ozone are considered the primary greenhouse gases and their impact on the Earth's atmosphere is known as the 'Greenhouse Effect'. The heating of the Earth's atmosphere is referred to as 'Global Warming'.

Anthropogenic activities such as burning of fossil fuels and extensive clearing of native vegetation have contributed to the increase in greenhouse gases since the Industrial Revolution. This has increased the Earth's atmospheric temperatures and in turn can negatively affect natural bio-systems. Future global warming is expected to impact sea level rise, increase the severity of extreme weather events, and affect biodiversity.

5.7.2 Legislative Framework

5.7.2.1 International Policy

Internationally, Australia has committed to reducing greenhouse gas emissions by ratifying the *Kyoto Protocol* in 2007. The *Kyoto Protocol* is an international agreement created under the *United Nations Framework Convention on Climate Change* (UNFCCC) in Kyoto, Japan in 1997.

The *Kyoto Protocol* aims to reduce global greenhouse gas emissions by requiring developed countries to meet internationally agreed emission reduction or limitation targets.

Australia's second commitment period of the *Kyoto Protocol* commenced on the 1st January 2013 and ends in 2020. Australia has agreed to a Kyoto target to reduce its emissions to five per cent below 2000 levels by 2020.



5.7.2.2 National Policy

In order to achieve Australia's greenhouse gas emission reduction targets, legislative frameworks have been introduced. Australia's National climate change policy was initially outlined in the *National Greenhouse and Energy Reporting Act 2007*. This Act has been repealed by the *Clean Energy Act 2011*.

Clean Energy Act 2011

The *Clean Energy Act 2011* provides the framework for the introduction of a carbon pricing mechanism to reduce Australia's greenhouse gas emissions. The Act established the Clean Energy Regulator to administer the National Greenhouse and Energy Reporting scheme, the Renewable Energy Target and the Carbon Farming Initiative programs. The Act also provided a platform for an independent Climate Change Authority to advise the Australian government on the setting of the carbon pricing mechanism criteria and reviewing climate change laws.

National Greenhouse and Energy Reporting Act 2007

The *National Greenhouse and Energy Reporting Act 2007* provided a national framework for the reporting and collation of information relating to Australian greenhouse gas emissions, greenhouse gas abatement projects and the energy use of individual corporations.

From 1 July 2008, corporations have been required to report their greenhouse gas emissions and energy consumption if they exceeded the below criteria:

- An individual facility emits 25 kilotonnes or more of greenhouse gas (CO₂ equivalent), or produce/consume 100 terajoules or more of energy; or
- Their corporate group (a number of facilities) emits a total of 125 kilotonnes or more greenhouse gas (CO₂ equivalent), or produces/consumes 500 terajoules or more of energy.

Bindaree Beef greenhouse gas emissions have exceeded the reporting criteria, and as a result have been reporting greenhouse gas emission data since 2008. This reporting has provided background data on the existing facility emissions and has been incorporated into this assessment.



5.7.3 Methodology

The *National Greenhouse and Energy Reporting (Measurement) Technical Guidelines* (NGER Technical Guidelines) have been developed to assist corporations to understand and apply the *National Greenhouse and Energy Reporting* (NGER) (Measurement) Determination 2008.

The NGER Technical Guidelines have been used as the basis of the greenhouse gas calculations for this assessment.

Emission factors used in this assessment have been derived from either the Department of Environment, site-specific information or from operational details obtained from similar emission sources.

The majority of the emission factors used in this report have been sourced from the Department of Climate Change and Energy Efficiency National Greenhouse Accounts (NGA) Factors Workbook, (DCCEE, 2013b) as indicated in Table 22.



Table 22: Emissions Factors

SCOPE	EMISSION SOURCE	EMISSION FACTOR	SOURCE
1	Combustion emissions from ULP (stationary)	2.38 t CO ₂ -e / kL	NGA Factors (2013)
	Combustion emissions from diesel (stationary)	2.68 t CO ₂ -e / kL	NGA Factors (2013)
	Combustion emissions from LPG (stationary)	2.29 t CO ₂ -e / kL	NGA Factors (2013)
	Combustion for transport (general)	2.69 t CO ₂ -e / kL	NGA Factors (2013)
	Combustion for transport (gasoline)	2.38 t CO ₂ -e / kL	NGA Factors (2013)
	Bituminous Coal	2.388 kg CO ₂ -e / t	NGA Factors (2013)
	Methane from Wastewater Handling (industrial)	5.3 t CO ₂ -e / t COD	NGA Factors (2013)
	Sludge Biogas (captured for combustion)	0.18 kg CO ₂ -e / m ³	NGA Factors (2013)
2	Electricity Consumption (NSW)	0.87 kg CO ₂ -e/kWh	NGA Factors (2013)
3	Electricity Consumption (NSW)	0.19 kg CO ₂ -e / kWh	NGA Factors (2013)
	Bituminous Coal	124.2 kg CO ₂ -e / t	NGA Factors (2013)
	Diesel consumption	0.2046 t CO ₂ -e /kL	NGA Factors (2013)
	Embodied energy for concrete	0.13 kg CO ₂ -e/kg	Sustainable Energy Research Team (2008)
	Embodied energy for low carbon steel	1.77 kg CO ₂ -e/kg	Sustainable Energy Research Team (2008)
	Embodied energy for stainless steel	6.15 kg CO ₂ -e/kg	Sustainable Energy Research Team (2008)



The NGA Factors Workbook (DCCEE, 2013b), divide the emission factors by activities as shown in Table 22. The scope that emissions are reported under is determined by whether the activity is within the organisation's boundary (Scope 1 – Direct Emissions) or outside the organisation's boundary (Scopes 2 and 3 – Indirect Emissions).

The scopes are outlined below:

- Scope 1 Emissions: Direct (or point-source) emission factors give the kilograms of carbon dioxide equivalent (CO₂-e) emitted per unit of activity. Scope 1 activities include fuel use, energy use, manufacturing process activity, mining activity, and on-site waste disposal.
- Scope 2 Emissions: Indirect emissions from the generation of the electricity purchased from the grid and consumed by an organisation as kilograms of CO₂-e per unit of electricity consumed.
- Scope 3 Emissions: Indirect emissions for organisations that:
 - a. Burn fossil fuels: to estimate their indirect emissions attributable to the extraction, production and transport of those fuels; or
 - b. Consume purchased electricity: to estimate their indirect emissions from the extraction, production and transport of fuel burned at generation and the indirect emissions attributable to the electricity lost in delivery in the transmission and distribution network.

5.7.4 Existing Environment

The proposed development provides significant greenhouse gas emission reduction benefits for the existing abattoir operation. Currently, the abattoir generates Scope 1 greenhouse gas (GHG) emissions from the following sources:

- Burning of coal for boiler operation;
- Liquefied Petroleum Gas (LPG) consumption for stationary uses;
- Unleaded petrol (ULP) fuel consumption for transport purposes;
- Diesel fuel consumption for transport purposes;
- Diesel fuel consumption for stationary purposes; and
- Wastewater stored in effluent holding ponds during treatment.

Scope 2 emissions are generated from purchased electricity from the grid for abattoir operations. Yolarno Pty Ltd currently report greenhouse gas emissions from the site under the National Greenhouse and Energy Reporting Act 2007 (NGER).



GHG emissions from the site in 2012-2013, using the NGER reporting data collected by Yolarno Pty Ltd, were calculated to be 64.73 kilotonnes CO₂^e per annum. This was based on production values and GHG emissions data provided by Yolarno Pty Ltd.

5.7.5 Proposed Environment

The proposed development will provide GHG emission savings due to the elimination of coal as a fuel source, decommissioning of the effluent treatment ponds, and the new, higher efficiency rendering plant installation.

The conversion from coal-fired to bio-gas-fired boilers for the rendering plant operation will result in a considerable reduction in GHG emissions for the site.

5.7.5.1 Construction Phase

During the construction phase of the project, GHG emissions will be sourced from:

- Construction staff travelling to/from the abattoir;
- Delivery vehicle movements onsite;
- Plant movement onsite;
- Delivery of materials from offsite;
- Embodied energy of vehicle movements from offsite;
- Embodied energy of construction materials (concrete);
- Embodied energy of construction materials (low carbon steel); and
- Embodied energy of construction materials (stainless steel).

The direct emissions during the construction phase from vehicle and plant movements onsite are predicted to be 30.06 tonnes CO₂-e.

The scope 1 emissions from delivery of materials from offsite are predicted to be 212.5 tonnes CO₂-e.

The scope 3 indirect emissions from the embodied energy of construction materials were calculated to be 3118.25 tonnes CO₂-e.

The total construction phase GHG emissions are predicted to be 3,331 tonnes CO₂-e.



Figure 36 shows that the embodied energy of the construction materials is the greatest contributor to the greenhouse gases emissions with 92%. The upstream vehicle movements contribute 7% and the direct transport movements onsite equated to 1% of the total emissions during construction.

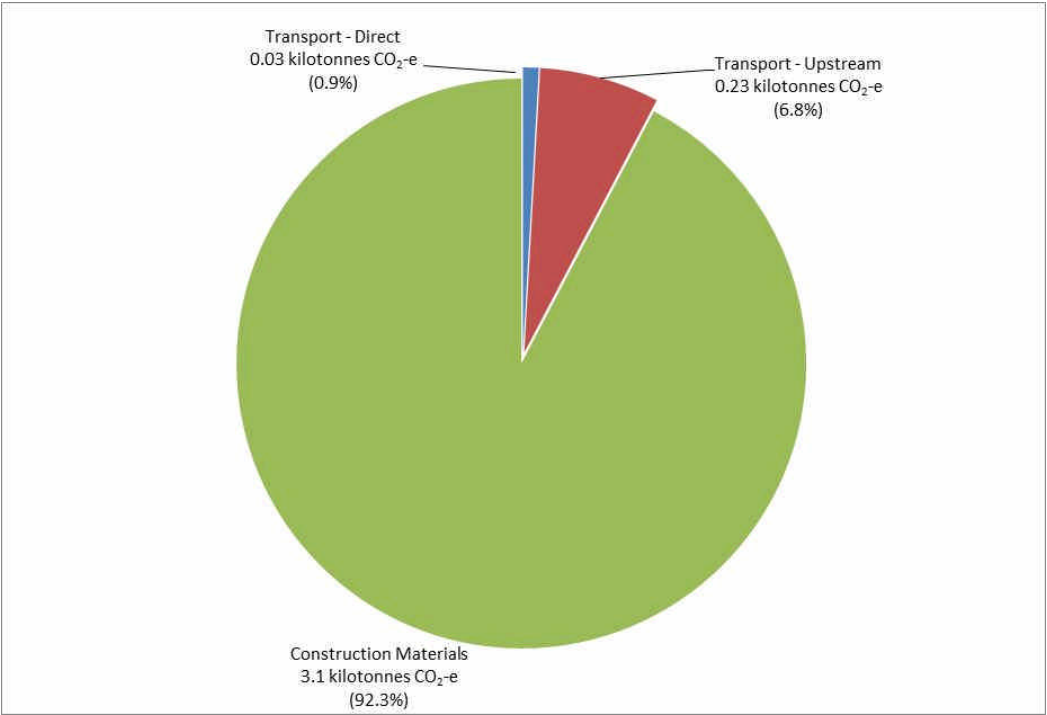


Figure 36: Summary of Emissions (kilotonnes co2-e) during Construction Phase



5.7.5.2 Operational Phase

During the construction phase of the project, GHG emissions will be sourced from:

- Electricity consumption from the grid;
- Sludge bio-gas; and
- Transport fuel emissions.

The annual future emissions from purchased electricity (both scope 2 and 3 emissions) is calculated to be 19,048 tonnes CO₂-e/year. The annual direct transport fuel emissions are predicted to be 108.6 tonnes CO₂-e/year. The annual upstream emissions for transport fuel is 13,834.3 tonnes CO₂-e/year.

The stationary fuel emissions include diesel, LPG and sludge bio-gas. The scope 3 emissions from the embodied energy of diesel and LPG consumption have also been used in the GHG assessment. The annual stationary fuel direct emissions during operation have been calculated to be 1,387.6 tonnes CO₂-e/year. This is a dramatic reduction in emissions due to the removal of coal as a fuel source as part of the proposed development.

The total annual emissions for the site during the operational phase of the project is predicted to be 34,378.5 tonnes CO₂-e/year (3.4 kilotonnes CO₂-e/year).

The combined GHG emissions from the construction and operational phase of the project are 37,709.5 tonnes CO₂-e/year (3.8 kilotonnes CO₂-e/year).

A summary of the future emissions of the proposed development is shown in Figure 37. It can be seen that the greatest emissions are the power generation which accounts for 54% of annual emissions. Upstream transport emissions account for 40% and stationary fuel accounts for 6% of the 35 kilotonnes CO₂^{-e} emitted by Bindaree Beef per annum.

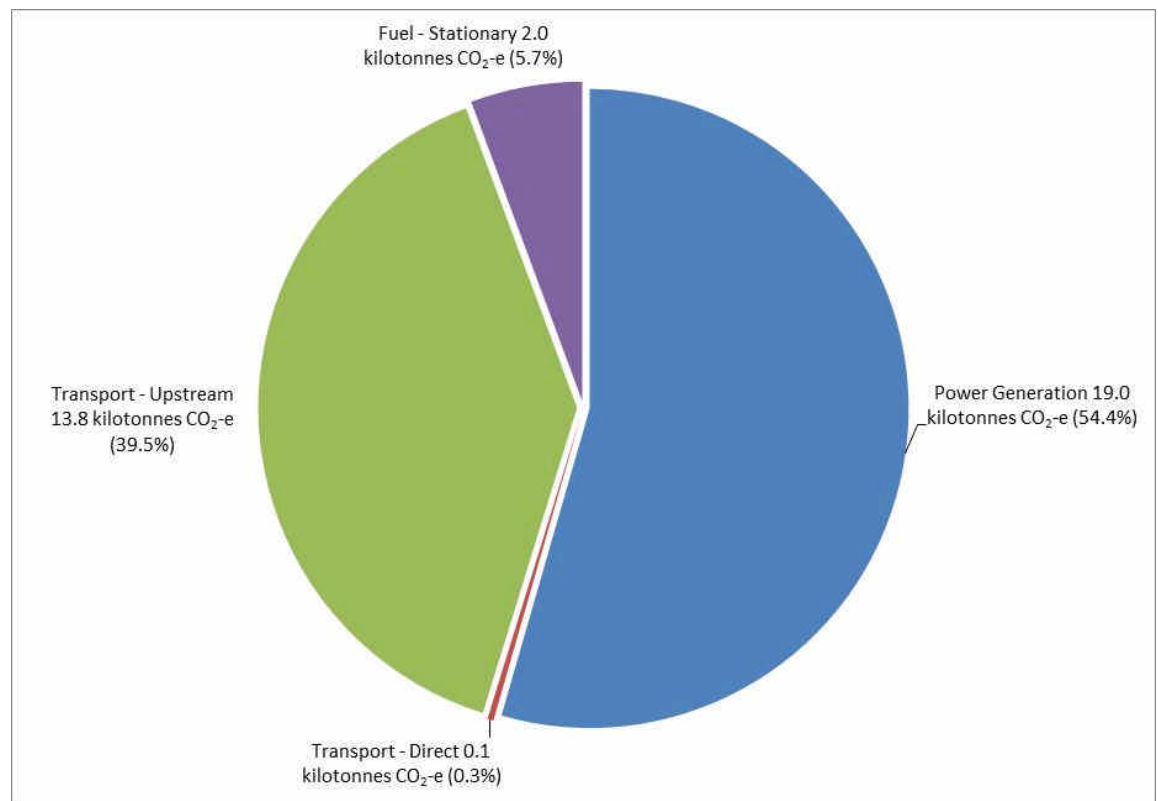


Figure 37: Summary of Emissions (kilotonnes co2-e) during Construction Phase

5.7.6 Mitigation Measures

The proposed anaerobic digester project is considered a major investment in the Bindaree Beef operation and will set a benchmark for abattoir wastewater treatment and greenhouse gas reduction measures.

The entire project is a significant mitigation measure for reducing greenhouse emissions from the site.

5.7.7 Conclusion

The GHG emissions over the life of the project have been evaluated based on a 30 year life of the project. The total annual GHG emissions for the site increase to 68.8 kilotonnes CO₂^e, including the proposed development. The main savings are:

- 16.07 kilotonnes CO₂-e per annum (482 kilotonnes CO₂-e over the life of the Project) is achieved by the removal of coal burning boiler and its associated transportation;
- 16.38 kilotonnes CO₂-e per annum (491 kilotonnes CO₂-e over the life of the Project) is achieved by installing the anaerobic digesters to capture methane and convert it to carbon dioxide (based on a production capacity of 1,100 cattle per day); and



- 2.2 kilotonnes CO₂-e per annum (66.5 kilotonnes CO₂-e over the life of the Project) is achieved from the reduction in purchased electricity.

The Project will reduce Bindaree Beef's overall greenhouse gas emissions by 52% per annum. The benefits of this development in terms of greenhouse gas emission reduction are quite significant.

This wastewater treatment method will considerably reduce the GHG emissions from the site due to the removal of wastewater treatment in traditional ponds. Similarly, the installation of a new rendering plant will increase the energy efficiency of the site and remove the need for coal as a fuel source.

ViPAC' Assessment has provided a quantitative assessment of the potential scope 1 and 2 GHG emissions of the development. The installation of an anaerobic digester for wastewater treatment will set the standard for abattoir wastewater treatment in NSW and Australia.



5.8 Soil and Land Capability

5.8.1 Introduction

The bio-digester facility and application of digestate to existing cropping land of the proposed development has the potential to impact on local soils. The following sections discuss the methodology used to assess the soil and land capability of the subject site and propose mitigation measures, where required.

5.8.2 Background

5.8.2.1 Abattoir Waste

Abattoirs are a large user of water for wash-down of livestock, cleaning and sanitizing of plant and equipment in order to maintain strict hygienic standards for meat processing. The resulting wastewater contains contaminants such as blood, fat, manure, paunch contents, brines, detergents, disinfectants and bacteria.

Wastewater from the abattoir is discharged into an effluent stream and undergoes primary and secondary effluent treatment before final discharge back into the environment. Rural abattoirs such as Bindaree Beef will typically discharge the treated effluent via irrigation onto land for crop production (Meat and Livestock Australia, 2006).

Traditional wastewater from abattoirs contains approximately 45% soluble and 55% coarse suspended organics with most of the organics coming from the blood and paunch.

The effluent is largely biological and contains very little material that is not fully degradable by biological means. The primary treatment of effluent involves the screening of solids and removal of fats from the effluent stream. The secondary treatment of effluent commonly used by abattoirs involves large open anaerobic and aerobic ponds, similar to the current practice at Bindaree Beef.



5.8.2.2 Digestate

Digestate (or biofertiliser) is a nutrient-rich material produced as a result of the Anaerobic Digestion that is ideally suited for use as an organic fertiliser. All the nitrogen, phosphorous and potassium present in the feedstock (abattoir waste streams) remains in the digestate, however, the nutrients are passed through the process of digestion, and are made considerably more bioavailable, making it easier for plants to make use of them. Digestate can be used as fertiliser without any further treatment after its removal from the digester, or alternatively can be further treated to enhance its quality and marketability and to produce standardised biofertilisers (solid or liquid) that are commonly sold in hardware stores and nurseries.

With limited biogas plants operating in Australia, examples of the use of digestate as a fertiliser as standard practice are given throughout the world, including, but limited to no Austria, Canada, Denmark, Germany, Netherlands, Sweden, Switzerland and the United Kingdom.

While climatic and soil conditions in the above examples may vary somewhat from those at Inverell, comparison data, including data from the Bindaree Beef pilot plant, and local examples such as the Berrybank Bio-digester case example show that similar results would be achieved.

The design proposed for Bindaree Beef will have a digestate output of 955m³/day over seven days (equivalent to approx. 1.3ML per day over the five plant operating days), some or all of which will potentially be used as fertiliser for the Alsace farm. Water balance calculations will be used to determine the maximum volume of digestate that can be sustainably used on average each year and to ensure the requisite amount is applied at the right times to meet the crop requirements while ensuring increases in runoff and percolation are minimised.



5.8.3 Construction Area Capability Assessment

A detailed geotechnical investigation will be carried out in the Construction Certificate phase of the project prior to construction works commencing. This investigation will identify the areas that are suitable for foundation construction, and areas that require additional works to provide suitable foundations for the proposed development.

The construction site is located on the side of a hill crest where the soil depth is expected to be shallow and soil appropriate for construction.

Proposed erosion and sedimentation controls are outlined in detail within Section 5.11.2. Best management practices in sediment and erosion control will be implemented during the construction phase to minimise impacts.

5.8.4 Digestate Irrigation Area Capability Assessment

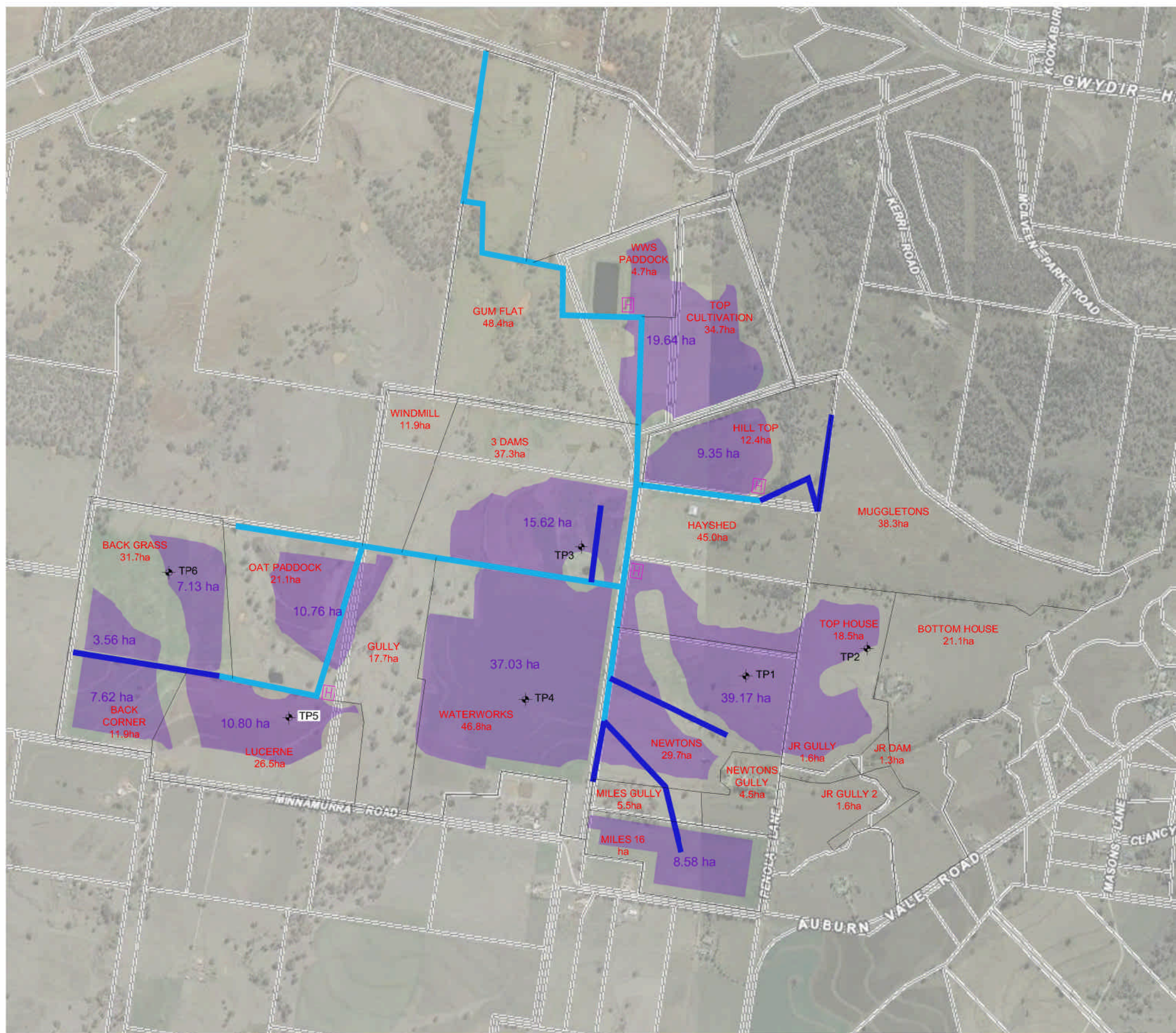
5.8.4.1 Assessment Methodology

To determine the soil and land capability of the proposed development site, a combined approach of soil and geology data review, site soil field assessment and site soil laboratory analysis was undertaken.

The site soil assessment undertaken by Environmental Scientist Ms Kelly Leedham (Mitchel Hanlon Consulting) involved the analysis of soils within the existing/proposed digestate application areas by way of soil profile analysis using 6 separate pit locations.

Pits were excavated to depth ranging from approximately 1.0metres to 1.5 metres, depending on the target horizon depths of each location.

A plan depicting the location of each pit is depicted as Figure 38.



LEGEND

- UNDERGROUND LINES
- DRAG AROUND LINES
- HYDRANT
- TEST PIT



5.8.4.2 Assessment Results

5.8.4.2.1 Geology Data Review

The site exists in the geological region of New England with a geological age of Silurian to Triassic (206 to 443 million years old). The landforms of this region include mountain ranges, dissected plateaus, hills and ridges. This geological region incorporates Late Silurian to Middle Triassic shelf and trough sediments, felsic to mafic volcanics and continental sediments. The continental sediments display major breaks in the Middle Devonian, Middle to Late Carboniferous, Middle to Late Permian and early Triassic. There is also evidence of tertiary volcanics within the local geology (NSW Government NR Atlas, 2014).

A geology profile for the site has been derived from the driller's log of groundwater bore GW019233, as presented in Table 23. This shows the extent of clay soil material in the surface, and the extensive basalt parent material to approximately 100 m depth. This profile is consistent with the literature identifying volcanic geology within the region. This profile is representative of the geology of the proposed development site and digestate irrigation areas. Appendix R includes a copy of the groundwater bore summary for GW019233.



Table 23: Groundwater Bore GW019233 Geology Profile

DEPTH (M)		THICKNESS (M)	MATERIAL DESCRIPTION
FROM	TO		
0.00	7.62	7.62	Clay
7.62	23.16	15.54	Basalt Soft
23.16	41.76	18.60	Basalt Very Hard
41.76	42.06	0.30	Basalt Soft Water Supply
42.06	65.53	23.47	Basalt
65.53	74.37	8.84	Clay
74.37	87.17	12.80	Basalt
87.17	89.31	2.14	Shale Black
89.31	90.53	1.22	Rock Very Hard
90.53	99.36	8.83	Clay Grey Soft

5.8.4.2.2 Soil Field Analysis Results

The existing digestate irrigation area comprises two distinct land resource areas, black/grey vertosols and red ferrosols. Black and grey vertosols cover the majority of the property over the eastern and northern areas of the digestate irrigation area. They vary in depth between 40cm to 1.2 m. The surface soils are characterised by high clay percentage, minimal rock and mottling, and self-mulching properties. At depth clay content decreases, small pieces of decomposed rock are present and slight mottling appears below 60 cm.

The following sections provide a written summary of the properties of the two soil types encountered. Results are tabulated in Table 25 and accompanied by comments regarding the limitations that they pose, as well as proposed mitigation measures.



5.8.4.2.2.1 Black Vertosols

In the surface, the pH of the black vertosols range from 3.97 (strongly acidic) to 6.59 (neutral). The nitrate concentrations range from 17.8 mg/kg (moderate) to 87 mg/kg (high), and total nitrogen ranges from 1500 (medium) to 2600 mg/kg (high). The available phosphorus concentrations range from 62.4 mg/kg to 172.4 mg/kg, high to very high levels.

At depth, the pH ranges from 6.63 (neutral) to 7.58 (alkaline). The nitrate concentrations decrease with depth, ranging from 5.7 mg/kg (low) to 35.4 mg/kg (satisfactory). The total nitrogen concentrations also decrease with depth, ranging from 600 mg/kg (low) to 1200 mg/kg (low). The available phosphorus concentrations decrease with depth, with concentrations ranging from 9.6 mg/kg (low) to 83.2 mg/kg (high).

Salinity levels throughout the profile range from 0.09 dS/m (low) to 0.23 dS/m (medium) in the surface soils, with salinity generally increasing slightly with depth. Salinity ranges from 0.09 dS/m (low) to 0.27 dS/m (medium) with depth.

The effective cation exchange capacity of the black vertosol soils is very high throughout the profile indicating high fertility and excellent capacity to produce crops and pasture.

5.8.4.2.2.2 Red Ferrosols

Red ferrosols extend over the western side of the digestate irrigation area, in a smaller area than the black vertosols. They are characterised by a deep profile extending over 1 m, clay loam soils, small decomposed rock from 1 m and mottling from 80 cm.

The surface soils have a pH range from 4.46 (strongly acidic) to 5.06 (slightly acidic). The nitrate concentrations range from 49.8 mg/kg (satisfactory) to 71.8 mg/kg (satisfactory). Total nitrogen ranges from 1500 mg/kg (low) to 1800 mg/kg (medium). Surface available phosphorus concentrations range from 40 mg/kg (satisfactory) to 236 mg/kg (very high).

The subsoils of the red ferrosols reflect pH ranges of 6.25 (slightly acidic) to 7.47 (slightly alkaline). The nitrate concentrations decrease with depth, ranging from 2.2 mg/kg (very low) to 38 mg/kg (satisfactory). Total nitrogen also decreases with depth to levels of 500 mg/kg (very low) to 1000 mg/kg (low). Available phosphorus concentrations range from 1.6 mg/kg (very low) to 28 mg/kg (moderate).

Salinity levels throughout the profile range from 0.15 dS/m (low) to 0.16 dS/m (low) in the surface soils, with salinity generally decreasing slightly with depth. Salinity ranges from 0.08 dS/m (very low) to 0.22 dS/m (medium) with depth.



The effective cation exchange capacity of the red ferrosol soils is moderate in the surface soils, increasing with depth to very high levels in the subsoil. This indicates suitable fertility to produce crops and pasture.

5.8.4.3 Soil Suitability for Digestate Irrigation

When selecting a site for digestate irrigation, it is essential to assess the suitability of the site to minimise environmental impacts. The proposed digestate irrigation system will be assessed as per the recommendations of the NSW Department of Environment and Conservation (2004) *“Environmental Guidelines: Use of Effluent by Irrigation”* document. Figure 39 shows there is approximately 185 ha available for digestate irrigation.

As part of the assessment, the current site physical and chemical properties will be outlined. The landform characteristics of the site will also be discussed. Table 2.1 and Table 2.2 from the NSW Department of Environment and Conservation (2004) document will be used to assess the limitations of the site for digestate irrigation.

Table 24 outlines the landform characteristics of the digestate irrigation area. A field assessment of the site was undertaken on the 9th October 2013 by Mitchel Hanlon Consulting staff.

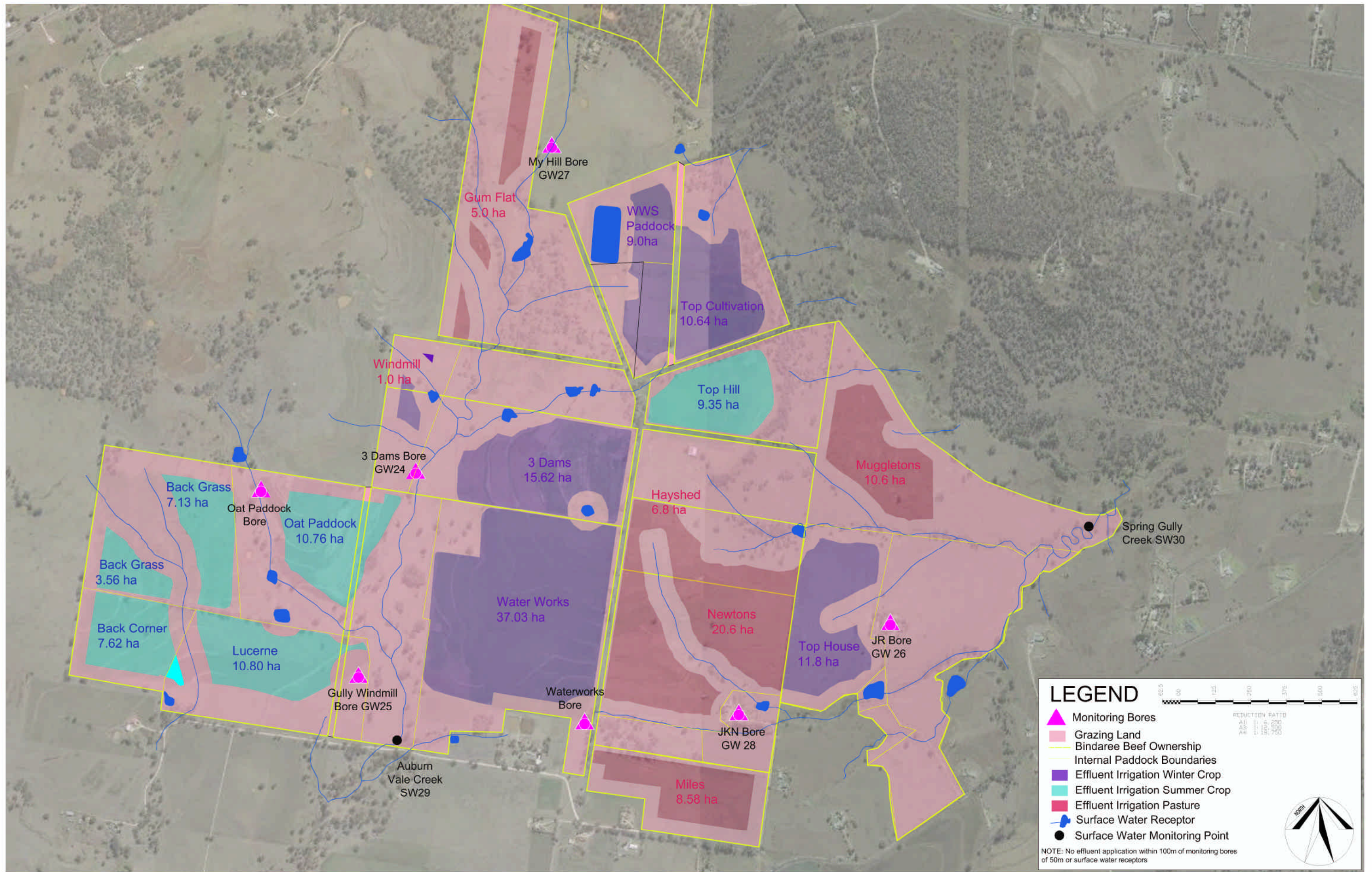


Table 24: Landform Characteristics of the Wastewater Irrigation Area

LANDFORM PROPERTY	SITE CHARACTERISTIC	POTENTIAL LIMITATION	RECOMMENDED MITIGATION MEASURE
Slope % - Surface irrigation	2.4-4.8%	Moderate (1-3%) to Severe (>3%)	Wastewater irrigation scheduling will be monitored to ensure no runoff and erosion risk
Flooding	None or Rare	Nil or Slight	No recommendation
Landform	Crests, convex slopes and plains	Nil or Slight	No recommendation
Surface rock outcrop %	Nil	Nil or Slight	No recommendation

Table 25 outlines the soil characteristics of the wastewater irrigation area. Field data was collected on the 9th October 2013 and where soil analysis was undertaken the results have been included.

Literature data has been used for some parameters as part of the assessment, and is considered representative of the site soils.



Source: NSW LPI



Table 25: Soil Characteristics of the Wastewater Irrigation Area

SOIL PROPERTY	SITE CHARACTERISTIC	POTENTIAL LIMITATION	RECOMMENDED MITIGATION MEASURE
Exchangeable Sodium Percentage (0-40 cm) %	1.7-5.9 % ¹	Slight (0-5%) to Moderate (5-10%)	Ongoing soil monitoring of wastewater irrigation area
Exchangeable Sodium Percentage (40-100 cm) %	1.27-4.51 % ¹	Nil or Slight (<10%)	No recommendation
Electrical Conductivity (ECe) (dS/m at 0-70 cm)	0.4-1.6 dS/m ²	Nil or Slight (<2 dS/m)	No recommendation
Electrical Conductivity (ECe) (dS/m at 70-100 cm)	0.4-1.84 dS/m ²	Nil or Slight (<4 dS/m)	No recommendation
Depth to top of seasonal high watertable (m)	4.3-15.7 m ³	Nil or Slight (>3m)	No recommendation
Depth to bedrock or hardpan (m)	0.5-1.2 m ⁴	Moderate (0.5-1m) to Slight (>1m)	Ongoing soil monitoring of wastewater irrigation area
Saturated hydraulic conductivity (Ks, mm/hr, 0-100cm)	0.5-1 mm/hr ⁵	Severe (<5 mm/hr)	Wastewater irrigation scheduling will be monitored to ensure no runoff or waterlogging
Available Water Capacity (mm/m)	150-200 mm/m ⁵	Nil or Slight (>100 mm/m)	No recommendation
Soil pH (CaCl ₂) Surface layer	3.97-5.72 ¹	Moderate (pH 3.5-6.0)	Ongoing soil monitoring of wastewater irrigation area and lime application



SOIL PROPERTY	SITE CHARACTERISTIC	POTENTIAL LIMITATION	RECOMMENDED MITIGATION MEASURE
Effective cation exchange capacity (cmol(+)/kg) (0-40cm)	14.8-76.3 ¹	Nil or Slight (>15 cmol(+)/kg) to Moderate (3-15 cmol(+)/kg)	No recommendation
Emerson Aggregate Test (0-100cm)	2(1) – 5	Nil to slight (4, 5, 6, 7, 8) to Moderate (2, 3)	Ongoing soil monitoring of wastewater irrigation area
Phosphorus Sorption (kg/ha 0-100cm)	2800-5424 kg/ha ⁶	Moderate (2000-6000 kg/ha)	Ongoing soil monitoring of wastewater irrigation area

1. Soil analysis results undertaken on the 9th October 2013
2. Converted from EC soil water extract 1:5 method, multiplication factor of 8 for light/medium clay. Soil analysis results undertaken on the 9th October 2013
3. Using historical groundwater monitoring data from 2003-2010
4. Using soil profile pits undertaken on the 9th October 2013
5. Literature data from Peverill et. al. (1999) for Black Vertosols (pg 92)
6. Calculated using bulk density of 1.6 g/cc, PBI results undertaken on the 9th October 2013, and NSW DPI (2004)



5.8.4.4 Potential Limitations/Impacts and Mitigation

The results of the site soil assessment have been used to identify potential limitation for digestate application (refer to Table 25)

Where a soil property is classified as 'Slight' (as per Table 25) no soil amelioration is generally necessary. Where a soil property is considered 'Moderate', a management response is required to minimise environmental impacts. If a soil property is considered 'Severe', the site may be unsuited to digestate irrigation and mitigation measures are recommended to be implemented.

A Digestate Management Plan by Utilitas has been prepared for the site based on the obtained results and is contained in Appendix O.

The following sections provide a written account of potential limitations and impacts associated with the subject site soils and propose measures to effectively mitigate these.

5.8.4.4.1 Site Slope Limitations

The slope of the digestate irrigation area is potentially a limiting characteristic. It is proposed that digestate irrigation activities are closely monitored to minimise erosion and runoff from the site. The surface exchangeable sodium percentage (ESP) is rated moderate due to the previous digestate irrigation activities on the site. The quality of digestate and the farm management of the proposed development will improve compared to the current practices. Ongoing soil monitoring will be undertaken to identify any trends in ESP.

5.8.4.4.2 Bedrock Depth Limitations

The depth to bedrock or hard pan is approximately 50cm in some upslope areas of the digestate irrigation area. Digestate irrigation on these areas will be minimised where possible. Irrigation scheduling will be monitored to prevent waterlogging and runoff from the site.

5.8.4.4.3 Saturated Hydraulic Conductivity Limitations

The saturated hydraulic conductivity of the site has not been measured in the field due to the specific equipment required and high cost of analysis. The literature values for a black vertosol have been used for the assessment. Irrigation scheduling will be monitored to minimise potential impacts from waterlogging and runoff.



5.8.4.4.4 Surface pH Limitations

Surface pH is a moderate limitation on the digestate irrigation site. This is due to historic wastewater and paunch applications to the site and poor management. It is recommended that amelioration using lime and ongoing soil monitoring be undertaken to monitor improvements in soil acidity.

5.8.4.4.5 Phosphorus Sorption Capacity Limitations

The phosphorus sorption of the proposed digestate irrigation areas is a moderate limitation. This is due to the fertile nature of black vertosol soils and the historic wastewater application at the site. It is proposed that ongoing soil monitoring be undertaken to identify trends in soil phosphorus sorption.

5.8.4.4.6 Hydrological Migration Impacts

The proposed irrigation practices will limit the application of digestate to areas no closer than 50m to surface water receptors and no closer than 100m to subsurface (groundwater bore) receptors. No impacts on groundwater are anticipated as a result of the surface application of digestate matter to the proposed irrigation areas. Figure 39 shows the hydrology receptor buffer areas in relation to the digestate irrigation areas.

The proposed digestate irrigation area is suitable for purpose with the proposed mitigation measures in place. The improved irrigation scheduling and agronomic management as part of the development will enhance the nutrient management and environmental outcomes for the site.

5.8.4.4.7 General Nutrient Capacity

While it has been determined that the site soils are suitable for digestate application, appropriate crop selection will need to occur to ensure the prevention of nutrient over-loading.

The proposed crops for the digestate irrigation area to mitigate potential nutrient overloading include Hybrid Sudan grasses and winter cereals such as oats. The estimated yields for Sudan grass are 15 t/ha dry matter (DM) and 9 t/ha DM for winter irrigated oats. These crops have a high nutrient uptake and produce suitable biomass for silage or hay production. The crops will be harvested for grain or hay to ensure nutrient removal from the site is maximised.



5.8.4.4.8 Future Analysis & Mitigation

Further analysis possible only after the commencement of operation of the proposed bio-digester is required to determine an accurate picture of the digestate coming from the bio-digester plant. The *NSW Environmental Guidelines – ‘Use of Effluent by Irrigation’* should be used as a starting point to classify the digestate streams and as a basis for assessing and managing their use. These Guidelines however acknowledge that they may not provide guidance in all circumstances and that the onus is on the producer to discuss likely impacts with DEC or the local council so that appropriate ‘strength’ classification.

Once a clear understanding of the digestate from the bio-digester is gained, a comprehensive nutrient balance will be undertaken for the proposed digestate irrigation areas. The nutrient balance will incorporate:

- Nutrient applied through digestate application;
- Crop nutrient removal;
- Crop type and cropping season; and
- Nutrient losses through leaching.



5.8.5 Impact and Mitigation Summary

Potential impacts on soil within the digestate irrigation areas include nutrient overloading, increases in salinity and increases in sodicity. These impacts will be minimised and mitigated through best practice management during management during digestate irrigation activities. Management practices will be refined once specific information has been obtained relating to the properties of the resulting digestate solution.

The soils of the proposed bio-digester development area will be assessed in terms of their suitability for construction prior to development. Potential impacts from construction activities on soil include soil erosion and compaction. Soil erosion can impact on local surface waters by increasing sediment loading. These impacts will be mitigated through the application of appropriate erosion and sediment management, as outlined in Appendix N

A detailed geotechnical investigation will be carried out in the Construction Certificate phase of the project prior to construction works commencing. This investigation will identify the areas that are suitable for foundation construction, and areas that require additional works to provide suitable foundations for the proposed development.

5.8.6 Conclusion

The proposed digestate irrigation areas are suitable for purpose due to the highly fertile soils and geological properties. The improved cropping and agronomic management as part of the development will enhance the nutrient management and environmental outcomes for the site.

The Environmental Protection Licence (EPL) for the existing abattoir operation will be reviewed and if necessary amended to consider the proposed development. Continued soil and digestate monitoring will be enforced under the EPL.



5.9 Hydraulic Modelling

Mitchel Hanlon Consulting engaged the services of FSA Consulting Pty Ltd to prepare a Hydraulic and Nutrient Balance Modelling Report to comply with the DGRs issued by the NSW Department of Planning and Infrastructure. A copy of the report can be found in Appendix P and a summary of the assessment has been provided below.

A hydraulic and nutrient balance assessment was undertaken for the proposed land irrigation of low strength effluent. A desktop study was undertaken initially to collate proposed effluent volume, relevant meteorological data, existing pond infrastructure, existing and future irrigation areas and soil properties of the site.

To maximise the benefits of the water, nutrient and soil amendment values of the effluent, long-term hydraulic modelling using the Model for Effluent Disposal using Land Irrigation (MEDLI) was undertaken. This modelling program is recognised as a suitable method of predicting the sustainable volume and concentrations of effluent that can be reused on the 'Alsace' property.

Climate data for the site was required in order to undertake the necessary modelling of the effluent reuse system. Daily data (100 years) for the site was obtained from the Bureau of Meteorology. The median annual rainfall is 767 mm/year.

The effluent volume generated by the anaerobic digester is estimated to be 1.25 megalitres (ML) per day, five days per week, 52 weeks per year. Therefore, the annual effluent inflow to the ponds was estimated to be approximately 326.6 ML/yr.

The MEDLI model was calibrated to have nitrogen, phosphorus and salinity concentrations in the irrigated effluent at the maximum concentrations allowable for "low strength" effluent as described in the Environmental Guidelines – Use of Effluent by Irrigation (DEC 2004).

The effluent generated by the anaerobic digester will be stored in the existing effluent ponds and wet weather storage pond that have a combined capacity of over 200 ML. The existing aerobic treatment ponds will be decommissioned as aerobic treatment ponds. These ponds will be cleaned out and used as effluent holding ponds for the proposed development. The anaerobic pond will be retained as bacteria feedstock for the anaerobic digester.

Mitchel Hanlon Consulting undertook soil sampling and analysis of the existing effluent irrigation areas in late 2013. The results showed that dark heavy clay soils dominate the effluent reuse areas. These soils have moderate to high water holding capacity and are imperfectly drained with low permeability. Therefore, the default 'Black Vertosol' soil in MEDLI was used for the modelling.



The irrigation input data required for the modelling includes the irrigation method, irrigation area size and irrigation scheduling. The available effluent irrigation area totals 160 ha and effluent will be applied using spray irrigation. Irrigation scheduling was based on a 20 mm soil water deficit. The MEDLI model assumes that all crop material grown is harvested and then removed from the site.

Two scenarios are modelled (effluent irrigation scenario and dryland scenario) to identify the increase in nutrient loading and deep drainage due to effluent irrigation compared to the dryland cropping system.

The modelling results show that under the proposed effluent reuse system, overtopping is estimated to be approximately 2.8 ML/yr or about 0.9% of annual effluent inflow. It is predicted that five overtopping events occur every 10 years, which meets the “uncontrolled releases may be permitted in 50 percent of years” for low strength effluent as outlined in the EPA guidelines (DEC 2004).

The modelling results give an indication of the predicted nutrient loading rates and deep drainage for the effluent irrigation areas. The effluent irrigation volume applied is approximately 200 mm/yr. The predicted deep drainage rate is 41 mm and predicted runoff is estimated to be 20 mm/yr. The nitrogen loading rate is estimated at 101 kg/ha/yr and leached nitrogen is predicted to be <1 kg/ha/yr.

The predicted phosphorus loading rate is 20 kg/ha/yr, with approximately 19 kg/ha/yr will be utilised by the cropping regime. It is predicted that no phosphorus leaching will occur. The predicted crop yield of the ryegrass pasture modelled is 12.2 tDM/ha/yr on average. This is within the yield estimates for the Inverell area provided by the agronomist.

The modelling results for the dryland scenario show the predicted deep drainage rate is 21 mm/yr and predicted runoff is 27 mm/yr. Therefore, it is expected that applying 200 mm/yr of effluent will increase deep drainage by 20 mm/yr (~49%) and runoff will actually decrease by 7 mm/yr due to crop growth and improved crop cover.

The modelling of the proposed “low strength” effluent reuse system is considered sustainable in terms of the DEC (2004) guidelines as it meets the criteria of acceptable pond overtopping frequency (5 events in 10 years), balanced nutrient loading rates causing negligible leaching and minor impacts on deep drainage.

Water balance modelling scenarios were also undertaken to determine the irrigation requirements and wet weather pond volume that would be acceptable for both “medium” and “high” strength effluent. An additional 10 modelling runs were undertaken. For all scenarios, the effluent inflow of ~327 ML/yr, soil types and irrigation scheduling were kept constant.



The additional modelling showed that the existing effluent holding pond and wet weather storage capacity of 200 ML is sufficient to meet the medium and high strength effluent overtopping frequency criteria from a water balance perspective.

The effluent irrigation area site water balance demonstrates that the irrigation of low strength effluent will not cause detrimental environmental impacts on the existing effluent irrigation areas. The capacity of the existing aerobic and wet weather storage ponds is sufficient to meet the overtopping event requirements of the DEC (2004) guidelines.

The nutrient balance from the application of low strength effluent is environmentally sustainable in terms of crop requirements and minimal leaching of nutrient. The Digestate Management Plan (Appendix O) outlines in more detail the proposed management practices for the digestate utilisation on land.



5.10 Site Contamination Review

5.10.1 Introduction

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

Subsequently, the need for the development site's potential for contamination as a result of the historical land use has been identified. The potential for site contamination has been discussed in the following sections.

5.10.2 Site History Review

To reliably identify the potential for contamination within the proposed development site, a review of the site history has been undertaken. Discussions were held with a number of current and past members of abattoir staff.

Mr Paul Murray, employee at the abattoir from 1985 – 1992 (prior to Bindaree's ownership) was consulted. Mr Murray confirmed that to his knowledge, the proposed development area was only ever used for grazing and temporary livestock holding. The development area was never used for the storage of chemicals, lubricants, oils or fuels, nor was it subject to regular chemical application. Mr Murray also confirmed that the abattoir waste was never disposed of (ie buried or spread) within the development area.

Discussions were held with Mr David Sneddon who currently works onsite and has done so for approximately four (4) years. Mr Sneddon confirmed that during this time, the use of the proposed development area has been limited to grazing and temporary livestock holding. It was also detailed that the proposed development area has not been used for the storage of chemicals, oils, fuels or lubricants. With exception of selective pesticide use for weed management, the site has not been subject to chemical application. Mr Sneddon detailed that no waste products produced by the abattoir have been stored on or applied to the development area during his time working onsite.



5.10.2.1 Abattoir Related Contamination Sources

A number of waste products have been historically generated by the onsite abattoir including paunch and manure, Bone and other livestock waste and blood and wash-down waste. Recent waste disposal practices have been well documented and it is clear that during the current ownership, no abattoir waste has been applied to, or stored within, the proposed development area. Further to this, Discussions with Mr Paul Murray revealed that prior to the current ownership; all forms of waste disposal and storage were isolated from the proposed development area. Physical inspection of the site did not result in the identification of any obvious signs of onsite abattoir waste disposal in this area.

Therefore, it has been deemed that there is a low probability of the historical land use and associated abattoir waste management practices having caused soil contamination or a health risk within the study area.

5.10.2.2 Chemical Storage and Handling

Based upon the extensive review of the site's land use history and discussions with the current and past abattoir employees, it has been determined that the proposed development area is unlikely to have been extensively exposed to chemicals which have the potential to detrimentally affect the surrounding environment. Past and present employees of the abattoir have detailed that no chemicals have been stored within the proposed development area, and that all chemicals have been used only as directed.

Therefore, it has been deemed that there is a low probability of the historical land use and associated chemical practices having caused soil contamination or a health risk within the study area.

5.10.2.3 Petroleum Product Storage and Handling

Based upon the extensive review of the site's land use history and discussions with the current and past abattoir employees, it has been determined that the proposed development area is unlikely to have been exposed to petroleum products which have the potential to detrimentally affect the surrounding environment. Past and present employees of the abattoir have detailed that no petroleum products have been stored within the proposed development area.

Therefore, it has been deemed that there is a low probability of the historical land use and associated fuel storage practices having caused soil contamination or a health risk within the study area.



5.10.3 Required Actions

Based on the site historical review and review of current landuse practices, it has been determined that the proposed development area is suitable for the proposed development.

The proposed landuse of the development site (bio digester and rendering plant) is deemed to be a less sensitive landuse than the current grazing practices occurring onsite. In addition to this, it was found that there were no historical landuses within the development area that make the presence of contamination likely.

The proposed landuse of the wastewater irrigation areas has been identified as being no more sensitive than the current effluent application landuse. The proposed irrigation practices will (unlike previous applications) limit the application of wastewater to areas no closer than 50m to surface water receptors and no closer than 100m to subsurface receptors. A review of historical landuse information has determined that it is unlikely that the proposed wastewater irrigation area harbours any form of agricultural contamination.

It had subsequently been determined that no further investigation or assessment into the contamination status of the proposal site is required.



5.11 Surface Water

The subject property is located within the Macintyre River and Copeton Dam catchments. Surface water from the current abattoir site flows to the north east across the Gwydir Highway to the Macintyre River downstream of Inverell. The proposed development is located 30 m from the closest drainage line, and located approximately 5.4 km upstream from the Macintyre River.

Surface water from the eastern side of the current wastewater irrigation area flows from the property to the Spring Creek catchment to the east, meeting the Macintyre River at Inverell. The surface water from the western side of the current wastewater irrigation area flows to the south west into the Auburn Vale Creek catchment a tributary of Copeton Dam which is over 13 km downstream.

Surface water monitoring has currently been undertaken as part of the Environmental Protection Licence (EPL) monitoring requirements for the abattoir operations. The monitoring data is discussed further in Section 5.11.6. There are no surface water irrigation licenses current for the property.

The property is not identified as a flood prone area as per the Inverell Development Control Plan 2013. Flooding historically on the site is short lived due to the upper slope location within the landscape and the close proximity to drainage lines.

5.11.1 Stormwater and Site Drainage

Stormwater has the capacity to transport contaminants from the site to local surface water and potentially affect downstream systems. Water quality and quantity can be affected by the construction works and operational activities in the following ways:

- Sedimentation of surface waters from soil excavation or stockpiled material,
- Contaminants entering surface water,
- Hazardous materials entering surface water,
- Waste products entering surface water, and
- Chemicals entering surface water.

CPC Land Development Consultants Pty Ltd has prepared a stormwater report and plans outlining the proposed drainage for the rendering plant and bio-digester plant. This report is contained in Appendix N.



MeatEng plan 312-016-DA14 (Appendix C) shows an overall stormwater and drainage concept plan for the rendering and bio-digester plants site.

5.11.1.1 Rendering Plant Site Drainage

The proposed rendering plant construction site is approximately 0.14 ha. CPC Land Development Consultants Pty Ltd has prepared a stormwater report and plans outlining the proposed drainage from the rendering plant site. This report is contained in Appendix N.

Stormwater from the rendering plant area will be sourced from the:

- Roof area of the rendering plant building;
- Hard stand areas around the building; and
- Road areas around the building.

The rendering plant catchment area extends approximately 3.4 ha upslope. The existing overland flow travels to the north into three existing swale drains. All site drainage will be via open grassed swale drains.

Roof water from the rendering plant will be directed into a rock pod to dissipate flows then flow into the existing drainage line. The proposed hard stand and road areas around the rendering plant building will be directed to the existing drainage line via open swale drains. The predicted increase in runoff from the site will be approximately 51 l/s from the rendering plant and an additional 16 l/s from the bio-filter.

MeatEng plan 312-016-DA09 (Appendix C) outlines the proposed cut and fill earthworks for the rendering plant site. MeatEng plan 312-016-DA11 (Appendix C) shows the proposed stormwater and drainage concept plan for the rendering plant.

One rainwater tank will be installed to capture roof water from the rendering plant building. A 100,000 litre tank would effectively mitigate any additional stormwater impact from the render building. This tank will be located next to the building and used as water storage for fire or emergency management.

Any hazardous materials or chemicals used in the rendering plant process will be stored within the rendering plant building. The hazardous materials and chemicals will be handled and stored as per the MSDS requirements and in a suitably bunded storage area. These materials will be used only by trained staff and records will be kept of their usage. All hazardous materials will be disposed of in accordance with the relevant waste classification requirements. By storing and handling hazardous materials in the recommended way, there will be minimal environmental impacts on surface water.



All waste products and render products (tallow and meat meal) will be stored and handled within the rendering plant building to minimise impacts on the surrounding waterways. The processed tallow and meat meal will be handled and transported by a suitably trained operator, and spillage of the products will be kept to a minimum.

All waste products will be disposed of in accordance with the relevant waste classification requirements. No waste products will be disposed of onsite with the proposed rendering plant catchment.

5.11.1.2 Bio-digester Site Drainage

The total proposed bio-digester development site is approximately 1.04 ha. CPC Land Development Consultants Pty Ltd has prepared a stormwater report and plan outlining the proposed drainage from the bio-digester site. This report is contained in Appendix N.

Stormwater from the bio-digester area will be sourced from the:

- Roof area of the buildings and tanks;
- Hard stand areas around the buildings and tanks; and
- Road areas around the facility.

The bio-digester area will be sloped to the east to allow for natural overland flow within existing and constructed swale drains. Roof water from the bio-digester tanks, generators, and sheds will be directed into the existing swale drains and culvert. The proposed hard stand and road areas around the bio-digester facility will be directed to the existing swale drains.

The area will drain to an existing culvert underneath the access road to the abattoir. This culvert is a 450 mm RCP and is capable of handling the predicted increase in discharge (284 l/s) from the site. This is within the capacity of the existing pipe and contained within the existing drainage works.

The construction of diversion banks on the north eastern side and southern side of the bio-digester plant will assist in separating the water flows from the vast bulk of the catchment and assist in directing this water towards the existing irrigation dam and the box culvert (under Gwydir Highway), vastly reducing the size of proposed constructed swale drains.

Utilitas plan A04-001-Sheet 06 (Appendix C) outlines the grading cut and fill for the proposed bio-digester site. Utilitas plan A04-001-Sheet 07 (Appendix C) shows the proposed stormwater and drainage concept plan for the bio-digester plant.



Stormwater from both the rendering plant and bio-digester sites will flow into a rock lined check dam with an outlet to an existing RCP culvert. This 600 mm culvert has a capacity of 695 l/s. From the culvert, site stormwater flows into an existing swale drain and natural drainage line to an existing twin cell box culvert under the Gwydir Highway. The increase in discharge from the proposed development sites will be negligible in terms of the total discharge to the box culvert on the Gwydir Highway.

Any hazardous materials or chemicals used in the bio-digester process will be stored within the bio-digester facility area. The hazardous materials and chemicals will be handled and stored as per the MSDS requirements and in a suitably bunded storage area. These materials will be used only by trained staff and records will be kept of their usage. All hazardous materials will be disposed of in accordance with the relevant waste classification requirements. By storing and handling hazardous materials in the recommended way, there will be minimal environmental impacts on surface water. Any spills of hazardous materials or chemicals will be contained within the bio-digester site and bunded to prevent movement offsite.

All waste products will be stored and handled within the bio-digester facility area to minimise impacts on the surrounding waterways. The effluent from the bio-digester will be pumped directly to the existing holding ponds for storage. All waste products will be disposed of in accordance with the relevant waste classification requirements. No waste products will be disposed of onsite with the proposed bio-digester catchment.

5.11.2 Erosion and Sedimentation Controls

Erosion control will be implemented at this site during construction activities to minimise soil erosion and protect surface water quality. The clay surface soils are prone to erosion and maintaining groundcover will be prioritised to minimise erosion on the site.

Utilitas plan A04-001-Sheet 08 (Appendix C) shows the proposed erosion and sediment control plan for the bio-digester plant site. MeatEng plan 312-016-DA11 (Appendix C) shows the proposed erosion and sediment controls for the rendering plant.

Site runoff and erosion will be controlled by installing a deflection bank upslope of the construction site and direct clean runoff away from the site. Water will be directed around the site into the existing swale drain and natural drainage line to the existing box culvert at the Gwydir Highway.

Sedimentation of surface flows will be minimised by ensuring stockpiles are located within the construction zone and sediment fencing is installed around the downslope area of the stockpile. Rock line energy dissipaters will be installed and allow sediment to settle out of surface water prior to moving offsite.



Constructed grassed swale drains will be installed to direct surface water flows throughout the site. Water flow will be slowed in the swale drains by using rock lined energy dissipaters, one located where the rendering plant stormwater enters the swale drain, and one located in the swale drain nearest to the car park. A rock lined check dam will be installed to slow flows from the bio-digester and rendering plant construction sites.

Potential impacts on water quality during construction will be minimised by the development and implementation of a Sediment and Erosion Control Plan to be developed as part of the construction phase. Rehabilitation of exposed surfaces will be implemented to minimise sediment runoff.

Appendix N includes the Stormwater Report prepared by CPC Land Development Consultants Pty Ltd outlines a number of erosion and sedimentation control measures that will be implemented onsite during the construction and operational phase.

5.11.3 Controlled Activity on Waterfront Land

A 'Controlled Activity' approval will be sort for the proposed development site. Waterfront land is defined as the bed of any river, lake, and any land within 40 m of the river banks, lake shore or estuary under the Water Management Act 2000. This includes any drainage line defined on a topographic map.

A 'controlled activity' is defined as:

- the erection of a building or the carrying out of a work (within the meaning of the *Environmental Planning and Assessment Act 1979*); or
- the removal of material (whether or not extractive material) or vegetation from land, whether by way of excavation or otherwise; or
- the deposition of material (whether or not extractive material) on land, whether by way of landfill operations or otherwise; or
- the carrying out of any other activity that affects the quantity or flow of water in a water source.

The proposed development is defined as 'the erection of a building or the carrying out of a work (within the meaning of the *Environmental Planning and Assessment Act 1979*). The proposed development is located within 40 m of a watercourse as marked on topographic maps provided by the NSW Land and Property Information SIX Maps online mapping tool.



The impacted watercourses are ephemeral drainage lines and classified as 1st order streams as per the Strahler System of ordering watercourses. Due to the upstream nature of the drainage lines, there are no defined channels or banks, and no defined vegetated riparian zones adjacent to the drainage lines.

Developments classed as State Significant Development are excluded from the requirement to obtain a Controlled Activity Approval.

The predicted impact on the drainage lines will be minimal due to the implementation of sediment and erosion controls during and post-construction. The proposed stormwater drainage management measures outlined in Section 5.11 will complement the existing site drainage and minimise negative impacts from the development.

The relevant approval process with the Office of Water will be undertaken once development consent has been received.

Any works that are undertaken within 40 m of a watercourse will be in accordance with the Office of Water Guidelines for Controlled Activities.

5.11.4 Flooding

The property is positioned high in the headwaters of the Macintyre and Copeton Dam catchments, and is only exposed to short-term localised flooding. Flood waters recede quickly as the water moves offsite.

The proposed development site is not located within identified Flood Prone Land as per the Inverell Shire Council DCP 2013, and the Inverell Flood Plain Management Plan 1996.



5.11.5 Water Requirements

Water will be required for the proposed development for the following activities:

- Rendering plant condenser;
- Staff amenities; and
- Fire/emergency and bushfire management requirements.

The proposed development has an existing connection to the Inverell Shire Council reticulated water supply. This will continue to be the only source of water used within the abattoir facility and proposed rendering plant and bio-digester.

The existing water agreement between Yolarno Pty Ltd and Inverell Shire Council will remain. No increase in the water volume required from the reticulated supply is proposed.

The groundwater bores currently onsite are not licensed for industrial or commercial use. Groundwater will not be used as part of the proposed development. Similarly, surface water will not be used as part of the proposed development.



5.11.6 Auburn Vale Creek and Spring Creek Monitoring Data

5.11.6.1 Introduction

Surface water monitoring is currently undertaken as per the requirements of the Environmental Protection Licence No. 809. Surface monitoring points are located at the discharge point from the property and are indicated on Figure 39 in Section 5.8.4. Figure 40 details the Auburn Vale Cree and Spring Creek catchments.

A summary of the parameters monitored at the site within the last six years are outlined in Table 26 and Table 27 below. Sampling is undertaken in accordance with the licence conditions. Sampling is undertaken after each wet weather storage overflow event and during stormwater runoff discharge from the premises at least every 3 months. Where there is no stormwater runoff discharge from the premises, no sampling is undertaken.

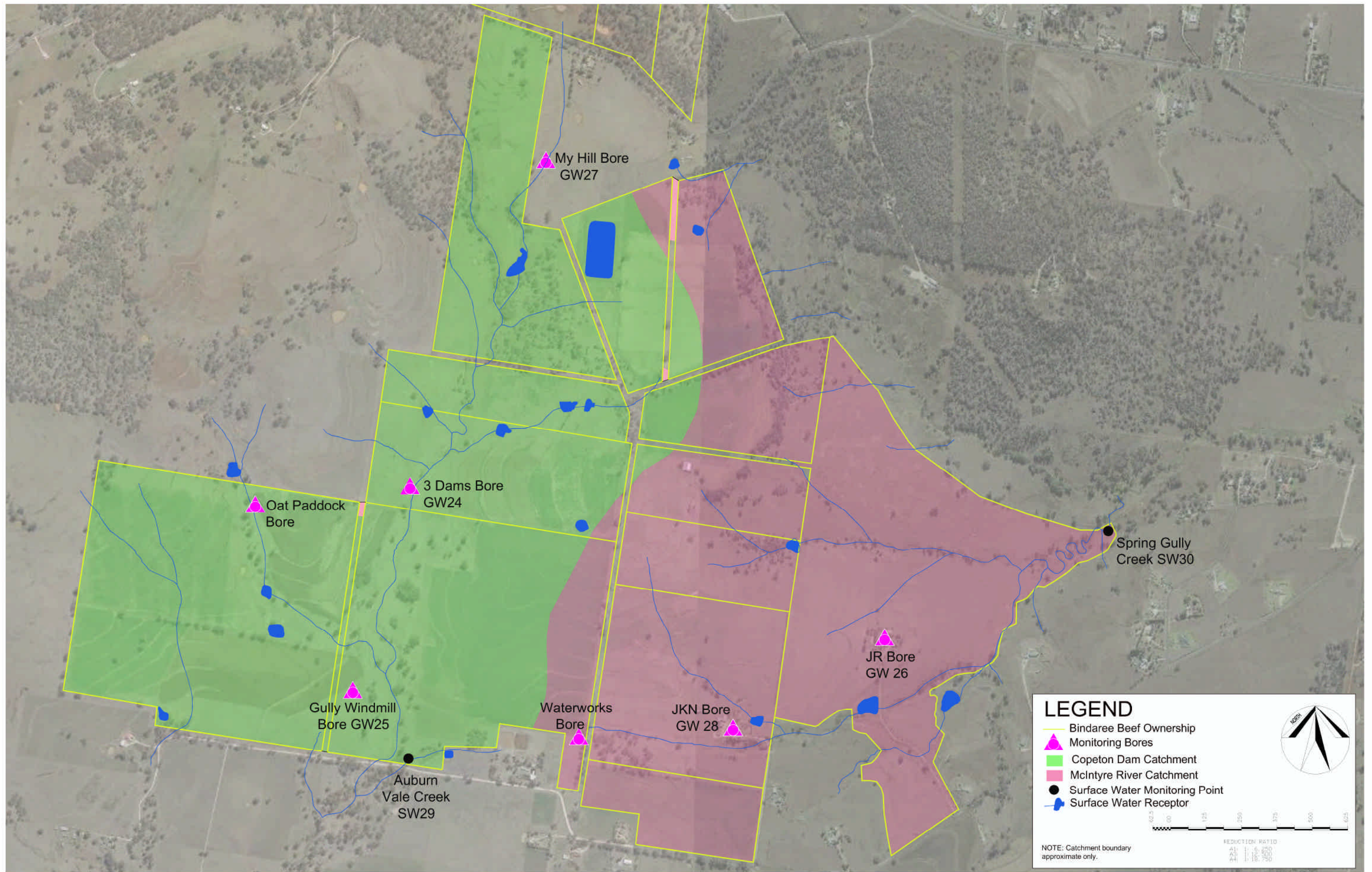




Table 26: Auburn Vale Creek Background Water Quality

DATE OF SAMPLING	pH	TOTAL NITROGEN (MG/L)	NITRATE (MG/L)	TOTAL PHOSPHORUS (MG/L)	ELECTRICAL CONDUCTIVITY (DS/M)
14/2/08	6.69	0.78	0.030	0.15	1.6
12/11/08	6.78	0.98	0.027	0.15	1.3
27/08/10	7.09	5.96	3.039	1.41	1.89
18/07/12	6.32	0.8	0.009	0.18	2.1
04/01/13	6.6	0.78	0.015	0.09	1.8

Table 27: Spring Creek Background Water Quality

DATE OF SAMPLING	pH	TOTAL NITROGEN (MG/L)	NITRATE (MG/L)	TOTAL PHOSPHORUS (MG/L)	ELECTRICAL CONDUCTIVITY (DS/M)
14/2/08	7.47	1.31	0.002	0.58	0.44
12/11/08	7.85	3.26	1.694	0.7	0.52
27/08/10	7.54	1.25	0.213	0.49	0.25
18/07/12	7.28	2.83	1.661	0.69	0.70
04/01/13	7.75	1.43	0.382	0.37	0.81

The wastewater irrigation area is located within the Border Rivers and the Gwydir River catchments in terms of the Water Quality and River Flow Objectives. The Spring Creek (Border Rivers) and Auburn Vale Creek (Gwydir River) are classified as uncontrolled streams; their flow patterns are largely natural, flows can occur from local runoff and they are typically ephemeral.

The sampling results have been assessed against the *National Water Quality Management Strategy: Australian and New Zealand Guidelines for Fresh and Marine Water Quality – Primary Industries* (ANZECC/ARMCANZ) 2000. The trigger values for irrigation and general use water uses has been use for this assessment. The results have also been assessed against the water quality objectives for Irrigation Water Supply within the relevant catchment.



5.11.6.2 Auburn Vale Creek

The pH of the surface water ranges between 6.32 and 7.09. These values are within the recommended range of pH 6 to 9 for surface water systems.

Total nitrogen levels are generally below 1 mg/L, with an unusually high reading obtained in August 2010 of 5.96 mg/L. These levels are generally below the long-term trigger value of 5 mg/L for total nitrogen in irrigation waters. The nitrate nitrogen levels are generally below 0.03 mg/L, with a correspondingly high reading in August 2010 of 3 mg/L. These concentrations are well below the recommended nitrate trigger value of 100 mg/L for drinking water for adults and infants older than 3 months old. The concentrations are also below the trigger value of 50 mg/L for infants below 3 months old. There are no recommended trigger values for nitrate or ammonia nitrogen levels for irrigation quality water.

The total phosphorus concentrations are consistently below 0.2 mg/L. An unusual result was obtained in August 2010 of 1.41 mg/L. These results are within the short term trigger values of 0.8-12 mg/L for total phosphorus. The reactive phosphorus concentrations range between 0.03-1.21 mg/L. There are no recommended trigger values for phosphate or reactive phosphorus.

The slightly elevated results in August 2010 are considered to be a seasonal fluctuation and are not considered part of an increasing trend in nutrient loading. Continued monitoring of the surface water will be undertaken as part of the proposed development and any trends in nutrient loading identified.

The total dissolved solids concentrations are well within the drinking water trigger values of 0-600 mg/L for good palatability. The recommended trigger values for livestock drinking water for beef cattle are 0-4000 mg/L for no adverse effects on animals. The results from Auburn Vale Creek are well below this concentration.

Electrical conductivity is an indicator of salinity in water. The electrical conductivity of Auburn Vale Creek ranges from 1.3-2.1 dS/m. This is a medium level of electrical conductivity (medium trigger values range from 1.3-2.9 dS/m).



5.11.6.3 Spring Creek

The pH of the surface water in Spring Creek ranges between 7.28 and 7.85. These values are within the recommended range of pH 6 to 9 for surface water systems.

Total nitrogen levels range between 1.25 and 3.26 mg/L. These levels are below the long-term trigger value of 5 mg/L for total nitrogen in irrigation waters. The nitrate nitrogen levels range between 0.002-1.69 mg/L. These concentrations are well below the recommended nitrate trigger value of 100 mg/L for drinking water for adults and infants older than 3 months old. The concentrations are also below the trigger value of 50 mg/L for infants below 3 months old. There are no recommended trigger values for nitrate or ammonia nitrogen levels for irrigation quality water.

The total phosphorus concentrations are between 0.37 and 0.70 mg/L. These results are within the short term trigger values of 0.8-12 mg/L for total phosphorus. The reactive phosphorus concentrations range between 0.178-0.56 mg/L. There are no recommended trigger values for phosphate or reactive phosphorus.

The total dissolved solids concentrations are well within the drinking water trigger values of 0-600 mg/L for good palatability. The recommended trigger values for livestock drinking water for beef cattle are 0-4000 mg/L for no adverse effects on animals. The results from Spring Creek are well below this concentration.

Electrical conductivity is an indicator of salinity in water. The electrical conductivity of Spring Creek ranges from 0.25-0.81 dS/m. This is a very low to low level of electrical conductivity.

The surface water quality of the Auburn Vale and Spring Creeks indicates that the creeks are in good health and there are no indications that wastewater irrigation has a detrimental effect on the creek health. This is level of water quality expected to remain due to the effective management of effluent and utilisation on the cropping land.

5.11.7 Conclusion

The subject property is located within the Border Rivers and Gwydir River catchments. Surface water from the current abattoir site flows to the north east across the Gwydir Highway to the Macintyre River downstream of Inverell.

Surface water from the eastern side of the current wastewater irrigation area flows from the property to the Spring Creek catchment to the east, meeting the Macintyre River at Inverell. The surface water from the western side of the current wastewater irrigation area flows to the south west into the Auburn Vale Creek catchment a tributary of Copeton Dam which is over 13 km downstream.



Stormwater from both the rendering plant and bio-digester sites will flow into a rock lined check dam with an outlet to an existing RCP culvert. From the culvert, site stormwater flows into an existing swale drain and natural drainage line to an existing twin cell box culvert under the Gwydir Highway. The increase in discharge from the proposed development sites will be negligible in terms of the total discharge to the box culvert on the Gwydir Highway.

Sedimentation and erosion controls will be implemented during construction and operation. Sediment control techniques include straw bales in drainage lines and sediment fencing around stockpile areas. Erosion control measures include a rock-lined check dam, grassed swale drains and diversion of upstream water around the site. Sedimentation or erosion will not be a significant issue on the site.

The proposed development is classified as a 'controlled activity on waterfront land' under the Water Management Act 2000. The proposed development is located within 40 m of a watercourse, and the proposed works constitute a 'controlled activity'. All works undertaken within 40 m will be undertaken in accordance with the Office of Water Guidelines for Controlled Activities.

Surface water monitoring has currently been undertaken as part of the Environmental Protection Licence (EPL) monitoring requirements for the abattoir operations. The monitoring data indicates that the creeks are in good health and that the surface water quality has not been affected by wastewater irrigation activities. Continued monitoring of the creeks will be implemented as part of the revised EPL for the site.

There are no surface water irrigation licenses current for the property. There are no proposed new surface water licenses required for the proposed development.

The property is not identified as a flood prone area as per the Inverell Development Control Plan 2013. Flooding historically on the site is short lived due to the upper slope location within the landscape and the close proximity to drainage lines.

The current water agreement between Yolarno Pty Ltd and the Inverell Shire Council for town water supply will remain and continue for the proposed development. This will be the sole water source for the existing abattoir operation and proposed development.



5.12 Groundwater

The surface application of nutrients can raise concerns for groundwater systems. Potential impacts on groundwater resulting from the proposed application of digestate matter are assessed in the following sections.

5.12.1 Existing Environment & Background

The groundwater sources within the Inverell region are dominated by fractured rock aquifers including Palaeozoic and Mesozoic granites, basalts, unconsolidated sediments and metasediments.

The Inverell region is underlain by sandstones, shales and mudstones of the Great Artesian Basin. The groundwater source is approximately 175,250 ha, occurring throughout the whole Inverell district and extending to Delungra in the west. In the south-west it forms the water-shed with the Gwydir and Macintyre Rivers.

Groundwater resources within the Inverell region are managed under the Water Sharing Plan for the NSW Murray-Darling Basin Fractured Rock Groundwater Sources. The subject site is located within the Inverell Basalt Groundwater Source, part of the New England Fractured Rock and Northern Basalts Water Resource Plan Area.

There are no identified high priority groundwater dependant ecosystems located on the subject property as outlined by this document.

The existing groundwater entitlements for the subject property are for stock and domestic use. There are no groundwater irrigation licenses current for the property. Groundwater will not be used for construction or operational activities, or dust suppression.

A desktop hydrology study was undertaken to aid in the identification of sensitive receptors on the proposed development site that could potentially be impacted by the proposal. The findings of this investigation are summarised in Section 5.12.2. The groundwater works summaries for the identified bores can be found in Appendix R.



5.12.2 Existing Groundwater Bores

Groundwater will not be utilised as part of the proposed development. The current licenses for the bores are currently allocated for stock and domestic use only. There are no proposed additional groundwater licenses as part of the development.

Table 28 and Table 29 outline the operational and non-operational bore licences on the property.

The groundwater works summaries for the bores located within the Border Rivers catchment indicate groundwater bearing zones between 22 m and 123 m. The groundwater works summaries for the bores located within the wastewater irrigation area (Gwydir River catchment) indicate groundwater bearing zones between 19 m and 75 m.

Due to the depth of the water bearing zones and the nature of the development, it is envisaged there will be minimal impact on the local groundwater system.

Table 28: Operational Groundwater Bore Receptors

GROUNDWATER BORE RECEPTOR	LOT/PLAN	FINAL DEPTH (m)	WATER BEARING ZONES (m) THICKNESS (m)
GW070235	404 /	92.99	51.52 – 86.28 (34.76 m)
	DP753287		89.32 – 90.24 (0.92 m)
GW054220	3 /	132.60	64.00 – 67.70 (3.70 m)
	DP536185		119.50 – 121.90 (2.4 m)
GW050905 (JKN Bore)	234 / DP753287	76.20	51.20 – 51.50 (0.3 m) 75.60 – 75.90 (0.3 m)
GW006950 (JR Bore)	7 / DP238696	39.90	25.90 – 27.40 (1.50 m)



Table 29: Non – Operational Groundwater Bores

GROUNDWATER BORE RECEPTOR	LOT/PLAN	FINAL DEPTH (m)	WATER BEARING ZONES (m) THICKNESS (m)
GW019233	83/DP7 53638	79.60	22.30 – 22.30 (0 m) 41.80 – 42.10 (0.3 m)
GW019434	83/DP7 53638	42.40	36.30 – 42.00 (5.70 m)
GW038489	83/DP7 53638	58.20	25.90 – 29.20 (3.30 m)
GW002646	83/DP7 53638	78.00	48.80 – 48.80 (0 m) 77.70 – 77.70 (0 m)
GW964950	83/DP7 53638	123.4 7	109.75 – 123.47 (13.72 m)
GW964949	83/DP7 53638	77.74	70.12 – 75.00 (4.88 m)
GW006946	234/DP 753287	19.20	19.20 – 19.20 (0 m)
GW901534	156/DP 753638	44.10	35.60 – 36.20 (0.6 m) 40.20 – 40.50 (0.3 m)
GW901075	7/DP23 8696	64.63	36.28 – 39.93 (3.65 m) 45.73 – 51.82 (6.09 m) 56.40 – 62.50 (6.10 m)



5.12.3 Existing Groundwater Bore Monitoring Data

Groundwater monitoring is currently undertaken as per the requirements of the Environmental Protection Licence No. 809. Groundwater monitoring points are located within the wastewater irrigation areas and are indicated on Figure 39 in Section 5.8.4.3.

A summary of the parameters monitored at the site between 2008 and 2013 are outlined in Table 30, Table 31, Table 32, Table 33 and Table 34.

Sampling is undertaken every six months in accordance with the environmental protection licence conditions



Table 30: Groundwater Bore Monitoring Results – 2008-2013 – 3 Dams Bore – EPA Monitoring Point 24

DATE OF SAMPLING	pH	TOTAL NITROGEN (mg/L)	NITRATE (mg/L)	NITRITE (mg/L)	TOTAL KJELDAHL NITROGEN (mg/L)	AMMONIA NITROGEN NH ₄ (mg/L)	TOTAL PHOSPHORUS (mg/L)	REACTIVE PHOSPHORUS (mg/L)	ELECTRICAL CONDUCTIVITY (dS/m)	STANDING WATER LEVEL (m)
27/06/08	7.3	9.3	7.055	0.0025	2.19	0.0025	0.17	0.07	1.18	4.4
15/01/09	7.1	1.8	2.29	0.0025	-	0.05	0.18	0.15	1.09	4.6
18/06/09	7.26	1.96	1.485	0.0025	0.47	0.005	0.2	0.09	1.09	5.2
14/01/10	7.03	1.59	1.565	0.009	0.01	0.009	0.14	0.11	1.08	6.6
05/07/10	7.22	1.51	1.463	0.0005	0.04	0.007	0.17	0.09	1.07	-
19/04/12	7.2	1.51	0.665	0.27	0.81	0.114	0.5	0.34	0.79	-
28/10/12	7.13	1.42	0.662	0.002	0.76	0.001	0.18	0.16	1.08	-
19/11/12	7.21	1.93	1.737	0.005	0.19	0.029	0.17	0.144	1.1	-
14/01/13	7.19	1.88	1.855	<0.001	0.03	<0.005	0.21	0.15	1.09	-
10/04/13	7.19	4.37	3.953	0.001	4.37	0.014	0.29	0.187	1.09	-
11/07/13	7.30	3.21	1.894	0.002	3.21	0.012	0.20	0.15	1.07	-
12/09/13	7.73	1.76	1.657	0.001	1.76	0.016	0.16	0.16	0.99	-



Table 31: Groundwater Bore Monitoring Results – 2008-2013 – Gully Bore – EPA Monitoring Point 25

DATE OF SAMPLING	pH	TOTAL NITROGEN (mg/L)	NITRATE (mg/L)	NITRITE (mg/L)	TOTAL KJELDAHL NITROGEN (mg/L)	AMMONIA NITROGEN NH ₄ (mg/L)	TOTAL PHOSPHORUS (mg/L)	REACTIVE PHOSPHORUS (mg/L)	ELECTRICAL CONDUCTIVITY (dS/m)	STANDING WATER LEVEL (m)
27/06/08	7.23	2.46	2.441	0.0025	0.02	0.015	0.08	0.02	1.37	4.8
15/01/09	7.13	1.7	1.259	0.036	-	0.019	0.11	0.16	1.24	6.4
18/06/09	7.19	1.92	1.483	0.0025	0.43	0.007	0.11	0.04	1.27	4.8
14/01/10	7.0	1.98	1.933	0.0025	0.05	0.027	0.1	0.07	1.29	5.9
05/07/10	7.18	2.02	1.997	0.001	0.03	0.001	0.09	0.04	1.24	-
19/04/12	6.3	1.78	1.677	0.027	0.1	0.013	0.11	0.05	1.37	-
28/10/12	7.07	1.98	1.197	0.009	0.78	0.002	0.1	0.07	1.35	-
19/11/12	7.18	1.94	1.752	0.003	0.19	<0.005	0.1	0.077	1.35	-
14/01/13	7.23	2.06	1.45	<0.001	0.61	<0.005	0.15	0.05	1.31	-
10/04/13	7.10	1.8	0.381	0.008	1.41	0.012	0.14	0.098	1.38	-
11/07/13	7.08	6.78	1.973	0.077	4.73	3.748	0.59	0.48	1.35	-
12/09/13	7.23	6.02	1.352	0.43	4.24	3.024	0.59	0.51	1.29	-



Table 32: Groundwater Bore Monitoring Results – 2008-2013 – JR's Bore – EPA Monitoring Point 26

DATE OF SAMPLING	pH	TOTAL NITROGEN (mg/L)	NITRATE (mg/L)	NITRITE (mg/L)	TOTAL KJELDAHL NITROGEN (mg/L)	AMMONIA NITROGEN NH ₄ (mg/L)	TOTAL PHOSPHORUS (mg/L)	REACTIVE PHOSPHORUS (mg/L)	ELECTRICAL CONDUCTIVITY (dS/m)	STANDING WATER LEVEL (m)
27/06/08	9.47	0.17	0.0025	0.0025	0.17	0.035	0.02	0.0025	0.21	Enclosed bore
15/01/09	9.33	0.19	-	0.003	-	0.003	0.01	0.01	0.2	
18/06/09	9.02	0.1	0.032	0.0025	0.07	0.007	0.02	0.02	0.2	
14/01/10	9.33	0.6	0.307	0.0025	0.29	0.027	0.01	0.01	0.2	
05/07/10	9.7	0.04	0.001	0.001	0.04	0.022	0.01	0.01	0.19	
19/04/12	7.66	5.18	4.954	0.002	0.23	0.005	0.02	0.01	0.57	
28/10/12	9.14	0.03	0.005	0.001	8.38	0.02	0.05	0.04	0.21	
19/11/12	8.98	0.15	<0.005	0.001	0.15	0.018	0.02	<0.005	0.21	
14/01/13	9.4	0.10	<0.005	<0.001	0.1	<0.005	0.01	0.01	0.21	
10/04/13	7.15	0.29	0.008	<0.001	0.28	0.042	0.03	0.014	0.21	
11/07/13	9.28	1.17	0.023	0.003	1.15	0.003	0.02	0.02	0.1	
12/09/13	9.55	0.10	0.04	0.001	0.06	0.028	0.03	0.02	0.19	



Table 33: Groundwater Bore Monitoring Results – 2008-2013 – Myhill's Bore – EPA Monitoring Point 27

DATE OF SAMPLING	pH	TOTAL NITROGEN (mg/L)	NITRATE (mg/L)	NITRITE (mg/L)	TOTAL KJELDAHL NITROGEN (mg/L)	AMMONIA NITROGEN NH ₄ (mg/L)	TOTAL PHOSPHORUS (mg/L)	REACTIVE PHOSPHORUS (mg/L)	ELECTRICAL CONDUCTIVITY (dS/m)	STANDING WATER LEVEL (m)
27/06/08	7.01	9.25	7.055	0.0025	2.19	0.0025	0.17	0.17	1.72	16.70
15/01/09	6.97	6.93	6.77	0.0025	-	0.059	0.17	0.15	1.39	17.00
18/06/09	6.84	9.05	5.965	0.0025	3.08	0.026	0.14	0.04	1.60	17.50
14/01/10	6.76	9.35	6.852	0.0025	9.35	0.036	0.14	0.12	1.61	18.00
05/07/10	6.99	8.92	8.64	0.006	8.92	0.069	0.3	0.05	1.57	-
19/04/12	7.1	5.76	4.079	0.003	1.68	0.006	0.02	0.01	1.22	-
28/10/12	6.88	9.48	7.347	0.013	2.12	0.04	0.13	0.12	1.6	-
19/11/12	6.91	13.97	12.426	0.005	0.54	0.01	0.12	0.102	1.69	-
14/01/13	6.94	12.68	11.910	<0.001	0.77	<0.005	0.12	0.11	1.68	-
10/04/13	6.96	10.15	6.0	2.277	1.87	<0.005	0.14	0.114	1.03	-
11/07/13	6.78	17.63	17.022	0.003	0.61	<0.005	0.14	0.13	1.67	-
12/09/13	7.08	16.49	9.002	0.004	7.48	0.011	0.15	0.13	1.57	-



Table 34: Groundwater Bore Monitoring Results – 2008-2013 – JKN's Bore – EPA Monitoring Point 28

DATE OF SAMPLING	pH	TOTAL NITROGEN (mg/L)	NITRATE (mg/L)	NITRITE (mg/L)	TOTAL KJELDAHL NITROGEN (mg/L)	AMMONIA NITROGEN NH ₄ (mg/L)	TOTAL PHOSPHORUS (mg/L)	REACTIVE PHOSPHORUS (mg/L)	ELECTRICAL CONDUCTIVITY (dS/m)	STANDING WATER LEVEL (m)
27/06/08	7.49	15.48	13.724	0.043	1.72	0.089	0.08	0.03	1.33	Enclosed bore
15/01/09	8.33	0.86	0.0025	0.0025	-	0.0025	0.02	0.01	0.26	
18/06/09	9.03	0.31	0.255	0.0025	0.05	0.006	0.02	0.02	0.19	
14/01/10	7.55	6.0	1.606	0.0025	4.39	0.0025	0.02	0.02	0.73	
05/07/10	7.77	4.83	4.249	0.0005	0.58	0.006	0.01	0.01	0.73	
19/04/12	7.19	46.75	38.028	0.001	8.72	<0.005	0.04	0.01	1.82	
28/10/12	7.29	35.53	27.15	0.001	8.38	0.008	0.05	0.04	1.65	
19/11/12	7.47	55.1	39.747	0.001	15.35	<0.005	0.04	0.021	1.89	
14/01/13	7.49	37.63	36.531	0.009	1.09	<0.005	0.03	0.01	1.62	
10/04/13	7.38	24.51	23.001	<0.001	1.51	<0.005	0.03	0.019	1.22	
11/07/13	7.49	30.10	27.281	0.003	2.82	<0.005	0.03	0.03	1.42	
12/09/13	7.58	32.88	17.732	0.005	15.14	0.015	0.04	0.02	1.39	



5.12.4 Existing Groundwater Results Discussion

Generally the groundwater results for the property show a good level of groundwater quality and generally within the recommended trigger values for irrigation water as per the ANZECC (2000) guidelines.

A discussion of recent groundwater results for existing bores is provided in the following sections.

5.12.4.1 Groundwater pH

The pH of the groundwater ranges between 6.3 and 9.7. These values are slightly outside the recommended range of pH 6 to 8.5 for groundwater systems. The pH of JR's Bore has been consistently alkaline for a number of years and the cause is unknown.

5.12.4.2 Nitrogen and Nitrates

Total nitrogen levels range between 0.03 – 55.1 mg/L. Total nitrogen levels are generally below the long-term trigger value of 5 mg/L in the JR's, 3 Dams and Gully Bores. Myhill's and JKN bores are within the short-term irrigation threshold value of 25-125 mg/L for irrigation water.

The nitrate nitrogen levels range between 0.005 – 39.747 mg/L. These concentrations are well below the recommended nitrate trigger value of 100 mg/L for drinking water for adults and infants older than 3 months old. The concentrations are also below the trigger value of 50 mg/L for infants below 3 months old. There are no recommended trigger values for nitrate or ammonia nitrogen levels for irrigation quality water.

5.12.4.3 Phosphorus

The total phosphorus concentrations range between 0.01 – 0.59 mg/L. These results are within the short term trigger values of 0.8-12 mg/L for total phosphorus in irrigation water. The reactive phosphorus (orthophosphate) concentrations range between 0.0025 – 0.51 mg/L. There are no recommended trigger values for phosphate or reactive phosphorus.

5.12.4.4 Electrical Conductivity

Electrical conductivity is an indicator of salinity in water. The electrical conductivity of the monitored bores range from 0.1 – 1.89 dS/m. This is a very low to medium level of electrical conductivity (medium trigger values range from 1.3-2.9 dS/m).



5.12.5 Potential Impacts and Mitigation

The surface application of nutrients can raise concerns for groundwater systems. The proposed development will involve the application of high nutrient digestate matter that if not managed effectively, can have the potential to migrate into groundwater systems.

Effective management measures proposed to prevent the migration of digestate matter into groundwater systems include:

- The adoption of a 100m waste water irrigation exclusion buffer around existing bores to prevent nutrient transportation into the groundwater via existing groundwater extraction points;
- Ongoing nutrient budgeting to prevent the over application of digestate matter to the site; and
- Continued monitoring of onsite groundwater.

The above mitigation measures will ensure that the current adequate status of groundwater achieved by sufficient effluent and solids utilisation practices (as demonstrated by a monitoring history that demonstrates compliance with the ANZECC (2000) guideline), will be maintained or improved following the implementation of the proposed digestate application practices.

5.12.6 Conclusion

There are existing groundwater bores on the property within the existing abattoir and wastewater irrigation areas. There are no new groundwater bores as part of the proposed development. Groundwater will not be used as part of the proposed development.

The groundwater monitoring data from the past seven years indicates a good level of groundwater in the existing wastewater irrigation areas. Generally the parameters tested are within the recommended trigger values of the ANZECC (2000) guideline. This indicates that the current effluent and solids utilisation practices on the property are not detrimentally affecting the groundwater resources.

Better management practices undertaken as per the proposed digestate application will ensure that the current lack of impacts on groundwater is maintained.

The proposed development will not impact on the local groundwater due to the nature of the development. Effluent and solid utilisation will be managed and nutrient budgeting will ensure over-application of nutrients is minimised.



5.13 Extractive Industries

The proposed development area is within the Exploration Licence (EL) 7277. This licence is held by Volcan Holdings for bauxite exploration activities. Robert Coenraads (Principal Project Geologist) of Volcan Holdings was contacted on the 10th September 2013 to discuss the project and potential impacts on the exploration area. It was confirmed by Volcan Holdings that the exploration area activities are located further to the west of the abattoir site and that the proposed development would not impact any bauxite exploration activities.

There are no operating mines in the vicinity of the proposed development. The proposed development will not restrict access for future exploration activities in the area.



5.14 Traffic and Parking

Mitchel Hanlon Consulting engaged the services of Better Transport Futures (BTF) to prepare a Traffic Impact Statement (TIS) to comply with the DGRs issued by the NSW Department of Planning and Infrastructure. A copy of the TIS can be found in Appendix E and summary of the TIS has been provided below.

5.14.1 Traffic Impact Statement Summary

5.14.1.1 Introduction

Mitchel Hanlon Consulting (on behalf of Bindaree Beef Pty Ltd) engaged the services of Better Transport Futures (BTF) to prepare a Traffic Impact Statement (TIS) for inclusion in the EIS for the proposal.

The assessment was undertaken in accordance with the NSW RTA Guide to Traffic Generating Developments, the DGRs and other relevant guidelines, publications or standards (including the Ausroads Guide and Inverell DCP). To assist in the preparation of the assessment, BTF also liaised with representatives of Inverell Shire Council and the NSW Roads and Maritime Services (RMS)

The assessment evaluated the traffic and parking implications of the proposal. The assessment also provides advice on access issues, internal site layout and issues relating to service vehicles during construction and operation of the facilities in relation to traffic flows, road limitations and capacities, access and safety.

5.14.1.2 Existing Situation

The TIS identified three (3) primary and one secondary access points to the site. The three (3) primary points of access all utilise the Gwydir Highway while the secondary point has access from Copeton Dam Road.

Primary access to the facility is gained via Access Point 1 and all traffic movements associated with operation of the site (including employee movements and stock deliveries) utilised this point. Access points 2 and 3 are prohibited for use by all non-emergency vehicles. Use of access point 4 is restricted to light vehicles (cars) associated with the operation of the farm owned and operated by Bindaree Beef (this area includes facilities effluent irrigation area) as well as emergency vehicles.

The site is able to accommodate the current parking demands of all vehicle types wholly within the site boundary and there are areas that could be made available for any parking overflow.



5.14.1.3 Traffic Conditions

As the Gwydir Highway provides primary access to the facility, an analysis of the characteristics of the Gwydir Highway within the vicinity of the subject site has been provided in Table 35.

Table 35: Characteristics of Gwydir Highway in the vicinity of Bindaree Beef facility

VARIABLE	CHARACTERISTIC
Speed Limit	100km/h
Lanes	2 (one each direction)
Pavement Width	~ 7m
Lane Width	~ 3.5m
Traffic Flow	Two-way flow (E-W)
Line Markings	Centre and shoulder, in good condition
Kerbs, Gutters	None
Lighting	None
Road Markings	Yes, with reflectors
Land Uses	Rural in character
On-Street Parking	No formal, informal opportunities are available

Based upon discussions held with the NSW RMS and Inverell Shire Council it is understood that other than routine maintenance works there are no plans for any major road network changes nor are there any planned traffic management works planned in the vicinity of the development site.

5.14.1.4 Traffic Flows

Traffic surveys were undertaken by BTF on the evening of Tuesday 15th October 2013 and in the morning of Wednesday 16th October 2013. The surveys indicated that there is an evening peak period between 15.45 and 16.45 and a morning peak between 8.00 and 9.00.

Current operations indicate approximately 660 employees are expected onsite each weekday, with staff levels spread out over shifts. The traffic surveys conducted indicate that, at present traffic generated by the site includes approximately 430 vehicles per day, 130 of which are heavy vehicles (30% of the all site flows).



Bindaree Beef records all truck movements on site. On average, up to five (5) 25t B-double trucks and up to three (3) 40 B-double tankers enter the site per operational day.

The maximum hourly vehicle flow was observed during the PM peak period when 336 vehicles traversed the intersection of the Gwydir highway and Bindaree Beef access road. The RTA Guide to Traffic Generating Developments indicates a level rural road with 10% heavy vehicle traffic has a capacity of 2390 vehicles per hour, which indicated the current design capacity ratio of approximately 0.14 during peak periods.

Observations made onsite show that there are little if any delays for through traffic movements along the Gwydir Highway at its intersection with the Bindaree Beef access road. Traffic entering or exiting the access road also experience minimal delays.

5.14.1.5 Proposed Development

The proposed development and the resulting process will eliminate the need for coal and reduce electricity needs. No additional staff will be added as a result of the development proposal (although some staff will be re-trained) and as such, no additional traffic nor parking demands will be generated by the site upon completion of the construction phase.

A 10% increase in traffic flows to/from the site during the construction phase is expected. Given the current site generates approximately 430 trips to the site per day, an additional 43 trips to the site would be expected during the construction phase. It is estimated up to 64 construction labourers will be on site at any given time during the construction phase, and the traffic generated by these construction crews has been factored into the construction traffic demand generation.

All vehicle access to the subject site will continue to occur via the existing access main point from Gwydir Highway. This access was upgraded in 2008 to include a centre divider to prevent traffic from crossing into opposing lanes when turning.



5.14.1.6 Transportation Analysis

5.14.1.6.1 Traffic Generation

The proposed development will not generate additional staffing on the site nor increase the frequency of heavy vehicles to the site upon completion of the construction phase.

5.14.1.6.2 Daily and Seasonal Factors

The proposed development will not generate additional staffing on the site nor increase the frequency of heavy vehicles to site upon completion of the construction phase.

The existing facility operates from 5.00 to 23.50 daily. Staffing is managed with shift work with boning / palletizing and loading shifts occurring from 5.00 to 15.15 and from and from 15.45 to 23.50. The abattoir facilities operate from 7.15 to 16.15.

The timing of the shifts indicate the site would have a peak generation rate around 15.30, when employees from the early shift depart the site and employees of the evening shift arrive on site.

5.14.1.6.3 Sight Distances

Sight distances at the intersection of Gwydir Highway with the Bindaree Beef access road (Access Road 1) are very good. Ausroads Guide to Road Design indicates sight distances along a road of 100km/h speed environment, such as Gwydir Highway at this location, requires a minimum sight distance of 248m with adjustment for any road taper. A sight distance of 248m, with adjustment for taper, is considered desirable and 262m is considered very safe. Sight distances from the access road along Gwydir Highway exceed 400m to the east and exceed 270m to the west.

5.14.1.6.4 Queuing at Entrance to Site

Given the overall traffic flows along the Gwydir Highway and the Bindaree Beef access road, it is considered that there will be negligible queues associated with the traffic movements into the subject site via a rural auxiliary right hand turn lane in to the access road from the eastbound traffic on Gwydir Highway. There is also an auxiliary left hand turn lane for westbound traffic on Gwydir Highway into the Bindaree Beef access road.



5.14.1.7 Impact of Generated Traffic

5.14.1.7.1 Impact on Daily Traffic Flows

The existing daily traffic flows are well within acceptable limits for their classifications. The Gwydir Highway in the vicinity of Bindaree Beef is classified as a rural road acting as an arterial road.

A level, rural two lane arterial road with 10% of traffic being heavy vehicles is capable of carrying over 2,350 vehicles per hour (Source Table 4.5 Peak Hour Flow on Two Lane Rural Roads, RTA Guide to Traffic Generating Developments 2002), which is significantly higher than the current hourly flow of 336 vehicles per hour recorded during traffic surveys.

5.14.1.7.2 Impact of Construction Traffic

The construction phase of the project will increase traffic generated to the site by approximately 10% over a 9 month period, which will equate to around an additional 43 trips per day, 6 days per week.

The typical peak construction staff during the construction phase will be 64 labourers. Flat top tray, ridged and articulated heavy vehicles will also be required to access the site and are included in the 43 additional trips to the site per day during the construction phase.

The current intersection of Gwydir Highway and Bindaree Beef access driveway has suitable turn treatments to accommodate the additional traffic anticipated to / from the site during construction.

5.14.1.8 Improvement Analysis

No modification of the existing external road network nor internal road circulation pattern will be required for this project.

While traffic may temporarily increase during the construction phase of the project, the proposed development will not generate additional trips on the surrounding road networks upon completion of the construction phase.

The existing turn treatments are suitable to accommodate the additional traffic that will occur during the construction phase and no additional controls at the intersection of Gwydir Highway and the Bindaree Beef access road will be required to accommodate this construction traffic.



5.14.1.9 Recommendations

The overall conclusion from the BTF Report is that traffic and parking arrangements for the development proposal are satisfactory and that there is no traffic or parking impediments to the development.

5.14.2 Initial Comments from NSW Roads and Maritime Services

To ensure completeness, the NSW RMS was asked to provide informal and advisory comments on the Traffic Impact Statement prepared by Better Transport Futures. The NSW RMS subsequently requested that additional information be supplied to assist in the assessment of the development.

The correspondence received from the NSW RMS has been included in Appendix E.

5.14.3 Additional Information

Due to unforeseen circumstances BTFs was not able to provide the additional information requested. Therefore, Mitchel Hanlon Consulting engaged the services of SECA Solutions Pty Ltd (SECA) to provide the additional information requested and to undertake the required SIDRA analysis.

The information contained below is supplementary to the previous traffic assessment completed by Better Transport Futures and should be read in conjunction with this report.

A summary of the additional information provided by SECA has been provided in the following sections with the full version contained in Appendix E as an addendum to the BTFs report.

5.14.3.1 Traffic Movements

The traffic movements (both observed and future) at the access intersection for all legs of the intersection have been provided diagrammatically in Figure 41 and Figure 42 respectively. It should be noted that, the future flows depict site flows plus background growth on Gwydir Highway (assumed 2% per annum).

The proposed works on site will not alter the number of staff working at Bindaree Beef. As such the peak hour traffic volumes observed during the on-site surveys completed by BTF will represent the future traffic volumes once the upgrade works have been completed.

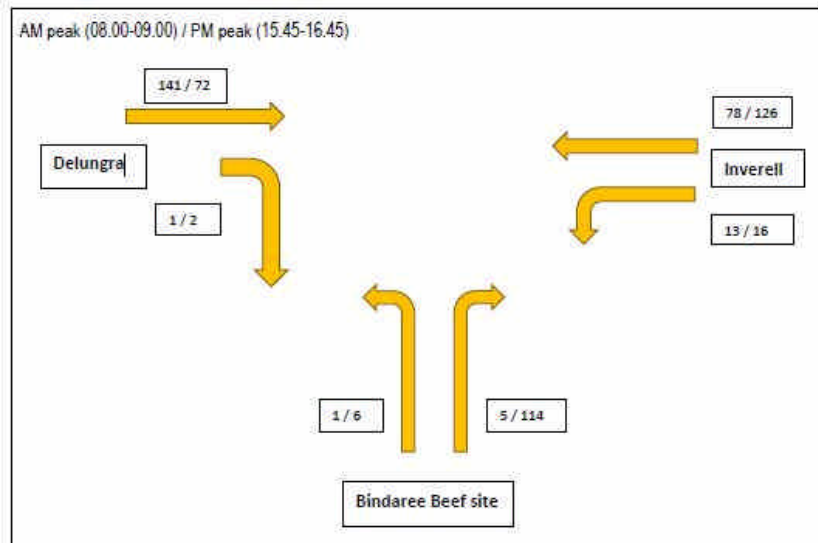


Figure 41: Existing Site Traffic Movements

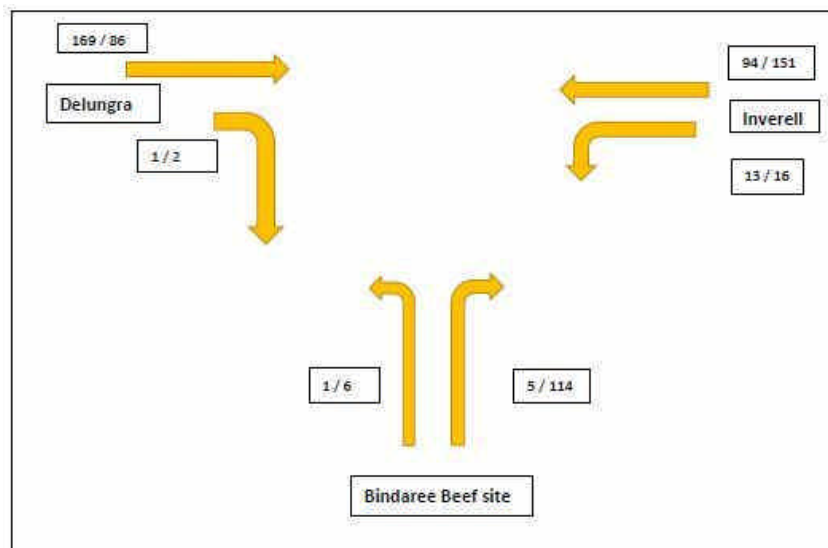


Figure 42: Future Flows 2023 Site Flows plus Growth on Gwydir Highway

5.14.3.2 Sidra Analysis

The Sidra analysis has been completed for the existing 2013 flows and the future 2023 flows. As per the BTF report, the through traffic movements have been increased by 2% per annum (giving 20% over 10 years) whilst the traffic movements in and out of the Bindaree Beef site have remained at the current levels, as there will be no increase in traffic movements associated with the proposed works on the site.

Based upon the design flows prepared by BTF and confirmed as part of SECA addendum, based upon the Austroads warrants for turn lanes a type CHR (S) together with an AUL turn treatment should be provided for the site access.



This arrangement can utilise the majority of the existing road pavement, as the existing layout allows for shoulder widening based upon the design parameters for a type AUR.

To alter the intersection layout to a Type CHR (S) a full design will need to be prepared, based upon a detailed road survey of the existing road layout. The CHR (S) is considered appropriate for this location, as the Sidra modeling shows for the future 2023 analysis (AM and PM peaks) the predicted queue length is less than a single vehicle.

The provision of a type CHR (S) will remove the risk for rear end type accidents associated with a vehicle turning right into the site off the Gwydir Highway in the 100 km/h zone.

5.14.3.3 On-site Parking

SECA confirm that the proposed development will not require any additional staff to work on site, therefore there is no increase in demand for on-site parking created by the proposal.

There are currently 265 formal parking spaces provided on-site which cater for the current daily parking demands. There is significant car sharing for trips to the site, due to the shift work operations and the works are split over a number of shifts reducing the peak parking demand.

During construction, the current operations will continue and there will be some additional parking demands associated with the maximum of 64 construction staff on site. Again, it is considered that there will be significant scope for shared trips for these construction workers and hence reduced parking demands.

The site has large areas of grassed area which will be utilised by the construction operations for plant and vehicles to park and will ensure that there will be no demand for parking external to the site.

5.14.3.4 Truck Movements

Currently, material deliveries are made by B-double vehicle and there is no planned change to this configuration. The use of HPVs (B-triples, AB triples etc) is not anticipated. Should this change in the future the RMS comment regarding the access is noted.



5.14.3.5 Amendments to Material Deliveries and Removal

The proposed operations on site will change slightly over the previous assessment completed by Better Transport Futures for the development, as there is a new provider of the bio-digester and sorghum is no longer a feedstock for this process.

All feedstock for the bio-digester will come from the existing operations undertaken at the abattoir. The waste product coming out of the plant is a rich source of plant nutrition and as such provides a fertiliser in two forms, a liquid and a pelletised fertiliser.

The major volume of output will be a liquid that will be used as a fertiliser that forms part of the on farm irrigation which will be pumped to the adjacent Bindaree Farm to the south of the site.

A smaller portion of the output will be dried on site, resulting in an organic fertiliser product that can be used for crop pastures, either on Bindaree Farm or taken off site to other farms in the location. The movement of this material across Copeton Dam Road will have a minimal impact upon the low traffic movements at this location.

The pelletised product will be removed from the abattoir site in a 10 tonne truck and will amount to a single load / truck per day.

This alteration to the rendering and bio-digester plant for the project will not have a significant traffic impact upon the local road network and there is sufficient parking on site for this plant.

5.14.4 Conclusion

Both the Traffic Impact Statement prepared by Better Transport Futures and the addendum report prepared by SECA Solutions (following feedback from the RMS) conclude that traffic and parking arrangements for the proposed development are satisfactory.

All vehicle access to the subject site will continue to occur via the existing access main point from Gwydir Highway which was upgraded in 2008 to include a centre divider to prevent traffic from crossing into opposing lanes when turning.



5.15 Waste Management

5.15.1 Introduction

Throughout the bio-digester facility's life cycle (including site preparation, construction and operation) a variety of waste streams and waste products will be generated. Waste management options identified within this section of the EIS will be employed to reduce or avoid impacts due to inappropriate handling of waste.

The options examine (where possible or feasible) alternatives that relate to waste minimisation, re-use and recycling of materials instead of disposal. It is intended that the waste products do not adversely impact the environment, human health or the amenity of the area.

The purpose of this 'waste management plan' is to:

- Identify, describe and quantify the various waste products and streams to be generated from the construction and operation of the facility.
- Assess the potential impacts to the surrounding environment.
- Identify options for waste minimisation and management, with specific reference to the waste hierarchy, as well as other cleaner production techniques.
- Develop mitigation measures to minimise any waste impact.

The following waste management goals will be applied for the facility:

- Consider all waste as a resource to minimise disposal.
- Design to minimise production of waste from facility's activities.
- Minimise the generation of regulated wastes.
- Apply the waste management hierarchy of 'avoid, reduce, recycle, recover, treat and dispose'.
- Apply sustainable waste management and disposal methods.
- Avoid contamination of land and water.
- Minimise adverse effects to aquatic and terrestrial vegetation and wildlife.
- Minimise potential risks to workers and the public.



5.15.2 Legislative and Policy Framework

Applicable legislation relevant to the handling of waste materials includes, but may not be limited to:

- Protection of the Environment Operations Act 1997 (POEO Act);
- Protection of the Environment Operations (Waste) Regulation 2005; and
- Waste Avoidance and Resource Recovery Act 2001 (WARR Act).

The POEO Act defines 'Waste' for regulatory purposes and establishes management and licensing requirements along with offence provisions to deliver environmentally appropriate outcomes. This Act also establishes the ability to set various waste management requirements via the regulation.

Following extensive consultation, the Protection of the Environment Operations (Waste) Regulation 2005 introduced a mechanism on 28 April 2008 for recognising genuine resource recovery in NSW. Exemptions allowing land application and thermal application of waste derived material were introduced under section 51 of the Regulation.

This Regulation also sets out provisions around the way waste is managed in terms of storage and transportation as well as reporting and record keeping requirements for waste facilities. It also provides for the contributions to be paid by the occupiers of licensed waste facilities for each tonne of waste received at the facility or generated in a particular area; exempts certain occupiers or types of waste from these contributions; and allows deductions to be claimed in relation to certain types of waste. The Regulation also details special requirements relating to asbestos and clinical waste.

The WARR Act repeals and replaces the Waste Minimisation and Management Act 1995 and promotes waste avoidance and resource recovery by developing waste avoidance and resource recovery strategies and programs such as the extended producer responsibility scheme for industry.

Other relevant legislation includes:

- *Environmentally Hazardous Chemicals Act 1985;*
- *Contaminated Land Management Act 1997;*
- *Environmental Planning and Assessment Act 1979; and*
- *Environmental Planning and Assessment Amendment Act 2008.*



5.15.2.1 Environmental Protection Licence

Licence 809 applies to Bindaree Beef and contains conditions pertaining to waste.

Section 4 Operating Conditions, Condition O7.1 states:

If solids are removed from the premises, the licensee must record:

- a) The date of removing the solids;
- b) The estimated weight of the solid removed; and
- c) The identity of the person removing the solids.

A copy of Bindaree Beef's Licence can be found within Appendix S of this document:

5.15.3 Waste Management

5.15.3.1 Definitions and Waste Classification

The POEO Act defines waste as:

- Any substance (whether solid, liquid or gaseous) that is discharged, emitted or deposited in the environment in such volume, constituency or manner as to cause an alteration in the environment, or
- Any discarded, rejected, unwanted, surplus or abandoned substance, or
- Any otherwise discarded, rejected, unwanted, surplus or abandoned substance intended for sale or for recycling, reprocessing, recovery or purification by a separate operation from that which produced the substance,
- Any substance prescribed by the regulations to be waste for the purpose of this Act.

A substance is not precluded from being waste for the purpose of this Act merely because it can be reprocessed, re-used or recycled.

Classification of waste is defined in Part 1 of the Waste Classification Guidelines (DECCW, 2009). The guidelines classify wastes into groups that pose similar risks to the environment and human health and facilitate their management and appropriate disposal. The six waste classes are described below:



- Special waste – is a class of waste that has unique regulatory requirements. Special waste means clinical waste, asbestos waste and waste tyres.
- Liquid waste – can be classified as ‘non-controlled aqueous’ (i.e. water containing filterable and non-filterable solids but not contaminated with suspended or dissolved chemicals Hazardous waste) or ‘classified liquid waste’ (i.e. oil, solvents, flammable liquids). Some liquid waste can also be hazardous.
- Hazardous waste – is a pre-classified waste that is inherently hazardous and potentially harmful to human health or the environment. In some cases the ‘hazard’ relates to the activity being carried out with the waste (e.g. transport and handling). Hazardous waste includes containers having previously contained dangerous goods, coal tar, lead acid or nickel-cadmium batteries, lead paint, mineral oil, asbestos, radioactive waste, or any mixture of these wastes. Hazardous Waste cannot be disposed of at a licensed landfill without being treated first.
- Restricted solid waste – is waste that has not yet been classified by the EPA. A chemical analysis should be conducted to identify restricted solid waste. Restricted solid wastes display contaminant/toxicity levels higher than general solid wastes and lower than hazardous wastes. The transport and disposal of restricted waste is prohibited without a permit.
- General solid waste (non-putrescible) – is inert material that does not readily decay under standard conditions, emit offensive odours and attract vermin or other vectors (such as flies, birds and rodents). Non-putrescible solid wastes have been preclassified; they include soils, timber, bricks, concrete, metals, glass, paper, rags, garden trimmings, agricultural, forestry and crop materials, and natural fibrous organic and vegetative materials. Non-putrescible solid wastes can be segregated between recyclable and non-recyclable waste.
- General solid waste (putrescible) – is pre-classified waste and includes organic materials, manure and night soils, incontinence pads, food waste, animal waste or grit and screenings from sewage treatment systems that do not contain free liquids.



5.15.3.2 Waste Hierarchy

Waste management at Bindaree Beef will be based around the hierarchy of waste management as shown in Figure 43 below. It is important that effective waste management practices are implemented to maximise the volume of waste that can be reused / recycled and hence minimise the volume of waste being disposed to landfill.



Figure 43: Waste Management Hierarchy

Avoid and Reduce: Where possible, opportunities for waste avoidance must be considered during equipment procurement and material purchasing from suppliers.

Reuse: Where possible, opportunities to reuse materials should be undertaken to ensure maximum utilisation of the resource is achieved.

Recycle: Where possible, waste material is reused in other applications or recycled.



5.15.3.3 Waste Transport and Disposal

The section below details the specific management requirements for the handling, storage and disposal of the various waste streams

Waste material that can be reused or recycled onsite will be transported to a suitable waste facility. All vehicles used in the transportation of waste are to be covered when loaded so as to prevent spillage and loss of waste.

All engaged waste transporters must:

- Retain all dockets and receipts for the waste;
- Provide suitable waste transport certificates to Bindaree Beef following waste collection (transport certificates can be downloaded electronically from the EPA website);
- Make sure that the waste load being transported is covered and tied down and does not leak, spill or have dust blow off the load; and
- Be licensed to transport that classification of waste (as required).

Waste transporters must have Environment Protection Licences issued by EPA to transport the appropriate classification of waste.

All waste removed from Bindaree Beef is done so by suitably licensed contractors. Under no circumstances will waste be received at the development site (abettor or farm sites) for storage, treatment, processing, reprocessing or disposal.

All recyclable waste is transported by a licensed contractor to a licensed recycling facility.

Where re-using / recycling options are not available, waste classified as General Solid Waste (putrescible or non-putrescible) will be disposed of at the Inverell Shire Landfill Facility

Domestic waste will be stored in a large skip bin and will be collected fortnightly and taken to the Inverell Shire Council landfill facility via a private waste collection contractor. It is recommended that provisions be provided, if not already, to enable the recycling of waste materials such as plastic, paper, cardboard and metal waste.

Large skip bins will be provided during the construction phase for construction waste. General construction waste such as concrete, metal, and timber is able to be disposed of at the Inverell Shire Council landfill facility. Hazardous waste such as petroleum products or chemicals will be disposed of via a licensed waste contractor. Hazardous waste will be stored separately to the general construction waste for easy disposal.



Soil and vegetation that has been removed as part of the pad preparation will be stockpiled and used as fill material where possible.

Both general waste and hazardous waste products can have a detrimental effect on the surrounding environment. Waterways, flora and fauna can be negatively affected by ingesting waste, drinking contaminated water or becoming tangled in waste products. Waste products will be managed to minimise environmental impacts on the surrounding areas.

Materials and products with recycled content will be used for site works wherever possible. Recycling or reuse of products will be undertaken where possible and recycling bin facilities installed prior to construction and continued during the operational phase.

Waste skip bins will be provided by a waste contractor for the duration of the construction period. The building waste (timber, metal, plastics and electrical cabling off cuts) and domestic waste anticipated to be generated from the construction will be considered General Solid Waste (putrescible and non-putrescible). This waste will be taken to the nearest landfill for disposal by a licensed waste contractor.

A number of other management actions will be undertaken to minimise waste impacts on the surrounding areas:

- All waste is to be stored onsite in a skip bin or on impervious material.
- All bins will be required to be covered when not in use to prevent pollution and wildlife accessing and spreading the materials. The burning of any construction waste or materials onsite is strictly prohibited.
- All waste storage areas shall be located at least 50m away from any watercourse or drainage line.
- All wastes and other potential polluting items must be stored correctly at the end of each day, and at the project completion, and the site shall be left in a clean and tidy state.
- All waste must be disposed of to a suitable landfill, by a licensed waste contractor.

Sewage waste from the temporary toilet facilities will be maintained and serviced on a regular basis to avoid discharge events. The waste will be disposed of by a licensed waste contractor and transported using licensed vehicles for the relevant waste classification.

Operational domestic sewage waste will be disposed of via the existing council owned sewage network.



5.15.3.4 Waste Tracking

A site register will be developed and maintained for all wastes generated onsite. It will include the following details:

- Type of waste;
- Volume;
- Origin;
- Date/s of collection;
- Storage location;
- Any storage particulars;
- Date of disposal/recycling; and
- Name and details of transporter and facility used to dispose the waste.

5.15.4 Waste Generation

There are a variety of sources of waste associated with the development and operation of the facility. The proposal will enable Bindaree Beef to become a very low waste generating facility, with minimal process wastes associated with the ongoing operation of the abattoir.

The following Section provides more detail about the construction and operational waste streams, the anticipated quantities of each of these streams and associated management options to minimise disposal of wastes and potential environmental or human harm.

Waste generated that cannot be recycled during the construction phase will be collected in mobile garbage bins and suitably-sized roll-on-roll-off bins with proper waste identification and labels in a designated waste segregation area. These wastes will be transported from the site and disposed of at a licensed landfill site.



5.15.4.1 Construction Waste

A number of wastes have been identified which are likely to be generated from general construction activities. These potentially include:

- Vegetation and soil cleared during site preparation works;
- Oils and oily wastes from equipment and machinery maintenance and refuelling activities;
- Waste paints and solvent;
- Waste adhesives;
- Aerosol cans;
- Waste antifreeze/radiator coolant;
- General domestic waste and recyclables from construction workers;
- Office wastes;
- Paper, cardboard, plastics and wood products from packaging;
- Surplus concrete;
- Used welding rods;
- General inert construction waste;
- Greywater and sewage;
- Batteries;
- Tyres;
- Solvents and chemicals;
- Scrap metals (ferrous and non-ferrous);
- Food waste;
- Atmospheric emissions; and
- Hazardous materials (chemicals and petroleum products).



5.15.4.2 Operational Waste

To allow a comparison of the quantities of operational waste generated this section has been split into Current Operational Waste generation and Future Operational Waste Generation.

5.15.4.2.1 Current Operational Waste

A number of waste materials have been identified as being generated from current operational and maintenance activities. These include:

- Paunch and Animal Skins;
- Manure;
- 'Dead on Arrival';
- Blood and Other By Products (Meat Meal, Tallow);
- Wastewater and sewage;
- Boiler Flyash;
- Dewatered Pond Sludge;
- Food waste;
- General domestic waste and recyclables from abettor workers;
- Office wastes;
- Paper, cardboard, plastics and wood products from packaging; and
- Hazardous materials (chemicals and petroleum products).



5.15.4.2.2 Future Operational Waste

Given that all organic matter generated within the abattoir will alternately end up as in the bio-digester, the proposal will not generate any additional waste streams/types. As a result of the proposal, Bindaree Beef will actually decrease the volume/quantity of waste generated within the facility that requires offsite disposal.

The proposal will either reduce or eliminate the generation of certain waste streams including 'fly ash' from the boilers, dewatered pond sludge and various animal by-products (including paunch Manure and Skins).

However, a number of wastes streams may still be generated from general operational or maintenance activities. These potentially include:

- Oils and oily wastes from equipment and machinery maintenance and refuelling activities;
- Waste paints and solvent;
- Waste adhesives;
- Used welding rods;
- General domestic waste and recyclables from maintenance / abattoir workers;
- Office wastes;
- General inert construction waste;
- Wastewater and sewage;
- Batteries;
- Scrap metals (ferrous and non-ferrous);
- Food waste; and
- Hazardous materials (chemicals and petroleum products).

It is noted that, as a result of the proposal the current paunch area / landfill will no longer be required and as such will be 'decommissioned'.



5.15.5 Classification and Quantities of Waste

The following table details (where possible) the type, quantity and quality of waste generated as a result of the proposal.

Table 36: Waste Type and Disposal Options

WASTE	LIKELY SOURCE	CLASSIFICATION OF WASTE	DISPOSAL OPTION	TESTING REQUIRED
	CONSTRUCTION AND/OR OPERATIONAL (C / F)*			
Timber	Construction	General Solid Waste (non-putrescible)	Inverell Shire Landfill	N
Metal	Construction	General Solid Waste (non-putrescible)	Inverell Shire Landfill	N
Concrete	Construction	General Solid Waste (non-putrescible)	Inverell Shire Landfill	N
General Domestic Waste	Construction and Operational	General Solid Waste (putrescible)	Inverell Shire Landfill	N
Soil	Construction	General Solid Waste (non-putrescible)	Reuse Onsite as Fill and for Landscaping	N
Vegetation	Construction	General Solid Waste (putrescible)	Inverell Shire Landfill or reused onsite as mulch	N
Hazardous Waste	Construction and Operational (C & F)	Hazardous Waste	Inverell Shire Landfill or via a Licensed Waste Contractor	Y
Domestic Sewage	Construction and Operational	Liquid Water (non-controlled aqueous)	Inverell Shire Sewage Network	N
Paunch	Operational (C) Operational (F)	General Solid Waste (putrescible)	Onsite Reuse (Land Application)	N



WASTE	LIKELY SOURCE	CLASSIFICATION OF WASTE	DISPOSAL OPTION	TESTING REQUIRED
	CONSTRUCTION AND/OR OPERATIONAL (C / F)*			
Manure	Operational (C) Operational (F)	General Solid Waste (putrescible)	Onsite Reuse (Land Application)	N
Skins	Operational (C) Operational (F)	General Solid Waste (putrescible)	Sold to External Enterprise	N
'Dead on Arrival'	Operational (C) Operational (F)	General Solid Waste (putrescible)	Onsite Reuse (Secondary Products via Rendering Plant)	N
Blood and Other By Products	Operational (C) Operational (F)	General Solid Waste (putrescible)	Onsite Reuse (Secondary Products via Rendering Plant)	N
Wastewater	Operational (F)	Liquid Water (non-controlled aqueous)	Onsite Wastewater Irrigation (Irrigation of Crops)	N
Wastewater	Operational (C)	Liquid Water (non-controlled aqueous)	Onsite Wastewater Irrigation (Irrigation of Crops)	N
Dewatered Pond Sludge	Operational (C) Operational (F)	General Solid Waste (non-putrescible)	Onsite Reuse (Land Application)	N
Boiler Fly Ash	Operational (C) Operational (F)	General Solid Waste (non-putrescible)	Onsite Reuse (Land Application)	N
Chemical Containers	Construction and Operational (C & F)	General Solid Waste (non-putrescible)	Inverell Shire Landfill	N

* C = Current & F = Future



5.16 Visual Amenity and Landscaping

The aesthetic amenity of the proposed development has been considered in detail within the context of the regional surrounds. While the existing abattoir facility incorporates vegetation plantings which effectively screen out external receptors in most directions, it has been noted that the proposed bio-digester facility is likely to be more visually prominent than existing infrastructure.

Mitchel Hanlon Consulting engaged MeatEng to prepare visual models of the proposed infrastructure and existing surrounds. Visual modelling (3D perspectives, elevation plans and colour montages) of the proposed infrastructure and existing environment as prepared by MeatEng is presented in Appendix C.

The proposed development is located on a flat between an eastern and western ridge of higher relief. Due to existing vegetation and topography, it is expected that receptors to the east, south and west of the development will experience minimal impact on amenity. Subsequently, modelling has focussed on views from the north/north-east. It is noted, from visual impact modelling, that the infrastructure may be slightly more visually prominent than existing infrastructure when viewed from this vantage point (the Gwydir Highway). While existing tree plantings will help to minimise the impact, additional mitigation will be beneficial.

As a result of this, additional landscaping will occur in the potentially visually sensitive areas immediately north and north-east of the proposed bio-digester and rendering plant facility. Landscaping will involve the planting of native *Myrtaceae Eucalyptus* trees (18-25m mature height). These tree plantings will assist in protecting the scenic value of the surrounding rural landscape/environment by incorporating species that are sympathetic to the surrounding rural setting. Existing canopy vegetation located on the eastern, western and southern sides of the proposed development area and existing infrastructure would be retained to ensure that no increased exposure occurs from other rural vantage points. A plan depicting the proposed landscaping plan is presented in Figure 44.

While it is anticipated that vegetation screening will be a sufficient means of protecting the aesthetic integrity of the area, wherever possible, the colouration of infrastructure associated with the proposal will be selected specifically to allow for visual integration into the surrounding rural area. In addition to this, wherever possible, surfaces with a matte finish will be incorporated in an effort to minimise reflectivity.



LEGEND



MYRTACEAE EUCALYPTUS
PLANTING (Mature height
18-25m)

NOTE: PLANTING LOCATIONS
APPROXIMATE ONLY



5.17 Cultural Heritage

5.17.1 Introduction

A desktop based Cultural Heritage Assessment has been undertaken for the proposed development area to determine potential impacts on any Indigenous and European cultural heritage sites or items potentially occurring.

5.17.2 Existing Environment

Inverell has a rich landscape mosaic of Indigenous and European Cultural Heritage. The city is surrounded by gemstone country and is responsible for supplying 80% of the world's sapphires, hence the name 'Sapphire City'. The gemstone rich landscape made for an active post-colonial period for the region, which is reflected today in the numerous heritage museums and sites around the region.

The Inverell area was included as a part of the taurai (hunting ground or territory) of five (5) local aboriginal tribes. The region is rich in indigenous heritage and is home to some significant Aboriginal sites, such as the Myall Creek Massacre site.

The site was established as an abattoir operation in 1951, as North West Abattoir, originally for both cattle and sheep. However, sheep have not been processed at the abattoir since 1976.

The existing plant has a long history in its strategic location in the Inverell district. Originally built and operated by the Smorgon Group, it has always been a high volume processing facility.

Bindaree Beef (Yolarno Pty Ltd) have owned and operated the abattoir at Inverell since acquisition of the facility in 1995.

The proposed development site is a highly disturbed paddock, vacant of any infrastructure, with exception of rural fencing. The site is free of any shrub or canopy vegetation, with high surface visibility in all areas.



5.17.3 Methodology

A preliminary desktop assessment has been undertaken to determine the cultural and European heritage of the site. Reviews of World, Federal, State and Local Heritage databases and plans have been consulted to identify any European or Indigenous heritage items or places occurring in or adjacent to the proposal site.

5.17.3.1 World, Federal & State Heritage

Reviews of World, Federal and State Heritage databases have been undertaken for both the Inverell Shire Local Government area and the subject site.

Sites and places determined to be heritage items under the NSW Heritage Act 1977 are listed on the NSW Office of Environment and Heritage NSW Heritage Search Tool.

The search tool has been consulted for listings occurring within the Inverell Area. Two (2) listings were returned; being the Inverell Shire Council Building (former) and Inverell Post Office. Both buildings are located within the CBD of Inverell, approximately 4km from the development site. Neither the Post Office building or former council building will be impacted by the development.

Sites and places determined to be heritage items under the Environment Protection and Biodiversity Conservation Act 1999 are listed on the Department of the Environment Australian Heritage Database. This database was also consulted for listings occurring within the Inverell area. No World, National or Commonwealth listed heritage items occurred within a 4km radius of the proposal site.

5.17.3.2 Local Heritage

The Inverell Local Environmental Plan 2012 has a list of identified Heritage Items outlined in Schedule 5. There are no listed heritage items identified on the proposed development site.

There are two (2) Environmental Heritage Listings located north-west of the proposed development site (in excess of 1km separation distance), identified as I117 (Fernhill) and I118 (Blair Athol Estate). It is not anticipated that the development will impact on these areas.

If any European cultural heritage item is discovered during site construction, all activity will cease and Inverell Shire Council and Office of Environment and Heritage will be notified in accordance with the Heritage Act 1977.



5.17.3.3 Protection of Aboriginal Cultural Heritage

Aboriginal sites within NSW are protected under the National Parks and Wildlife Act 1974 and National Parks and Wildlife Regulation 2009. Under this Act, all Aboriginal objects are protected regardless of their significance or land tenure. The Act also protects Aboriginal places that may or may not contain Aboriginal objects.

This Act outlines the 'Due Diligence' process that serves to provide a framework for identifying potential objects or sites of significance. This process minimises the likelihood of Aboriginal objects or sites being damaged or affected by development.

An Aboriginal Heritage Information Management System (AHIMS) database search was undertaken on the 9th September 2013. The search did not identify any Aboriginal sites within a 200m radius of the proposed development site. A copy of the search results is included in Appendix T.

The NSW Department of Environment, Climate Change & Water *Due Diligence Code of Practice for the Protection of Aboriginal Objects in NSW* provides guidance as to when a cultural heritage consultant should be engaged. The code details that proposed activities within 200m of waters on land that is not disturbed land must be subject to specialist assessment. Whilst the proposed development site does occur within 200m of a small ephemeral creek, the landscape has been significantly disturbed and modified as a result of agricultural landuse for an extended period of time. Therefore, it is concluded that the potential for any Aboriginal objects to be in existences is highly unlikely.

5.17.4 Conclusions

A desktop based assessment has been undertaken to determine the likelihood of potential impacts on any occurring items of historical significance. World, Federal, State and Local heritage registers were consulted to identify items of heritage significance within proximity to the proposed development area. The desktop assessment has determined that there is negligible likelihood that the proposed development area contains any items of heritage significance due to the site being highly disturbed and vacant of any infrastructure. Furthermore, the site has high surface visibility demonstrating the absence of any surface items of European significance.

The proposed development has been determined to have negligible potential to impact on any items of indigenous cultural heritage significance. The historical disturbance and current disturbed state of the site removes the requirement for a cultural heritage field assessment to be undertaken.



If any European or Indigenous cultural heritage item were to be discovered during site construction, all activity will cease and Inverell Shire Council and Office of Environment and Heritage will be notified in accordance with the Heritage Act 1977.



5.18 Biodiversity

The Inverell region straddles four bioregions; the New England Tablelands, Nandewar, Brigalow Belt South and the Darling Riverine Plain. The majority of fertile soils in this area have been extensively cleared. Woody vegetation cover (>20% canopy cover) for nearly half of the Inverell region is below 30% and is only marginally higher for the remaining parts of the area. Therefore, the Inverell area contains bioregions which have suffered major land clearing, land degradation and biodiversity decline. A number of threatened species are known to occur within the Border Rivers – Gwydir catchment area, including the Regent Honeyeater, and Squirrel Glider.

An assessment of the impacts on flora and fauna at the subject site and adjoining has been made with reference to the proposed development. The assessment was based upon a field assessment and literature review. All information has been addressed in reference to the *Threatened Species Conservation Act 1995*, *The Environmental Planning & Assessment Act 1979* and the *Environment Protection and Biodiversity Conservation Act 1999*, as well as other relevant legislation and planning instruments.

For the purpose of the investigation, only areas which fall within the immediate bio digester development footprint and irrigation land were assessed. Areas owned by Bindaree Beef that are not irrigated currently are not expected to be irrigated in the future as a result of landscape limitations were not assessed as the development is not expected to have any direct or indirect impact on these areas.

5.18.1 Development Area

The site assessment determined that the immediate development area spans across an area of severely degraded exotic pasturelands and lacking any form of overstorey. No State or Federally listed threatened species were observed within the development area. Subsequently no further assessment is required in regard to vegetation within the immediate development area.

5.18.2 Irrigation Land

The assessment of irrigation land vegetation involved the assessment of groundcover species within areas scheduled to be subject to the application of wastewater produced by the bio-digester.

The wastewater irrigation area was void of any canopy or shrub layer. The majority of groundcover species were identified as being exotic pasture/crop lands. Crops present during the site assessment included lucerne and triticale.



The site has been cropped extensively and subsequently the vegetation in these areas was determined to be non-native and of little conservation value.

No State or Federally listed threatened species were observed within the wastewater irrigation area. It is likely that the application of wastewater to this vegetation will have any detrimental impacts on the biodiversity of the subject site.

There were no EPBC or TSC threatened species sighted during the site inspection. It is noted however that adjacent wooded areas have the potential to act as foraging habitat for threatened species.

No woodland vegetation will be removed as a result of the development and waste water application will not occur in these areas.



5.19 Bushfire Risk

5.19.1 Introduction

Mitchel Hanlon Consulting have prepared the following section to comply with the DGRs issued by the NSW Department of Planning and Infrastructure.

The requirements and objectives of Planning for Bushfire Protection 2006 have been applied to the proposed development.

5.19.2 Bushfire Hazard Assessment

Properties considered to be affected by possible bushfire impact are determined from the local Bushfire Prone Land Map as prepared by Council and or the Rural Fire Service. All property development within affected areas is subject to the conditions detailed in the document '*Planning for Bushfire Protection – 2006*' (PBP). Set back distances for the purpose of creating Asset Protection Zones (APZs) must be applied and any buildings must then conform to corresponding regulations detailed in Australian Standard 3959 – 2009 '*Construction of Buildings in Bushfire Prone Areas*' (AS 3959 – 2009).

Planning for Bushfire Protection – 2006, (PBP) provides for the protection of property and life (including fire-fighters and emergency service personnel) from bushfire impact.

The thrust of the document is to ensure that developers of new properties or subdivisions include the constraints associated with the construction of buildings in bushfire prone areas within their proposed development sites. PBP is applicable to proposed development inside a determined Category 1 or 2 areas and also inside a buffer zone radius of 100m from a Category 1 bushfire area or 30m from a Category 2 bushfire area.

Bushfire mapping for the abattoir site supplied by Inverell Shire Council indicates that two (2) small areas are identified as being bushfire prone (see Figure 45: Bushfire Assessment). However, these areas are in excess of 100 metres for the location of the proposed bio-digester and associated infrastructure.

The mapping obtained from ISC doesn't delineate bushfire prone vegetation is Category 1 or Category 2. Therefore, as a conservative measure, the site is assumed as containing Category 1 bushfire prone vegetation.



As stated above, the Bio-digester site is identified as being located in excess of 100 meter from the bushfire prone vegetation. However, given the nature of the proposal a conservative approach has been taken and the requirements and objectives of Planning for Bushfire Protection 2006 have been applied to the proposed development

5.19.2.1 Predominant Vegetation Type

An assessment of the predominant vegetation types were undertaken in accordance with NSW Rural Fire Service’s *Planning for Bushfire Protection 2006*.

The assessment determined that, the vegetation within the wider area surrounding the location of the proposed bio-digester and associated infrastructure is predominately identified as ‘Grasslands.’ While the vegetation immediately surrounding the bio-digester is categorised as ‘Managed Grasslands’.

Following the vegetation classification, fuel loads were determined for each community type, as detailed in Table 37.

Table 37: Community Fuel Loads

VEGETATION FORMATION	DESCRIPTION	FUEL LOAD
Grasslands	Dominated by large perennial tussock grasses and the presence of broad leaved herbs in the inter-tussock spaces. Lack of woody plants. Associated with fertile heavy clay soils on flat topography in regions with low to moderate rainfall. Plants include grasses, daisies, legumes, geraniums, saltbushes and copper burrs.	6 t/ha
Managed Grasslands	Non-vegetated or reduced vegetation area such as: actively grazed pastures, maintained urban yards, maintained lawns, crops, orchards, vineyards, commercial nurseries, playing fields, golf course fairways, cleared parks, formed roads and footpaths etc.	N/A*



5.19.2.2 Slope

The site is located on the lower slopes of a large hill, and is expected to drain in a north-easterly direction. Field work was undertaken to determine the specific relative slope of the areas adjacent to the bio-digester site.

It was determined that the slope ranges from approximately 1-3 degrees. Areas of higher slopes occurred to the west / south west of the assessed area, with the lower laying sections demonstrating almost no slope, at less than two (2) percent.

Table 38: Site Land Slopes

DIRECTION FROM LOCATION OF BIO-DIGESTER	APPROXIMATE SLOPE (%)	APPROXIMATE SLOPE (°)	UP-SLOPE / DOWN-SLOPE
North	3	2	Down-Slope
South	2	1	Up-Slope
East	5	3	Down-Slope
West	5	3	Up-Slope

The results of the slope assessment have been used to calculate the required asset protection zones in Section 5.19.2.4.

5.19.2.3 Bushfire Risk

Given the site and wider district's vegetation and topographical context, the only point of interest raised was potential grassfire.

5.19.2.4 Asset Protection Zones

Asset Protection Zones for residential subdivisions are determined from Table A2.4 of PBP 2006 or radiant heat modelling not exposing the closest part of a dwelling to greater than 29 kW/m². As the proposed development does not contain a habitable component there are no minimum required Asset Protection Zones.

An APZ constitutes an Inner Protection Area (IPA) immediately surrounding the building and an Outer Protection Area (OPA) which adjoins the IPA and the bush land. For forest and woodland vegetation, the IPA manages the heat intensities at the building surface and incorporates the surrounding defendable space whilst the OPA reduces the potential length of flames by slowing the rate of spread, filtering embers and suppressing the crown fire.



Planning for Bushfire Protection 2006 mitigates grassfire impact with protection of the subfloor space or the provision of a 1.8 metre high protective (non-combustible) fence (e.g. colorbond or masonry) in conjunction with a basic Asset Protection Zone (APZ) of 10 metres around the immediate perimeter of the bio-digester facility.

It is acknowledged that due to the length of the combined perimeter of the development area that the provision of a solid type protective fence is not feasible and therefore we recommend the provision of an additional 10 metre APZ, totalling 20 metres around the proposed facility.

It is subsequently recommended that this APZ's consist of entirely of an IPA. To comply with the IPA requirements, It is recommended that (at a minimum), the grounds surrounding proposed bio-digester be periodically fuel-reduced by either slashing or grazing to reduce the likelihood of an internal grassfire impacting the facility. Similarly the grounds surrounding the individual structures comprising the proposed facility should be fuel reduced to ensure direct flame contact does not occur.

In addition the IPA will require:

- Trees and shrubs do not overhang buildings;
- The placement of vegetation does not provide a path for the transfer of fire;
- The placement of vegetation does not allow for direct ignition, or ignition by radiant heat, of a building; and
- Stored combustible material is not kept within the IPA.

5.19.2.5 Fire Fighting Water Supply

Clarence Consultants on behalf of Bindaree Beef have designed an independent fire system ring that will provide fire protection to the approved MAP building, new render plant and new bio-digester plant.

Appendix K contains a number of plans showing the proposed fire system. This system extended from the existing towns water main and will not be connected to the existing fire system covering the existing abattoir. It is noted, however, from the plans that Fire Hydrant No. 8 does offer scope to provide some protection to the existing maintenance shed, adjacent to the proposed new rendering plant.

Consideration was given to the Hazard and Risk Assessment Report prepared by CDM Smith when designing the fire system for the proposed render plant and bio-digester plant, particularly in relation to the hydrant location, relationship and coverage of the bio-gas storage dome and flare and possible truck locations.

This water supply would be considered suitable for the replenishment of Fire Service vehicles and first attack fire fighting.



5.19.2.6 Property Access – Fire Services & Evacuation

The development site currently possesses three (3) primary and one secondary access points. The three (3) primary points of access all utilise the Gwydir Highway while the secondary point has access from Copeton Dam Road.

Primary access to the facility is gained via Access Point 1 and all traffic movements associated with operation of the site (including employee movements and stock deliveries) utilised this point. Access points 2 and 3 are prohibited for use by all non-emergency vehicles. Use of access point 4 is restricted to light vehicles (cars) associated with the operation of the farm owned and operated by Bindaree Beef (this area includes facilities wastewater irrigation area) as well as emergency vehicles.

With the exception of access point 4, all access points are sealed allowing for two-way, all weather access to the entire abattoir site. The bio-digester and associated infrastructure will be accessed by an additional sealed road via Access Point 1.

The proposed additional access road to the bio-digester facility is deemed to comply with the requirements for 'Internal Roads' as detailed in Section 4.2.7 of *Planning for Bushfire Protection 2006*.

As such, access for Fire Service's and staff evacuation is considered satisfactory.

5.19.2.7 Building and Construction Considerations

The objectives of *Planning for Bushfire Protection – 2006* are for the protection of life including fire fighters. Provided these objectives can be met the construction of buildings is feasible and both the Rural Fire Service and Council should be in a position to consider such applications.

Given that the facility is located in excess of 100m from the identified bushfire prone vegetation the highest Bushfire Attack Level deemed to apply to the proposed facility was determined to be 'BAL – Low' requiring no minimum construction Level in accordance with AS 3959 – 2009 '*Construction of buildings in bushfire-prone areas*'.



5.19.3 Site Specific Bushfire Hazard Determination

The proposed development can meet the aims and objectives of PBP. MHC have assessed the property noting the following.

- The abattoir site is considered bushfire prone under Inverell Shire Bushfire Prone Land Mapping obtained.
- Available land for the APZ exceeds the requirements of PBP 2006.
- Internal access complies with the requirements for 'Internal Roads' under section 4.2.7 of PBP 2006;
- The bio-digester site requires no minimum construction Level in accordance with AS 3959 – 2009 ;and
- There are numerous hydrants located throughout the abattoir facility and additional hydrants will be provided within the proposed facility.

5.19.4 Mitigation Measures

Planning for Bushfire Protection 2006 suggests that to mitigate against grassfire impact the provision of a 1.8 metre high protective (non-combustible) fence (e.g. Colorbond or masonry) in conjunction with a basic Asset Protection Zone (APZ) of 10 metres around the perimeter of the development site wholly within the subject property.

In light of the length of the combined perimeter of the development area it is recommended the provision of an additional 10 metre APZ, totalling 20 metres around the proposed facility.

It is recommended that (at a minimum), the grounds surrounding proposed bio-digester be periodically fuel reduced by either slashing or grazing to reduce the likelihood of an internal grassfire impacting the facility. Similarly the grounds surrounding the individual structures comprising the proposed facility should be fuel reduced to ensure direct flame contact does not occur

The proposed development must also be considered in light of the potential impact it may have on the ignition and propagation of grassfires onto neighbouring allotments. It is the duty of care of land owner/s to prevent the occurrence of bushfires/ grassfires and minimise the danger of the spread of a bushfire / grassfire on or from that land.



5.19.5 Recommendations

The following recommendations are provided as the minimum necessary for compliance with *Planning for Bushfire Protection – 2006* and *AS3959 – 2009*.

Asset Protection Zones

- That a 20 metre Asset Protection Zone, consisting entirely of an Inner Protection Area, be provided around the proposed electricity generation facility.
- That all grounds within the subject property not built upon be periodically fuel reduced (e.g. grazing or slashing).

Access

The proposed internal road to the proposed the bio-digester facility is to comply with the requirements for 'Internal Roads' as detailed in Section 4.2.7 of *Planning for Bushfire Protection 2006*, in particular:

- Internal roads are two-wheel drive, sealed, all-weather roads;
- A minimum vertical clearance of four metres to any overhanging obstructions, including tree branches, is provided.
- Curves have a minimum inner radius of six metres and are minimal in number to allow for rapid access and egress.
- The minimum distance between inner and outer curves is six metres.
- Roads are clearly sign-posted and bridges clearly indicate load ratings.
- The internal road surfaces have a capacity to carry fully-loaded fire fighting vehicles (15 tonnes).

Fencing

- That no combustible fencing be installed within 10 metres of a structure.

Emergency Management

- That a Bushfire / Grassfire Evacuation Plan be prepared consistent with the NSW Rural Fire Service Guidelines.



Landscaping

- That landscaping around any proposed buildings complies with Appendix 5 '*Landscaping and Property Maintenance*' of *Planning for Bushfire Protection 2006*.

5.20 Building Code of Australia

5.20.1.1 Introduction

MHC (on behalf of Bindaree Beef Pty Ltd) engaged the services of Boyce Built Environment Consulting (BBEC) to undertake a *Building Code of Australia 2013* (BCA) compliance assessment of the proposed Bio-digester and new Rendering plants for inclusion in the EIS for the proposal.

Appendix L contains a copy of the BBEC BCA assessment.

The development incorporates three (3) proposed buildings as follows:

- Proposed Rendering Building
- Proposed Drying Building
- Proposed Control and Switchroom.

The development also includes several process tanks and a single bio-gas storage holder. These tanks and domes have been classified 10b structures in accordance with Part 3.2 of the BCA and subject to being designed and verified by an appropriately qualified structural engineer, no further BCA compliance was been undertaken.

The purpose of the BCA assessment was to:-

- Provide a BCA assessment of the proposed development against the Deemed-to-satisfy (DTS) Provisions of the BCA with specific regard to Section C (Fire Resistance), Section @ (Access and Egress), Section E (Services and Equipment), Section F (Health and Amenity) and Section J (Energy Efficiency) of the BCA and;
- To identify the DTS non-compliances with the BCA that could affect the proposed development; and
- Make compliance recommendations to address the identified DTS non-compliances with BCA, specifically by either recommending design changes to accommodate DTS compliance OR suggesting Alternative Solutions to demonstrate compliance with the relevant Performance Requirements of the BCA.

In undertaking the BCA Capability Assessment, BBEC has had regard to the specific purpose for which the development is proposed.



5.20.1.2 Summary of Findings

For the most part, the buildings comply with the DTS of the BCA subject to additional detailing that will be incorporated into the construction drawings for lodgement with the Construction Certificate. The remaining issues are that of compliance with the BCA performance requirements DP1 and DP8 relating to access and car parking for people with a disability. In addition, FP2.1 as it related to sanitary facilities for personal hygiene.

As discussed in the PEA, the proposed project involves the installation of a wastewater treatment system (Bio-digester) and new render plant facility. The bio-digester generates bio-gas from operations carried out in the existing abattoir to create methane which is subsequently used to create energy.

The owners have foreshadowed the commissioning of an alternative solutions report in relation to the Performance Requirements DP1 and DP8 which relate to access and car-parking for people with disabilities. The following information has been provided to support this compliance pathway:-

“The facility is a factory, the very nature of the process would mean that a person with a disability, particularly a person in a wheelchair, would not be suited to undertake these activities. One of the essential criteria for any potential employee is that they need to be physically fit to undertake the manual components of the occupation including the ability to access the screw conveyors, process areas and manoeuvre the handheld equipment associated with the process.”

In addition to responsibilities to comply with the BCA, Bindaree Beef have responsibilities under the Work, Health and Safety Act and Regulations to ensure a safe workplace for employees. This facility would pose a health and safety risk for people with a disability for the following reasons:

- The configuration and the operation of the facility would pose a safety risk in the length of time it would take a person with a disability to respond in a safe and reasonable manner to any risk posed in the event of an emergency;
- The inability to provide suitable personal protection equipment for people with a disability so as to prevent potential injury for individuals;
- The inability to provide a safe working environment for people with a disability; and
- The inability of a person with a disability to effectively manipulate machinery and other equipment used in the facility.



Bindaree Beef take pride in being a responsible and inclusive employer, in addition they are well aware of the organisations obligations under the Disability Discrimination Act 1992 (DDA) and as a gesture of good faith, would be happy to undertake an access audit of its office and administration buildings at the existing facility, with a view to upgrading the access and amenities for any potential employees that may have a disability.

The matter of the lack of proposed sanitary facilities has also been acknowledged by Bindaree Beef. It is anticipated that at any one time, there will be a maximum of 2 employees for 2 shifts in the three component buildings. A sanitary facility has been preliminarily identified within the new Render building at this stage.



5.21 Fire Systems

5.21.1.1 Fire System Upgrade – Existing Abattoir

A number of letters attached to the DGRs contained specific comments from a number of agencies. Inverell Shire Council provided detailed comments on the project including commentary on other matters including requirements to address matters relating to fire systems and management for the existing abattoir.

The abattoirs were established in 1951 and since that time has undergone various additional developments including storage shed, additional chiller rooms and numerous internal changes.

Bindaree Beef acknowledges that fire protection for the existing abattoir needs to be reviewed and potentially upgraded. However, Bindaree Beef would like to proceed with the development of the new render plant and bio-digester plant and as a result have held discussions with the possibility of addressing Inverell Shire Council's requirements in relation to the existing fire system as a separate matter.

Representatives from MHC, Boyce Built Environment Consulting and Bindaree Beef met with Inverell Shire Council in December 2013 regarding the need for upgrades to be undertaken to the existing fire system at the abattoir.

Subsequently in March 2014, MHC put a proposal to Inverell Shire Council outlining a number of options to progress the review of the existing fire system. A copy of the proposal put to Inverell Shire Council is continued in Appendix M.

Inverell Shire Council have subsequently provided a letter indicating that Council is prepared to enter into a binding agreement that allows maximum amount of flexibility between Inverell Council and Bindaree Beef to discuss, negotiate and set timeframes for the upgrading of the existing abattoir without hindering the continuation of the project. Appendix M contains a copy of the letter received from Inverell Shire Council.



5.21.1.2 Fire System Proposed – New Render Plant and Bio-digester Plant

A separate fire hydrant system is proposed for the new render plant and bio-digester plant. This system will be a stand-alone system that also includes the already approved Modified Atmosphere Package (MAP) Facility.

MHC (on behalf of Bindaree Beef Pty Ltd) engaged the services of Clarence Consultants to prepare a new hydrant system concept plan for the project. The detailed hydrant system plans are contained in Appendix K.

The new hydrant system includes:-

- Two (2) 216kl effective capacity water storage tanks proposed to be located between the MAP Facility and the bio-digester plant. This water storage capacity allows combined with the proposed fire hydrant pumps allows for 4hrs at 30L/s of fire fighting;
- Two (2) diesel powered fire hydrant pumps 30L/s at 850kPa to AS2941 standard;
- Nine (9) standalone hydrants located in accordance with AS2419.1 – Fire Hydrant Installations to ensure coverage of all buildings, bio filters, infrastructure, storage tanks and the flare. All infrastructure is shown to be within the AS2419.1 allowance of 60m of hose and 10m of water spray for an external attack hydrant;
- Coverage is provided based on only hydrants which are no less than 10m away from structures. Hydrants closer than 10m have not been used to assess coverage to the structure they are close to;
- Special attention has been paid to the area around the bio-gas storage dome to include two (2) landing valves to ensure that the hydrant itself is outside the lines shown as 4.7kW/m^2 for event scenarios 1 and 5.0kW/m^2 for event scenario 2 as outlined in the Hazard and Risk Assessment outlined in Section 5.6 of this EIS; and
- A possible fire brigade truck parking location has been identified, adjacent to fire hydrant No. 6, that would be likely required if the hydrants were to be used as feed hydrants. It is shown that the trucks could be no closer than 25m to the bio-gas storage dome and achieve the coverage required in accordance with AS2419.



5.22 Site Security

Bindaree Beef currently utilise a number of security measures to ensure access to the site is restricted to authorized personnel and to prevent injury to employees and the public.

These measures include security fencing, a 24 hour-a-day manned gate house and boom gate, strict sign-in sign-out requirements, site inductions, signage and security lighting.

These measures are deemed adequate to ensure the safety and security surrounding the bio-digester and associated infrastructure is maintained. It is, however, proposed to install additional lighting and security fencing around the new infrastructure. All access / egress points will be clearly delineated.

Additional lighting will be installed around the proposed gas storage dome, bio-digester buildings and other work areas to ensure a safe and secure work environment during periods of low natural light and night time operation. To ensure the surrounding area including the residential dwellings near the site are unaffected by the proposed lighting, all lighting will incorporate suitable shielding [Refer to Figure 46] to prevent or minimise light spill into the local environment or any offsite areas.

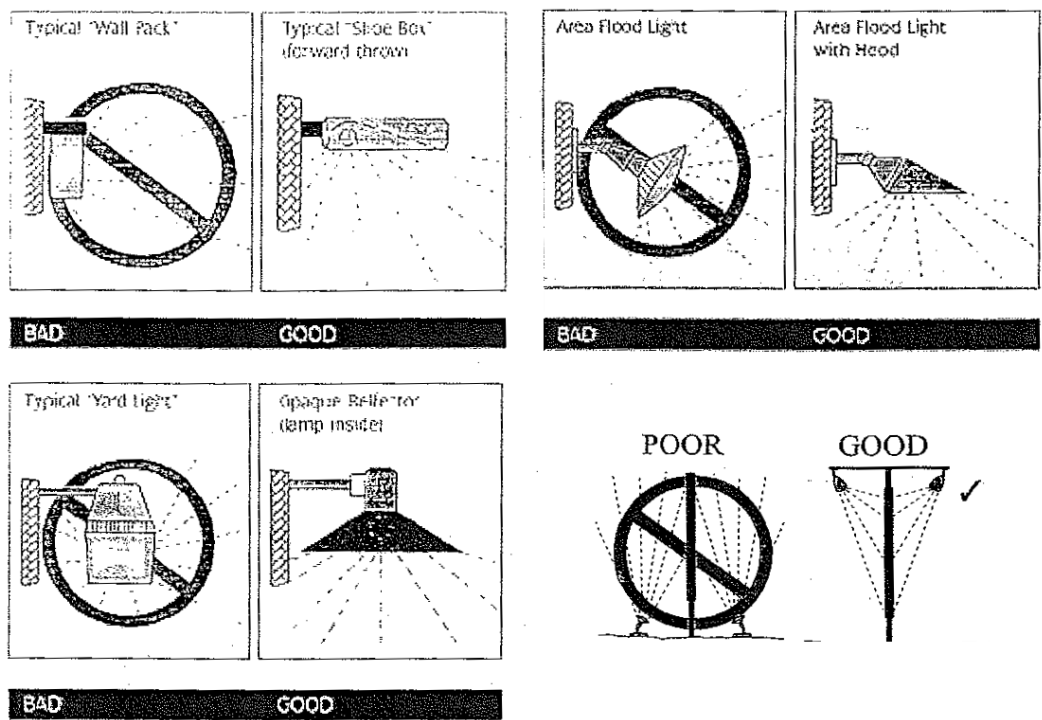


Figure 46: Recommended Site Lighting



Given the topography of the site and the distance between the site and (approximately 700 m) the nearest residential dwelling, offsite lighting impacts are unlikely to affect any local residents provided all site lighting incorporates the recommended light shielding.

5.23 Emergency Management

Bindaree Beef have developed an Emergency Evacuation and Response Plan for the existing abattoir operation. This plan details all emergency response requirements including the necessary measures to be implemented in the event of fire, spills and other emergency events. The plan also illustrates the location of various pieces of emergency equipment (e.g. fire hydrants, extinguishers, first aid kits) throughout the existing facility. This plan will be augmented to include the proposed facility and will include the location all necessary signs, equipment and infrastructure.



5.24 Biosecurity

Bindaree Beef have an existing Biosecurity Manual outlining the standard operating procedure and persons responsible for implementing the manual in the event of a biosecurity issue.

A brief outline of the procedure is included below:

- All notifiable diseases shall be communicated to the Department of Primary Industries Biosecurity Branch and the Environment Protection Authority (EPA) as soon as an outbreak is suspected. Immediate measures shall be implemented to isolate the infected farm and to notify all relevant managers and supervisors of the nature of the outbreak. Immediate quarantine procedures and any likely suspension of normal business activities will be implemented;
- Where a disease requires immediate slaughter of all on-farm stock, killing shall be co-ordinated by the Department of Primary Industries Biosecurity Branch, Senior Veterinary staff. Bindaree Beef's Managing Director will ensure all relevant protocols are carried out by all Bindaree Beef staff;
- A suitable mass burial pit will be constructed to the appropriate standards and to a suitable size to facilitate mass burial of animals; and
- Any vehicles entering or exiting the site are to be disinfected and cleaned under the supervision of the Department of Primary Industries Biosecurity Branch.



5.25 Services

Electricity, telecommunications and reticulated potable water supply services are existing to the site and available from the existing main abattoir plant.

5.25.1 Electricity

The rendering and bio-digester project does not require an upgrade of existing electrical power supply capacity or infrastructure to the site. The project includes an extension of onsite HV lines to new transformers located close to each of the render and bio-digester control rooms.

Bio-gas produced from the bio-digester plant will be used primarily as a fuel for a boiler to produce steam, however excess bio-gas will also be used to generate electricity to supply the abattoir's onsite power demand. It is intended that electricity produced by the cogeneration units (CHP's) will not be exported to the state power grid.

5.25.2 Water

Minimal potable water will be used for wash-down, amenities and boiler make-up water. There will be no additional potable water required for the process operation of either the render or bio-digester plants. Both the render and bio-digester plants will incorporate closed-loop heat exchanges.

Water requirements during construction will be primarily used for employee drinking water, dust suppression and flushing of piping systems.

5.25.3 Telecommunications

Telecommunications to the proposed development will be extended from the existing main abattoir plant. The current supply to the site is sufficient for the proposed development needs.



5.26 Environmental Protection Licence 809

The existing Environmental Protection Licence (EPL) for the abattoir operations is expected to be reissued as part of the development consent. Yolarno Pty Ltd will apply for an updated EPL prior to commencement of the development. Pursuant to Section 89K(1)(e) of the EP&A Act, an EPL must be granted if it is necessary for the carrying out of the activity that has been granted development consent. The EPL must be issued under the terms consistent with the development consent. A copy of the EPL 809 is included in Appendix S

5.26.1 Rendering Plant Coal-fired Boiler

One of the existing coal-fired boilers will be decommissioned as part of the proposed development. This boiler will be removed from the existing EPL, and monitoring conditions inserted for the proposed gas-fired boiler as an air discharge point. One of the existing coal-fired boilers is to remain on standby for emergency situations. The monitoring conditions will remain unchanged for this boiler and remain on the EPL.

5.26.2 Rendering Plant Biofilter

The existing biofilter for the rendering plant will be replaced with a new biofilter complementing the new rendering plant. The existing monitoring requirements for the biofilter will be reissued for the new biofilter. It is not expected the monitoring requirements will change for this monitoring point.

5.26.3 Wet Weather Discharge

The decommissioning of the existing aerobic effluent treatment ponds will increase the existing wet weather storage capacity to approximately 200 ML. This will create a storage buffer of digestate from the bio-digester. It is expected the monitoring requirements for the wet weather storage will remain.

5.26.4 Digestate

The digestate output from the bio-digester will be monitored for similar nutrient parameters to the existing effluent monitoring. The volume of digestate will also be monitored. Parameters for monitoring will be designed once the bio-digester is operational and a digestate stream is produced.



5.26.5 Soils

The existing wastewater utilisation areas and current management units as per the existing EPL will remain. The existing frequency of monitoring and nutrient parameters to be tested are suitable for the updated EPL.

5.26.6 Groundwater

The existing groundwater monitoring bores are suitable for the updated EPL and there are no proposed changes to the monitoring frequency or nutrient parameters.

5.26.7 Surface Water

The existing surface water monitoring points are suitable for the updated EPL and there are no proposed changes to the monitoring frequency or nutrient parameters.

5.26.8 Solids

The proposed solid fertiliser from the bio-digester will be monitored for similar nutrient parameters to the existing solids quality monitoring. The volume of solids will also be monitored. Parameters for monitoring will be designed once the bio-digester is operational and a solid fertiliser is produced.

5.26.9 Annual Monitoring Report

An annual monitoring report will continue to be produced by Yolarno Pty Ltd to outline and address the monitoring results and proposed actions for the year.



5.27 Summary of Environmental Mitigation Measures

Table 39: Summary of Environmental Mitigation Measures

ENVIRONMENTAL MEASURE	EIS SECTION
Air Quality – Operation	
• Ensure the retention of the Inverell Council LEP separation buffer; • Decommission the wastewater ponds as soon as practical; • Where practical, plant trees around the site boundary; • Implement a complaints hotline and maintain a complaints register; • Perform daily inspections of the site to ensure no waste material is left outside buildings; • Establish a maintenance procedure for the biofilter operation; • Establish a maintenance procedure for the standby coal-fired boiler operation.	5.4.6 and 5.4.7
Air Quality – Construction	
• Limit the disturbed areas to the minimum required; • Limit traffic to designated areas; • Cover stockpiles where practical; • Use dust covers on trucks where practical; • Surfaces should be left in a rough condition to slow wind speed; • Limit the removal of groundcover to the immediate area required; • Rehabilitate disturbed areas as soon as possible; • Dust suppression using as watering cart.	5.4.7 and 5.4.15
Biodiversity	
• There are no proposed clearing activities as part of the proposed development; • There is no mitigation measures proposed.	5.18
Bushfire	
• An Asset Protection Zone (APZ) of 20 m is proposed surrounding the proposed facility;	5.19.4



ENVIRONMENTAL MEASURE	EIS SECTION
- The grounds surrounding the proposed development will be periodically slashed or grazed to reduce fuel loading. This will occur prior to summer. - Access roads will be maintained and sign-posted for fire-fighting vehicles; - No combustible fencing will be installed within 10 m of a structure; - A bushfire evacuation plan will be prepared and implemented; - Landscaping will comply with the relevant guidelines and be planted outside the recommended APZ area.	
Building Code of Australia	
No mitigation measures are proposed.	5.20.1.2
Cultural Heritage	
Where any suspected cultural heritage item is identified during construction, all works will cease and the appropriate authority notified.	5.17
Emergency Management	
The existing Emergency Evacuation and Response Plan will be updated to included proposed emergency measures for the proposed development.	5.23
Environmental Protection Licence	
The existing Environmental Protection Licence will be reissued with appropriate changes as part of the development consent process.	5.26
Extractive Industries	
There are no proposed mitigation measures.	5.13
Greenhouse Gas Emissions	
- The project will reduce Yolarno Pty Ltd overall greenhouse gas emissions by 52% per year; - High efficiency equipment, decommissioning of the wastewater ponds, removal of coal burning for boiler operation and installation of a bio-digester for electricity production have significantly improved the greenhouse gas emissions from the site; - No mitigation measures are proposed.	5.7



ENVIRONMENTAL MEASURE	EIS SECTION
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Groundwater

- Groundwater monitoring will be continued as part of the revised EPL for the site;
- Implementation of a farm management plan will minimise potential impacts on groundwater from effluent and solid fertiliser utilisation.

5.12

Hazard And Risk Assessment

- Commissioning tests of all equipment undertaken prior to operation;
- Purging of oxygen from the bio-digester system prior to filling with bio-gas;
- Trained consultant overseeing bio-digester start-up;
- Bio-gas flare to comply with relevant Australian Standard (AS) be located away from any potential bio-gas release point;
- Setback distances from other infrastructure established;
- Assess explosive gas atmosphere zones in accordance with relevant Australian Standard;
- An Impact Protection Zone around bio-gas storage tanks;
- Security fencing and restricted access around the bio-digester plant;
- An appropriate separation distance exists from the site boundary;
- Installation of protective devices e.g. leak detection and emergency isolation valves;
- Gas safety regulations and AS to be met;
- Emergency Response Plan to be prepared and staff trained appropriately;
- Gas pipelines to comply with relevant AS and bio-gas pipelines to be clearly marked;
- Protective coatings to minimise corrosion;
- Bio-gas conditioning to remove condensate.

5.6.6

Hydraulic and Nutrient Balance Modelling

- The existing wet weather storage is sufficient to capture the 90% percentile rainfall event for low strength effluent;
- A revised hydraulic and nutrient balance modelling report will be undertaken prior to digestate utilisation on land.

5.9



ENVIRONMENTAL MEASURE	EIS SECTION
Noise – Operation and Construction - Avoid noise where possible; - Minimise noise through re-orientation of an activity, or use of Best Available Technology; - Management of noise through timing, frequency or duration; - Maintain a complaints register.	5.5.9
Site Contamination - No preliminary investigations indicate site contamination at the proposed development site; - If suspected contamination is found during construction, all works will cease until further investigations are carried out; - No mitigation measures are proposed.	5.10.3
Site Security - The existing mitigation measures of security fencing, 24 hr manned gate, sign-in /sign-out requirements, site inductions, signage and security lighting will be maintained; - Additional security lighting will be installed around the bio-digester facility.	5.22
Services - Existing water, electricity and telecommunications services are provided to the site; - Where upgrades are required, this will be outlined during the Construction Certificate phase.	5.25
Socio-Economic - There are no negative socio-economic impacts associated with the proposed development; - No mitigation measures are proposed.	5.2.6
Soils and Geology - The soils of the proposed construction site and current wastewater irrigation area are suitable for purpose; - A nutrient balance of the wastewater irrigation area will be undertaken prior to irrigation of digestate from the bio-digester; - A Wastewater Report has been prepared to outline the next steps in management practices of the digestate utilisation onto land.	5.8



ENVIRONMENTAL MEASURE	EIS SECTION
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Surface Water

- Implementation of a farm management plan will minimise potential impacts on surface water from effluent and solid fertiliser utilisation.
- Erosion controls to be implemented include: grassed swale drains, diversion of upstream water around the site and a rock lined check dam;
- Sedimentation controls will be implemented and include: straw bales, and sediment fencing around stockpile areas; 5.11.7
- Works undertaken within 40 m of a waterway will be undertaken in accordance with the Office of Water Guidelines for Controlled Activities;
- Surface water monitoring will be continued as part of the revised EPL for the site;
- No flood mitigation measures are proposed;
- The existing water agreement with Inverell Shire Council will remain and continue for the proposed development.

Traffic and Parking

- A Type CHR(S) lane treatment may be required at the site entrance for vehicles turning right into the site off the Gwydir Highway; 5.14.3
- No mitigation measures are proposed for onsite parking, traffic movements or the type of vehicles accessing the site.

Visual Amenity and Landscaping

- Landscaping will be implemented to the north and north-east of the proposed bio-digester site.
- Landscaping will include planting of native *Myrtaceae Eucalyptus* trees of a mature height of 18-25 m. 5.16
- Existing vegetation located near the bio-digester will be retained to ensure that no increased exposure occurs.

Waste Management

- Waste will be managed to avoid creating waste where possible, and reducing consumption of materials during the material purchasing stage; 5.15.3
- Opportunities to reuse materials will be undertaken;
- Waste material will be recycled where appropriate.



6.0 Stakeholder Engagement

6.1 Introduction

Community and stakeholder engagement has been undertaken as part of the EIS preparation to ensure all relevant parties have had the opportunity to participate in the consultation process. The key goal of the process has been to provide stakeholders and affected parties with appropriate details and information to enable them to form their views and comments. This ensures all relevant issues have been considered before final decision-making is undertaken.

6.2 Principles of Consultation

MHC believes there are four foundation principles in how we approach any type of community consultation to ensure effective community engagement. These are:-

- Openness
- Inclusiveness
- Responsiveness; and
- Accountability.

The manner in which these principles are applied by MHC will vary throughout the life of a project; however, they will be considered and applied consistently.



6.3 Consultation Process

6.3.1.1 Purpose and objectives

The purpose of the process was to provide the community, affected parties and stakeholders, information on the project and its outcomes with sufficient detail that any potential issues could be identified and responded to.

The objectives of the consultation process where:-

- Communicate the details of the project widely to all identified stakeholders using 'fit for purpose' information.
- Provide and encourage opportunities for feedback at key stages of the EIS process.
- Review inputs and ensure issues identified, assessed and considered appropriately before the completion of relevant decision-affect making.

6.3.1.2 Stakeholder identification

Affected parties and stakeholders were identified according to the key features of the project and the subsequent expected impacts and outcomes. Identification was made after consideration of the:

- Size and significance of the project for the region and community
- Location of the site and who would be directly affected (such as adjoining landowners)
- Nature and type of the development in terms of impact on infrastructure and services.



The following groups and individuals were therefore targeted:

Table 40: Consultation Stakeholders

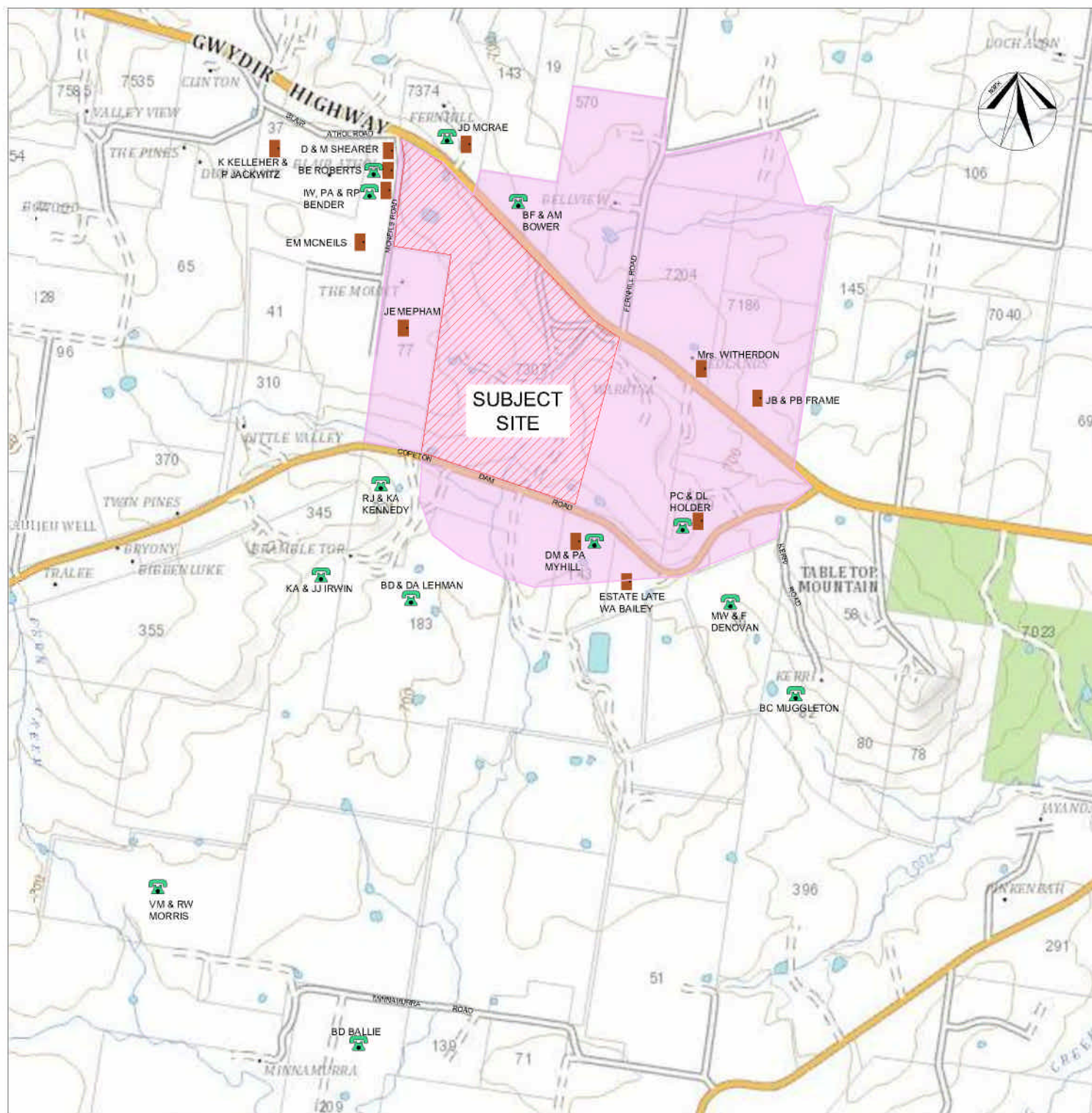
COMMUNITY	AGENCY
General local community	Inverell Shire Council
Adjoining neighbours	Roads and Maritime Service (RMS)
Nearby land owners	Department of Primary Industry
Local suppliers/contractors/employment.	Environment Protection Authority (EPA)
	Department of Planning and Infrastructure

6.4 Consultation Process and Activities

In line with the ‘Principles of Consultation’, opportunities were made available for all parties to participate in tailored activities to ensure appropriate information was shared.

During each event, feedback was actively encouraged. Direct invitations were given to key stakeholders to attend meetings and discussions, and community ‘Drop in’ sessions were widely advertised to promote the event. A range of different mediums and information formats were used during the process, with each activity tailored and well-resourced (refer Appendix U).

Neighbouring land occupiers were identified and contacted (refer to Figure 47). Table 41 details the summary of consultation undertaken to date.



NAME	PROPERTY DESCRIPTION
Mrs. WITHERDON	7204 GWYDIR HIGHWAY
JB & PB FRAME	"BAMBIL" 7186 GWYDIR HIGHWAY
PC & DL HOLDER	44 COPETON DAM ROAD
BF & AM BOWER	"GREEN OAK" 7360 GWYDIR HIGHWAY
JD MCRAE	"FERN HILL" 7374 GWYDIR HIGHWAY
K KELLEHER & P JACKWITZ	"BLAIR ATHOL" 37 BLAIR ATHOL ROAD
BE ROBERTS	"MOUNTAIN VIEW" 22 MCNEILS ROAD
D & M SHEARER	13 BLAIR ATHOL ROAD
IV, PA & RP BENDER	"KINTONE" 32 MCNEILS ROAD
DM & PA MYHILL	"POPLAR FARM" 143 COPETON DAM ROAD
ESTATE LATE WA BAILEY	"POPLARS" 95 COPETON DAM ROAD
EM MCNEIL	42 MCNEILS ROAD
JEMEPHAM	"MOUNT VIEW" 77 MCNEILS ROAD
BC MUGGLETON	82 KERRI ROAD
BD BALLIE	209 MINNAMURRA ROAD
RJ & KA KENNEDY	221 COPETON DAM ROAD
BD & DA LEHMAN	183 COPETON DAM ROAD
KA & JJ IRWIN	345 COPETON DAM ROAD
VM & RW MORRIS	216 MINNAMURRA ROAD
MW & F DENOVAN	38 KERRI ROAD



Table 41: Summary of Consultation Undertaken to Date

DATE	ACTIVITY	PURPOSE	OVERVIEW	PARTICIPATING PARTIES
6 June 2013	Meeting with Inverell Shire Council.	To clarify items of significance and obtain feedback from Council on key items.	Discussed aspects of the LEP, draft DCP, community issues/complaints, and consultation requirements.	Arranged by Mitchel Hanlon Consulting between: Manager of Planning, Inverell Shire Council Mitchel Hanlon Consulting representatives (2).
6-7 June 2013	Neighbourhood doorknock.	To provide information to directly adjoining neighbours.	Property visits to personally inform neighbours of the project and to source initial feedback. Those not contacted were left an information pack.	Conducted by Mitchel Hanlon Consulting representatives. Visited 15 of 18 neighbourhood properties.
14,24 & 26 June 2013	Phone calls to neighbours.	To contact neighbours who were not visited or not home during the doorknock and obtain any additional feedback.	Called neighbours to discuss the project and garner feedback.	Conducted by Mitchel Hanlon Consulting representatives. 16 neighbours called.
17 June 2013	Meeting with EPA.	To identify and discuss items to be considered and determine their significance.	Discussed neighbour complaints, noise, emissions, odours, DAF and lagoons, dust license requirements and water quality.	Arranged by Mitchel Hanlon Consulting between: Regional Operation Officer, EPA. Mitchel Hanlon Consulting representatives (2).



DATE	ACTIVITY	PURPOSE	OVERVIEW	PARTICIPATING PARTIES
19 July 2013	Meeting with the Department of Planning and Infrastructure.	To provide an outline of the project and seek initial feedback on the requirements of the Preliminary Environmental Assessment.	Agreed the definition off the project and determined it was State Significant; clarified DGR requirement for Quantity surveyors report; no requirement for Planning Focus Meeting; Need for odour study and SEPP 33 to be considered/ addressed.	Arranged by Mitchel Hanlon Consulting between: Officers of the Department of Planning and Infrastructure. Mitchel Hanlon Consulting representatives (2).
28 October 2013	Meeting with EPA	To determine the EPA requirements for the EIS.	Discussed details of the project, specifics of EPA requirements, complaints received, and items for follow-up.	Arranged by Mitchel Hanlon Consulting between: EPA representatives (2) Bindaree Beef representative Mitchel Hanlon Consulting representatives (2)
15 November 2013	Invitation to Landowners and Neighbours.	To give early notification directly to landowners and neighbours of the planned project update session.	Invitation provided details of an upcoming update session to encourage attendance.	Arranged by Mitchel Hanlon Consulting. Invitation sent to 28 landowners/ neighbours.



DATE	ACTIVITY	PURPOSE	OVERVIEW	PARTICIPATING PARTIES
28 November 2013	Agency Meeting. Invitees: - EPA - Office of Water - RMS	To discuss status of the project and expectations.	Project details presented. Discussed aspects of the project, EIS requirements, community consultation and feedback, buffer zoning.	Arranged by Mitchel Hanlon Consulting between: EPA representatives Manager of Planning, Inverell Shire Council Bindaree Beef representative Contract Engineer (MeatEng) Mitchel Hanlon representatives (3)
28 November 2013	Community Drop in Session no.1.	To provide the community information about the project and the opportunity to ask questions and meet the project team.	Made available plans, maps and technical information for the community to review, read and ask questions about.	Hosted by Mitchel Hanlon Consulting: Bindaree Beef representatives Mitchel Hanlon Consulting representatives Community attendees



DATE	ACTIVITY	PURPOSE	OVERVIEW	PARTICIPATING PARTIES
29 November 2013	Project Update Session for Landowners and Neighbours	To provide details about the project, an update of progress and plans, and the opportunity to ask questions.	Formal presentation provided by Mitch Hanlon Consulting, feedback given by some attendees	Hosted by Mitchel Hanlon Consulting: Bindaree Beef representatives Mitchel Hanlon Consulting representatives Neighbour attendees
30 November 2013	Community Drop in Session no.2.	As per the first Drop in session on 28 November.	As per the first Drop in session on 28 November.	Hosted by Mitchel Hanlon Consulting: Bindaree Beef representatives Mitchel Hanlon Consulting representatives Community attendees



6.5 Issues and Stakeholder Feedback

Table 42 summarises the feedback and issues raised during the process, and the response to these.

During the consultation process feedback was sought from all parties regarding any issues or concerns regarding the project. These were reviewed and where relevant, amendments made in response.



Table 42: Summary of Feedback and Issues Raised

STAKEHOLDER	CONSULTATION	FEEDBACK AND ISSUES	RESPONSE
Department of Planning and Infrastructure	Meeting held 19 July 2013	Need for DGRs: - Quantity Surveyors - Report be prepared and lodged - Updated odour study is required - SEPP33 to be considered and addressed	- A Capital Investment Value Report was undertaken by Rider Levett Bucknall and is contained in Appendix D. - An Air Quality and Odour Assessment was undertaken by ViPAC, which is summarised in Section 5.3 and is contained in Appendix G. - A Hazard and Risk Assessment Report was undertaken by CDM Smith and is contained in Appendix J.
EPA	Meetings 17 June, 28 October and 28 November 2013		No action required
RMS	Invited to Agency Meeting 28 November 2013.	Unable to attend	No action required
Inverell Shire Council and Agency Meeting	Meeting 6 June 2013 and Agency Meeting 28 November 2013.	See minutes of this meeting contained in Appendix V.	Detailed discussions were held at this meeting with particular focus given to the decommissioning of equipment and the retention of one coal fired powered boiler for back up/maintenance purposes. These matters have been addressed in Section 3.7 and 5.4.9
Department of Primary Industries – Office of Water	Invited to Agency Meeting 28 November 2013.	Unable to attend.	No action required
	•	•	•



STAKEHOLDER	CONSULTATION	FEEDBACK AND ISSUES	RESPONSE
Landowners and Neighbours	• Neighbourhood doorknock and information packs issued 6-7 June 2013 • Phone calls 14, 24 and 24 June 2013 • Invitation to Project Update Session sent 15 November 2013 • Project Update Session 29 November 2013.	• Concerned with odours • Questioned whether any changes to the buffer • Concerns regarding visual impact, scale and amenity • Potential impact on land value • Hazard/risk of methane storage and potential if earthquake • Concerned about any runoff • Concerned about airborne infections and viruses • Questioned whether irrigation water will have any impact on groundwater • Concerned about noise impacts	• An Air Quality and Odour Assessment has been undertaken by ViPAC which is summarised in Section 5.3 and is contained in Appendix G • The retention or otherwise of the land use buffer contained within Inverell Local Environmental Plan 2012 is a matter outside the scope of this project. • A Visual Impact Assessment has been undertaken as part of the assessment of the project and is addressed in Section 5.16. • The proposal involves the addition of significant infrastructure to the existing Bindaree Beef abattoir facility. The potential for the addition of this infrastructure to impact on neighbouring land values has subsequently been addressed in Section 5.3. • A Hazard and Risk Assessment has been undertaken by CDM Smith, which is summarised in Section 5.6 and is contained in Appendix J. • A Stormwater Discharge Report has been undertaken by CPC Land Development Consultants, which is summarised in Section 5.11 and is contained in Appendix N. • The proposed development will not contribute to airborne infection and viruses. The wastewater stream will predominantly be contained within enclosed tanks. This will limit the exposure pathways and potential for spread of pathogens from the bio-digester site. More details regarding the biosecurity procedures for the site are outlined in Section 5.24.



STAKEHOLDER	CONSULTATION	FEEDBACK AND ISSUES	RESPONSE
			- There are existing groundwater bores on the property within the existing abattoir and wastewater irrigation areas. Groundwater will not be used as part of the proposed development. The groundwater monitoring data from the past seven years indicates a good level of groundwater in the existing wastewater irrigation areas. The proposed development will not impact on the local groundwater due to the nature of the development. This matter is further addressed in Section 5.12. - A Noise Assessment has been undertaken by ViPAC, which is summarised in Section 5.5 and contained in Appendix H.
General Community	Community Drop in Sessions 28 and 30 November 2013.	Positive feedback was generally received from the general community during the drop in sessions. A number of Councillors and Council Staff attended the sessions. Adam Marshall, National Party representative for the Northern Tablelands and member of the NSW Legislative Assembly also attended the community drop in session on the 30 November 2014.	No action required



6.6 Ongoing Consultation

A requirement of the funding agreement between Bindaree Beef and AusIndustry is that Bindaree Beef must continue to consult with the local community on a monthly basis. Monthly “Community Liaison” meetings are to be held, including during the construction phase, to provide updated news and progress on the project.

Additionally, details of the project will be available on the Bindaree Beef and Mitchel Hanlon Consulting websites. The EIS will be available on display at Inverell Council during the advertising period. Upon closure of the advertising period, submissions will be reviewed by Mitchel Hanlon Consulting.



7.0 Justification of the Proposal

It is necessary to consider the reasons for carrying out of this proposed development and having regard to the biophysical, economic, and social considerations of the proposal, and the principles of ecologically sustainable development (ESD).

7.1 Biophysical Considerations

The various significant components of the biological and physical environment have been well documented and discussed in the previous sections of this statement, and the associated appendices.

7.2 Social and Economic Considerations

From an economic perspective, the proposed bio-digester will benefit Bindaree Beef by saving an estimated \$4.2 million in annual production costs, which in turn will provide Bindaree Beef a competitive advantage for its domestic and overseas sales.

The development also represents the opportunity for a significant and sustained stimulus to both the local and regional agricultural economy.

During the construction phase, Inverell's LGA residents will benefit from more jobs. The local economy will benefit from increased consumer spending by local businesses supplying labour and/or goods and services during construction.

Once commissioned, the bio-digester will benefit the local economy by providing sustainable employment and local business spending on goods.

The proposed bio-digester and new rendering plants will enable Bindaree Beef to grow its business and provide their workforce long term employment opportunities.

Overall, Inverell's LGA is competitive with sufficient human resources and local businesses available to make the most of the opportunity afforded the region from the proposed bio-digester and rendering plants.



7.3 Principles of Ecologically Sustainable Development

The principles of *Ecologically Sustainable Development* (ESD) are found in Schedule 2 of the *Environmental Planning and Assessment Regulation 2000* (EPA Reg) and in s6 of the *Protection of the Environment Administration Act 1991* (PEA Act),

They are defined as follows:

- The “precautionary principle”, namely that if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation;
- “Inter-generational equity”, namely that the present generation should ensure that the health, diversity, and productivity of the environment is maintained or enhanced for the benefit of future generations;
- “Conservation of biological diversity and ecological integrity”; that conservation of biological diversity and ecological integrity should be a fundamental consideration, and
- “Improved valuation, pricing and incentive mechanisms”, namely that environmental factors should be included in the valuation of assets and services.

Bindaree Beef is committed to the use of environmentally friendly practices in the development of the proposed facility. Furthermore, in considering this application, it needs to be remembered that ESD requires the effective integration of economic and environmental considerations in the decision-making process [s.6(2) Protection of the Environment Administration Act, 1991].

This Environmental Impact Statement has outlined the current environmental qualities of the site and mitigation measures to minimise environmental impact from the proposed development.



7.3.1 The Precautionary Principle

The EPA Reg defines the precautionary principle as:

...if there are threats of serious or irreversible environmental damage, lack of full scientific certainty should not be used as a reason for postponing measures to prevent environmental degradation.

Further, the EPA Reg states that, in applying the precautionary principle, decisions should be guided by:

- viii. Careful evaluation to, wherever practicable, avoid serious or irreversible damage to the environment;
- ix. An assessment of the risk-weighted consequences of various options

In the preparation of the proposed development of the facility, the Precautionary Principle has been adhered to, as evidenced by:

- Pre-Development Application consultations and meetings with the Department of Environment and Infrastructure and Inverell Shire Council;
- Discussions by the applicant with various adjoining neighbours;
- Careful evaluation of the perceived threats of environmental damage, as well as comprehensive planning, evaluation, and development of the implications of the proposal; and
- The objective and comprehensive environmental assessment of the proposed development.

This application is the result of a thorough assessment and evaluation of the environmental impacts which may result as a consequence of this proposal. Issues such as dust management, noise, traffic, flora and fauna, lighting, and site contamination, have been examined and reported in conformance with the requirements of this principle.

Based on implementation of the proposed mitigation measures, the proposed development will not contribute to serious or irreversible damage to the local environment.



7.3.2 Intergenerational Equity

The EPA Reg defines Intergenerational Equity as

...the present generation ensuring that the health, diversity and productivity of the environment are maintained or enhanced for the benefit of future generations.

The proposed development is in accordance with the principles of inter-generational equity on the following basis:

- It will result in a significant and sustained stimulus to the local and regional economies;
- It will improve the economic viability of many of the region's existing grain producing land holdings;
- The burden upon the utility for infrastructure upgrades and electricity supply will diminish; and
- The carbon footprint of the facility will be significantly reduced.

7.3.3 Conservation of Biodiversity and Ecological Integrity

The EPA Reg states:

...conservation of biological diversity and ecological integrity should be a fundamental consideration.

Biological diversity is defined by the Threatened Species Conservation Act 1995 (TSC Act) as:

...the diversity of life and is made up of the following 3 components:

- (a) genetic diversity - the variety of genes (or units of heredity) in any population,
- (b) species diversity - the variety of species,
- (c) ecosystem diversity - the variety of communities of ecosystems

The proposed development will preserve the variety of biodiversity and ecological integrity on the site by:

- The introduction and implementation of erosion and sediment control measures;
- Maintenance of the existing waterways and dams on the site for aquatic species;



- Sustainable wastewater irrigation with minimal impact on soil structure and nutrient loads;
- Maintenance of native vegetation via landscape screening. This has great potential to maintain native flora and fauna in the area once established.

7.3.4 Improved Valuation, Pricing and Incentive Mechanisms

The principle of Improved Valuation, Pricing and Incentive Mechanisms deems that environmental factors should be included in the valuation of assets and services. The EPA Reg identifies the following methods to achieve this:

- (i) Polluter pays: those who generate pollution and waste should bear the cost of containment, avoidance or abatement;
- (ii) The users of goods and services should pay prices based on the full life cycle of costs of providing goods and services, including the use of natural resources and assets and the ultimate disposal of any waste; and
- (iii) Environmental goals, having been established, should be pursued in the most cost effective way, by establishing incentive structures, including market mechanisms, that enable those best placed to maximise benefits or minimise costs to develop their own solutions and responses to environmental problem

The triple bottom line analysis includes costs associated with using or impacting upon environmental resources. Such costs should be factored into development proposals so that the value of the end-product and/or service is seen in the broader context of the natural environment.

In terms of the proposed development, Bindaree Beef will bear the full costs associated with:

- The avoidance, abatement, containment and management of any incident that results in or has the potential to result in environmental pollution during the construction and operation of the development;
- The appropriate management of all waste streams generated by the development;
- The upgrade and/or extension of infrastructure to service the proposed development; and
- Fulfilling and complying with the conditions of consent applied by Inverell Shire Council.

The proposed Bindaree Beef development will result in an improvement in the environmental performance of the food processing industry.



7.4 Analysis of Alternatives

The applicant has considered the alternatives to investing considerable finances into the proposed development. These include:-

a) The do nothing option.

The consequence of this is the continued emission of carbon from the coal fired boiler and the emission of odour from the rendering plant. There is a \$4.2 million loss of benefit to Bindaree Beef from not proceeding with the proposal (Section 5.2.2) and a loss of an estimated \$1.65 - \$5.1 million in construction that would have been spent directly within the Inverell LGA (Section 5.2.2.1.1).

Moreover, the opportunity to install infrastructure which would enhance the capacity to expand would be lost.

b) Discontinue operations.

The consequence of this action would have a significant economic on the region and the town of Inverell. Approximately 760 to 780 people (full time and casual) would be made redundant. This is estimated to be 11.4% of the Inverell LGA's total workforce. Total salary and wages (including on costs) of approximately \$41.7 million would be lost. Transport costs of \$11.3 million of which 80% (\$9 million) is contracted to local businesses would be lost.

For the 2012-2013 financial year, the total net disposable income for employees and Inverell LGA businesses supplying goods and services to Bindaree Beef was estimated to be \$182.3 million. In addition to this direct expenditure, the multiplier effect resulted in a further estimated \$221.9 million in indirect spending on locally supplied goods and services.

Cattle suppliers would be forced to seek abattoirs in other districts which would increase transport costs and reduce competitive prices.

7.4.1 Consideration of Alternative Sites

Potential sites would need to satisfy a number of criteria: highway access, water supply, power supply, wastewater irrigation disposal area and holding paddocks. The site would need to have suitable separation distances from receptors for visual amenity, odour, dust and noise. The site would need to be sufficiently near a labour force that can commute to the plant.

This option would be a considerable capital investment that would be beyond the reach of most processors.

Because of the time required to locate and acquire a suitable site that complies with the criteria plus the cost of development, this option is not considered viable



7.4.2 Consequences of the Development Not Proceeding

If the development were not to proceed, Bindaree would continue to operate the abattoir utilising the existing coal fired boiler. It would also be dependent on the supply of electricity from the power grid.

The opportunity to install a world leading technology to reduce carbon emissions would be lost. The potential to take a leading position in energy efficiency would also be lost and deter other processors from adopting similar technology.



8.0 Conclusion

An environmental assessment of the proposed bio-digester and rendering plant has been undertaken and presented in this Environmental Impact Statement. The assessment has been undertaken in accordance with the requirements of section 79C of the *Environmental Planning and Assessment Act, 1979*.

The proposed development of a bio-digester plant and a new rendering plant creates a number of key benefits for Yolarno Pty Ltd including:

- A state-of-the-art wastewater treatment plant to effectively utilise wastewater and produce bio-gas;
- Providing a renewable energy source of bio-gas for the bio-digester and rendering plant electricity and steam needs;
- Improve rendering efficiencies on the site by reducing cooking times, improving electrical and steam consumption and removing the use of coal as an energy source;
- Reduction in energy consumption of the site by 79% due to the removal of coal as an energy source and reduced electricity requirements; and
- Reduction of the greenhouse gas emissions from the site due to the elimination of coal burning and decommissioning of the anaerobic and aerobic treatment ponds.

This Environmental Impact Statement (EIS) outlines the proposal, the regulatory framework, potential impacts from the project on the environmental and the Inverell community and provides a number of mitigation measures to address these impacts.

This type of development is a first for the abattoir industry in Australia and will exceed current best practice for abattoir wastewater treatment. The development will enhance the environmental and economic performance of the facility and demonstrate considerable innovation for the abattoir industry.

Bindaree Beef is considered a leader in the area of red meat abattoir wastewater treatment and is determined to deliver a project that will benefit not only the environment, Inverell Community but also enable Bindaree Beef to grow its business and provide their workforce long term employment opportunities.



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