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DOCUMENT AUTHORISATION

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1 INTRODUCTION

The purpose of this Environmental Management Plan (EMP) is to provide details of the procedures to be implemented at the Goonoo Feedlot to minimise the risk of environmental harm due to the operation of the feedlot enterprise. This plan will include the relevant procedures, schedules and responsibilities for:

- Operating, maintaining and managing the feedlot;
- Monitoring, recording and reporting of feedlot operations and their impact on the environment;
- Implementing corrective measures and actions in the event of operational problems and emergencies.

The EMP addresses the key components that enable the assessment of risk to the environment and describes appropriate management practices to avoid or minimise risk.

The Key components in the EMP are:

- Plans and Maps;
- Resource Assessment;
- Current Management Practices;
- Risk Assessment;
- Community Amenity;
- Monitoring Program;
- Recording;
- Reporting;
- Contingency Measures; and
- Training.

The following EMP has not addressed the Existing Environment and has only provided a brief overview of the Proposed Development as a comprehensive review of these sections was undertaken as part of the Development Application (Premise Document 16TOO-1023 160907 Goonoo DA Report_Final_1).
2 PROPOSED DEVELOPMENT

2.1 Overview

Goonoo feedlot has a design capacity of 45,000 Standard Cattle Units (SCU) and an average operating capacity of about 40,500 SCU (assuming 90% occupancy). There are two distinct areas within the feedlot, the high density and low-density lot feeding areas. The operating stocking rate within the high-density lot feeding area is 12.5 m²/SCU and 61.5 m²/SCU for the low-density area. Cattle from the feedlot will be fed for a variety of markets ranging from 100-day short-fed cattle for domestic and export markets to 300-day long-fed bullocks.

The feedlot comprises 130 production pens at 210 SCU/pen in the high-density area and 30 pens at 590 SCU/pen in the low-density area, hospital pens, cattle handling receipt/dispatch areas, manure stockpile areas, a sedimentation basin, an effluent holding pond, an irrigation dam and effluent and manure reuse areas. The existing effluent pond will be redesigned to by-wash into the irrigation dam to the north which also captures any effluent from the low-density lot feeding area. The high-density pens have been designed in a ‘back-to-back’ configuration to make use of the natural topography.

The ponds and effluent irrigation areas have been sized assuming all effluent is being treated in an anaerobic pond and irrigated on-site. The volumes of the sedimentation basin and holding pond that service the high-density area are 31.5 ML and 250 ML respectively. The irrigation dam services the low-density area and has a capacity of 4,100 ML with no sedimentation basin. Due to the immense capacity of the irrigation dam, the requirement for a sedimentation basin is eliminated. However, if sediment build up becomes an issue, the dam will experience extensive dry periods, which will facilitate solids removal. As the irrigation dam is utilised for essential cropping activities across the property, it is in AACo’s best interests to maintain an appropriate capacity. The available irrigation area of 484 ha on the flats within the flood plain and 40 ha out of the flood plain, which is to be used in periods of extended wet weather if the flood plain become inundated. An additional 1,624 ha of land has been made available for manure spreading. Effluent irrigation water and nutrient balances for the high-density feedlot catchment area have been modelled in the Model for Effluent Disposal using Land Irrigation (MEDLI), ensuring the overtopping frequency of the effluent holding pond is no greater than 1 in 5 years. A copy of the MEDLI summary report for the high-density feedlot area can be supplied if required. However, due to the extensive capacity of the irrigation dam, which exceeds the Queensland Department of Agriculture and Fisheries recommended volume of 958 ML, by a factor of four, this catchment was not MEDLI modelled.

An overview of the feedlot facility is provided in the Feedlot Layout (Figure 2-1).

The proposed feedlot development has been designed in accordance with the National Guidelines for Beef Cattle Feedlots in Australia (National Guidelines) and The National Beef Cattle Feedlot Environmental Code of Practice (Environmental Code of Practice).
2.2 Feed Supply
Feedlot diets vary depending upon the availability and price of feed ingredients. They also vary depending on the stage of feeding. However, they generally consist of the following ingredients:

- Grain (such as sorghum, barley or wheat) – 71%
- Roughage (such as sorghum hay, silage, wheat or barley straw) – 20%
- Other ingredients – 9%

2.3 Manure Generation and Stockpiling
As a rule of thumb, the annual dry manure harvested from the production pen floor in a feedlot is approximately 700 kg/yr for a 600 kg animal. This is a decrease from the old estimate of 1,000 kg/yr and is a direct result of better feed quality, feed processing, specific diets and increased digestibility which means that less solids are excreted by the animals.

The average occupancy of the feedlot is 40,500 SCU, which will produce an estimated 28,350 t/yr of manure. However, manure applied to the low-density area will not require regular removal as it will be deposited across a larger area. Small volumes of manure may be removed from around high traffic areas. Therefore, the amount of manure removed from the high-density area will be approximately 17,325 t/yr.

Manure removed from the high-density pens is temporarily stockpiled in the manure handling area (Figure 2-1). The manure is stored in compacted stockpiles before it is either spread onsite or taken on internal roads to the other AACo owned properties for final disposal through land spreading. Approximately 16,000 tonnes (90%) of manure is spread onsite annually to the 1,600 ha available for manure spreading. The amount of manure spread onsite will vary from year to year as a result of varying cropping regimes. AACo has an additional 4,500 ha of offsite land available for manure spreading, which is accessed via their internal road network.

The manure stockpile area is located within the controlled drainage area and is formed atop an impermeable clay base foundation to eliminate seepage of nutrients from the area. Therefore, minimising potential environmental impacts.

2.4 Pen Cleaning and Maintenance
Pen cleaning operations should ensure that the dense, plastic, manure-soil interface layer that typically forms over feedlot pads remains intact. This interface layer is formed by the constant compacting action of cattle hooves on the moist pack that is deposited on the constructed pen surface. Note that the information presented in this section refers to the high-density area. Minimal cleaning will be required in the low-density area.

This layer gradually builds up over a period of months following the introduction of cattle into the facility. The interface is virtually impermeable and, provided it is maintained in good condition, it forms an effective barrier against seepage of contaminants below the pen surface into the soil profile.
Regular cleaning and maintenance in and around the feedlot, in accordance with industry standards including the National Guidelines, Environmental Code of Practice and Beef Cattle Feedlots: Waste Management and Utilisation (2015) (Waste Management Guidelines), see Table 1, will ensure that the impact on the receptors and surrounding environs is minimal. Regular cleaning will have the following effects:

- Optimise cattle performance and welfare;
- Present animals for pre-slaughter inspection in a clean condition;
- Provide a safe work environment for staff (particularly pen riders);
- Minimise odour levels;
- Minimise dust during hot, dry conditions;
- Promote good pen drainage;
- Promote good integrity of the pen surface; and
- Minimise costs of pen maintenance.

Table 1 – Routine Cleaning and Maintenance Schedule

<table>
<thead>
<tr>
<th>Cleaning &amp; Maintenance Practice</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Removal of spilt feed</td>
<td>At least weekly</td>
</tr>
<tr>
<td>Elimination of wet patches</td>
<td>At least weekly</td>
</tr>
<tr>
<td>Repairs to potholes</td>
<td>At least monthly</td>
</tr>
<tr>
<td>Under fence cleaning</td>
<td>At least monthly</td>
</tr>
<tr>
<td>Catch drain cleaning</td>
<td>After rainfall and as required to eliminate weeds</td>
</tr>
<tr>
<td>Diversion banks</td>
<td>After rainfall and as required to ensure integrity</td>
</tr>
<tr>
<td>Sedimentation basin</td>
<td>After rainfall and as required ensure working volume</td>
</tr>
<tr>
<td>Holding pond</td>
<td>Annually</td>
</tr>
<tr>
<td>Pen cleaning</td>
<td>Pen cleaning is continual with an average cleaning interval of 10 weeks. Depending on weather and pen conditions this may extend to 12 weeks</td>
</tr>
</tbody>
</table>

2.5 Carcass Disposal

Feedlots experience low mortality rates. In this case, 0.5% mortalities have been assumed within the feedlot. For a feedlot of this size (45,000 SCU), with an operating capacity of 90%, this equates to 223 mortalities per year for disposal. Carcass composting will be undertaken in line with the principles outlined in the Waste Management and Utilisation Guidelines (MLA, 2016).

All cattle deaths at the feedlot will be recorded. Carcasses will be composted in windrows using feedmill trash and harvested manure. The carcass composting windrows will be located on the manure stockpile area.

To ensure there is no impact to groundwater through leaching, the manure handling area is located atop a 300 mm clay lined, impermeable surface. Composting will be undertaken by placing carcasses on a bed of manure or sawdust and then covering them with manure or other co-composting material to a depth of 600 mm to reduce odour production. This is common practice in many feedlots in Australia. Water (effluent) from the holding ponds will be used in the composting process. After the composting, the manure solids will be spread onsite or transferred into trucks and taken offsite for final disposal through land spreading.
2.6 Mass Disposal of Carcasses

In the event of a large number of deaths at the feedlot, government officers would be called to investigate the cause of the mortalities and advise of the most suitable disposal option for mass burial of carcasses.

Emergency animal diseases (EADs) have the potential to severely impact Queensland’s economy or lifestyle. Some emergency diseases can affect large numbers of animals and have the potential to close Queensland’s animal trade and animal products markets.

All emergency animal diseases must be reported to Biosecurity Queensland on 13 25 23 as soon as they are suspected. All feedlot managers/staff should be aware of the signs of emergency diseases in the cattle.

In the case of an excessive number of cattle deaths, then:

- Immediately contact Biosecurity Queensland on 13 25 23 if there is a suspected disease outbreak;
- Contact DAF in the event of a suspected disease outbreak in accordance with relevant AUSVETPLAN manual procedures. DAF veterinary officers have the main responsibility and resources to combat an endemic disease outbreak;
- Contact the consultant veterinarian; and
- Contact the relevant Administering Authority as required to assist in the disposal of the cattle (burial, composting) on or off-farm (land fill site).

A copy of the AUSVETPLAN Enterprise Manual for the beef cattle feedlots and other supporting AUSVET documents will be kept onsite. The manual provides guidelines on farm managers responsibilities during an EAD outbreak, as required by relevant government authorities, and strategies that may be adopted to improve preparedness for, or ability to handle, a suspected EAD. Standard operating procedures for each government jurisdiction, agency support plans for the involvement of other areas of emergency management (e.g. police, local government), diagnostic resources and training materials also support the AUSVETPLAN core materials. All of these documents can be accessed from the Animal Health Australia website.

2.7 Stormwater Management: Runoff Diversion Banks and Drains

As the proposed development is a rural and agricultural development, the urban stormwater guidelines have not been used for the stormwater management of the site. Industry appropriate standards have been used, which involves locating the development within a controlled drainage area (CDA).

Diversion banks and/or drains will be built around the feedlot expansion to exclude extraneous runoff (where the natural lie of the land does not facilitate this) and to contain all contaminated runoff within the controlled drainage system. All pens will have drains below the pens. They will be designed to carry the peak flow rate from the 1 in 20 year design storm, at non-scouring velocity. Typical feedlot pen drain slopes will be 0.7%-1.0%.

All clean stormwater runoff will be diverted away from the pen area and manure stockpiling/carcass composting area. Contaminated stormwater runoff from within the feedlot area as well as the
manure stockpile and carcass composting area, will be directed to the existing and proposed sedimentation basins and holding ponds.

Figure 2-2 provides the layout of the controlled drainage area for the proposed feedlot.
NOTES:
1. CADASTRAL INFORMATION EXTRACTED FROM DNRM (STATE OF QUEENSLAND [DEPARTMENT OF NATURAL RESOURCES AND MINES] 2017), ACCURACY IS LIMITED

2. OTHER FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.

3. HARD CATCHMENT AREA INCLUDES: ROADS, ROOFS, MANURE HANDLING AREAS & SEDIMENTATION BASIN

CATCHMENT AREA 1 (EXPANDED):
- PEN AREA: 34.70 ha
- HARD AREA: 46.60 ha
- SOFT AREA: 56.70 ha
- POND AREA: 14.20 ha
- TOTAL CATCHMENT: 122.20 ha

CATCHMENT AREA 2 (PROPOSED):
- PEN AREA: 106.00 ha
- HARD AREA: 3.06 ha
- SOFT AREA: 340.14 ha
- POND AREA: 115.94 ha
- TOTAL CATCHMENT: 564.74 ha

PEELOT CAPACITY:
- EXISTING 12.5m³ PENS: 21.88 ha 17,200SCU
- PROPOSED 12.5m³ PENS: 12.81 ha 15,230SCU
- PROPOSED 61.5m³ PENS: 106.00 ha 17,230SCU
- TOTAL PENS: 140.69 ha 45,000SCU
2.8 Sedimentation Basin

The existing feedlot development uses a sedimentation basin to settle out solids from the feedlot runoff before it enters the holding ponds. The sedimentation basin is constructed to capture and detain rainfall runoff, allowing any entrained sediment to ‘settle out’ before the runoff enters the holding ponds. The system function is to reduce sediment deposition in the holding ponds and remove sediment from the system.

The base of the sedimentation basin slopes (0.1%) towards the weir that regulates discharge from the basin into the effluent holding pond. Solids are deposited in thin layers over a large area, facilitating rapid drying. The dried solids are then removed at the earliest possible opportunity.

The volumes of the sedimentation basins are designed to cater for the peak flow rate from a design storm having an average recurrence interval (ARI) of 1 in 20 years and using runoff coefficients of 0.8 from feedlot pens, roadways and other hard stand areas and 0.4 for grassed areas within the controlled drainage areas. The calculations for the design volume (Table 2) of the sedimentation basins shown in Figure 2-1 have been adopted from the DAF Cattle Feedlot Assessment Spreadsheet.

The sedimentation basin has adequate volume for the feedlot capacity based on the stormwater catchment areas identified in Figure 2-2.

Table 2 - Sedimentation Basin Capacity

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Symbol</th>
<th>Units</th>
<th>Feedlot CDA</th>
</tr>
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<tbody>
<tr>
<td>Length to Width Ratio</td>
<td>L/W</td>
<td>–</td>
<td>2.5</td>
</tr>
<tr>
<td>Scaling Factor</td>
<td>λ</td>
<td>–</td>
<td>2.5</td>
</tr>
<tr>
<td>Design Flow Velocity</td>
<td>v</td>
<td>m/s</td>
<td>0.005</td>
</tr>
<tr>
<td>Pen Overland Flow Length</td>
<td>Lp</td>
<td>m</td>
<td>50</td>
</tr>
<tr>
<td>Pen Overland Flow Time</td>
<td>to</td>
<td>minutes</td>
<td>7.8</td>
</tr>
<tr>
<td>Drain Length</td>
<td>Ld</td>
<td>m</td>
<td>1,460</td>
</tr>
<tr>
<td>Drain Flow Time</td>
<td>td</td>
<td>minutes</td>
<td>34.8</td>
</tr>
<tr>
<td>Time of Concentration</td>
<td>tc</td>
<td>minutes</td>
<td>42.57</td>
</tr>
<tr>
<td>Average Rainfall Intensity for 20 year ARI Design Storm</td>
<td>$I_{tc}^{20}$</td>
<td>mm/hr</td>
<td>86.67</td>
</tr>
<tr>
<td>Peak Inflow Rate for 20 year ARI Design Storm</td>
<td>Qp</td>
<td>m$^3$/s</td>
<td>2.88</td>
</tr>
<tr>
<td>Required Sedimentation System Volume</td>
<td>V</td>
<td>m$^3$</td>
<td>26,099</td>
</tr>
<tr>
<td>Proposed Sedimentation System Volume</td>
<td>V</td>
<td>m$^3$</td>
<td>31,500</td>
</tr>
<tr>
<td>Proposed Volume Buffer</td>
<td>%</td>
<td>20%</td>
<td></td>
</tr>
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</table>
2.9 Effluent Holding Ponds

After the runoff has gone through the sedimentation basin, it may still contain substantial levels of organic matter, nutrients and salt. The holding pond is then used at the end of the controlled drainage area. The holding pond captures and stores the runoff from the controlled drainage area until it can be sustainably used for irrigation.

The effluent holding pond has been designed to temporarily store effluent from major storms or extended wet periods, until it can be evaporated or irrigated onto marked effluent utilisation areas. The holding pond is constructed with an impermeable base and internal embankments to minimise the risk of groundwater contamination by leaching of effluent.

The design volume for the effluent holding pond shown in Figure 2-1 was calculated using the daily timestep model MEDLI. Ponds have been sized on 100 years of climate data sourced from the Long Paddock - Silo Data Drill (QLD Government) and have been sized to overtop at an average maximum of 1 overtopping event in 20 years. This is beyond the minimum requirements in the National Guidelines for an effluent management system that utilises frequent effluent irrigation. The decreased overtopping frequency has been designed to provide an additional safety factor for potential impacts to surface water (Comet River). Note that the effluent holding pond overtops into the irrigation dam and not towards the Comet River.

A MEDLI assessment was also undertaken to determine the minimum pond size required to meet the Feedlot National Guidelines requirements of 1 overtopping per 10 years for effluent systems using frequent irrigation. This analysis indicated a 250 ML, effluent pond would be sufficient which is the existing effluent pond size.

Table 3 summarises the MEDLI assessment that was undertaken for the catchment identified in Figure 2-2. The full MEDLI output data can be supplied, but as the effluent pond now overtops into the irrigation dam, it does not accurately represent the entire system.

<table>
<thead>
<tr>
<th>Holding Pond Summary</th>
<th>Units</th>
<th>High-Density CDA</th>
<th>Low-Density CDA</th>
</tr>
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<tbody>
<tr>
<td>Pen Area</td>
<td>Ha</td>
<td>34.70</td>
<td>106.00</td>
</tr>
<tr>
<td>Hard Catchment Area</td>
<td>ha</td>
<td>60.80</td>
<td>118.60</td>
</tr>
<tr>
<td>Soft Catchment Area</td>
<td>ha</td>
<td>26.70</td>
<td>340.14</td>
</tr>
<tr>
<td>MEDLI – Estimated Over Topping Frequency</td>
<td>Years</td>
<td>1 in 5</td>
<td>Not assessed in MEDLI</td>
</tr>
<tr>
<td>National Guidelines – Minimum Required Holding Pond Capacity (1 in 10 year overtopping)</td>
<td>ML</td>
<td>250</td>
<td>960</td>
</tr>
<tr>
<td>Existing Effluent Holding Pond Storage Capacity</td>
<td>ML</td>
<td>250</td>
<td>4,100</td>
</tr>
<tr>
<td>Proposed Buffer Above National Guidelines Recommendation</td>
<td>%</td>
<td>0</td>
<td>427</td>
</tr>
</tbody>
</table>
2.10 Effluent Utilisation

The feedlot management conforms to the waste and resource management hierarchy outlined in the *Waste Reduction & Recycling Act (2011)*. This is discussed further in Section 5.

Liquid effluent will be flood irrigated onto 484 ha of cropping land as detailed in Figure 2-3. Feedstuffs removed from the irrigated fields will be stored onsite and used as feed within the feedlot. The use of flood irrigation eliminates the production of irrigation spray drift, reducing the potential for effluent to impact outside of the intended irrigation zone.

The irrigation fields are set up with a network of tail water return drains which will capture any excess irrigation and prevent it from escaping into the surrounding environment. Therefore, eliminating the chance for effluent to escape outside of the irrigation area. The application frequency and application rates for effluent will be determined by crop demand and effluent holding pond volume, which will be monitored by the irrigation manager and by using soil moisture monitoring equipment.

An additional area of 40 ha has been identified for emergency irrigation and will be irrigated with a travelling irrigator. This land will only be used for irrigation if the Comet River is in flood, or is likely to flood, therefore eliminating the potential for irrigated effluent to be inundated in a time of flooding.

With large separation distances, it is unlikely that neighbouring residences would be adversely affected by effluent irrigation procedures. The feedlot has also implemented the following practices to avoid any impact on neighbouring residences.

- Regular light applications of effluent are less likely than infrequent large applications to cause problems.
- Irrigation of effluent only occurs in the morning and early afternoon in fine conditions.

The minimum distance from irrigation areas to the closest receptors are provided in Table 4.
Table 4 – Effluent Utilisation Area Receptors

<table>
<thead>
<tr>
<th>Receptor</th>
<th>Direction</th>
<th>Separation Distance</th>
<th>Topography</th>
<th>Vegetation</th>
<th>Wind Direction</th>
</tr>
</thead>
<tbody>
<tr>
<td>Receptor 1</td>
<td>N</td>
<td>2.6 km</td>
<td>Flat</td>
<td>Crops Only</td>
<td>Normal</td>
</tr>
<tr>
<td>Receptor 2</td>
<td>S</td>
<td>7.3 km</td>
<td>Flat</td>
<td>Crops Only</td>
<td>Normal</td>
</tr>
<tr>
<td>Receptor 3</td>
<td>S</td>
<td>7.6 km</td>
<td>Flat</td>
<td>Crops Only</td>
<td>Normal</td>
</tr>
<tr>
<td>Receptor 4</td>
<td>SW</td>
<td>11.8 km</td>
<td>Flat</td>
<td>Crops Only</td>
<td>Normal</td>
</tr>
<tr>
<td>Receptor 5</td>
<td>SW</td>
<td>5.8 km</td>
<td>Flat</td>
<td>Crops Only</td>
<td>Normal</td>
</tr>
<tr>
<td>Receptor 6</td>
<td>NE</td>
<td>4.3 km</td>
<td>Flat</td>
<td>Crops Only</td>
<td>Normal</td>
</tr>
</tbody>
</table>

2.11 Manure Utilisation

Approximately 17,325 t of dry manure solids will be harvested from the pen surface each year. Current practice sees 1,600 t (90 %) applied to lands on Goonoo Station. The remaining manure (estimated 1,325 t), will be taken offsite onto other AACo owned lands via an existing internal road network for final disposal through land spreading.

The manure disposal paddocks receive one application of manure per year, with a maximum loading rate of 10.0 t/ha/yr. A manure spreader is used to ensure manure is spread evenly across the paddocks. Because the land is farmed, the manure is incorporated as part of the land preparation process.

Since the manure is incorporated in the cultivation paddocks, the risk of nuisance-level odours, and nutrient runoff generation emanating from these areas is minimal.
Table 5 – Effluent Utilisation Practices

<table>
<thead>
<tr>
<th>Paddock</th>
<th>Lot/Plan</th>
<th>Area (ha)</th>
<th>Soil Type</th>
<th>Topography</th>
<th>Remnant Vegetation</th>
<th>Land Use</th>
<th>Yield (t/ha/year)</th>
<th>Application Frequency</th>
<th>Application Rate (ML/ha/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>5/HT57</td>
<td>479</td>
<td>Black earth</td>
<td>Flat</td>
<td>N/A</td>
<td>Forage sorghum</td>
<td>15</td>
<td>Variable, rainfall dependent</td>
<td>Variable, Up to 2.0</td>
</tr>
<tr>
<td>2</td>
<td>9/RP867919</td>
<td>40</td>
<td>Black earth</td>
<td>Flat</td>
<td>N/A</td>
<td>Forage sorghum</td>
<td>15</td>
<td>Variable, rainfall dependent</td>
<td>Variable, Up to 2.0</td>
</tr>
</tbody>
</table>

Table 6 – Manure Utilisation Practices

<table>
<thead>
<tr>
<th>Paddock</th>
<th>Lot/Plan</th>
<th>Area (ha)</th>
<th>Soil Type</th>
<th>Topography</th>
<th>Remnant Vegetation</th>
<th>Land Use</th>
<th>Yield (t/ha/year)</th>
<th>Application Frequency</th>
<th>Application Rate (t/ha/yr)</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-12</td>
<td>5/HT57</td>
<td>1,624</td>
<td>Black earth</td>
<td>Flat</td>
<td>N/A</td>
<td>Sorghum</td>
<td>3</td>
<td>Variable, rainfall dependent</td>
<td>Variable, Up to 10.0</td>
</tr>
</tbody>
</table>
2.12 Erosion and Sediment Control Plan

An Erosion and Sediment Control Plan (ESCP) will be developed and implemented to address strategies and management practices to be employed during and after construction of the proposed expansion. This will ensure minimisation of detrimental effects on the adjacent streams and watercourses.

The overriding operational objectives for the ESCP are to:

1. Control and minimise erosion activity within the construction site; and
2. Implement preventative measures to minimise sediment movement from the construction site.

This ESCP will ensure:

- The construction and operation of the feedlot development does not have a detrimental impact on the surface water quality and quantity; and
- All runoff from the site undergoes sedimentation control prior to entering the effluent holding pond. The potential for overflow into an adjacent watercourses/streams has been reduced, by increasing the holding pond capacity to limit overtopping to 1 in 10 years. An overtopping event will be captured and diluted by the irrigation dam.

The ESCP will apply to all construction activities undertaken on the site, particularly where vegetation is removed or soil is exposed. Particular care will be taken in erosion sensitive areas, such as steep slopes.

Irrespective of the content of the ESCP, it is the responsibility of the Site Foreman to ensure that the construction and operation of the works do not have a detrimental impact on the surface water quality and quantity, and that all runoff from the site will undergo sedimentation control prior to entering adjacent watercourses/streams.

The potential impacts on the existing environment of the feedlot construction may include:

- Impacts to the natural soil coverage and distribution; and
- Impacts to surface water quality and quantity.

These impacts may occur due to:

- Soil erosion of disturbed soil during the construction phase;
- The transport of sediment and organic matter from the construction site into adjacent watercourses and streams; and
- Erosion of exposed areas after construction has finished.

In order to minimise soil erosion of disturbed soil from the construction site during and after construction, the following management strategies are required to be implemented:

- Minimise stripping of vegetation to the smallest area required. Stockpile stripped topsoil and grass for revegetation after construction is completed. Store stockpile within the sediment-controlled zone;
- Minimise unnecessary clearance of vegetation;
- Stabilisation of one entry/exit point;
• Program work activities to complete one section before starting another section to minimise the area of disturbed ground that is exposed to erosion at any one time;
• As much as possible, large established trees will not be removed;
• Divert clean runoff around the construction site using diversion channels;
• When construction is completed, revegetation of disturbed areas will be undertaken. Planting of fast growing grass species will be carried out to promote rapid establishment of ground cover. Re-laying of stockpiled topsoil and grass will be undertaken to encourage quick re-establishment of vegetation; and
• Erosion control measures will be retained until sufficient ground cover becomes established.

Section 6 provides management practices to ensure that the measures are implemented to control erosion onsite at all times. Erosion and sediment control will be undertaken in accordance with the International Erosion Control Association (IECA) Best Practice Sediment and Erosion Control Guidelines (2008).
3 INFRASTRUCTURE

3.1 Water Supply and Storage

The National Guidelines suggest that the total average annual water requirement for feedlots in Queensland is approximately 24 ML/1,000 head of pen capacity. A feedlot of 45,000 SCU capacity will therefore require 1,080 ML/year.

Goonoo Feedlot statistics indicate that long term occupancy rates are approximately 90% of capacity. However, for the purposes of this report, the estimated drinking water usage has been calculated on 100% continuous occupancy.

Water to the existing feedlot is currently supplied by harvesting water from the Comet River into water storages at the feedlot. The applicant has eight licences to harvest water from the Comet River, two licences to conserve water and one licence to take underground water from the Comet River Alluvium (600 ML/year). The licence numbers and purpose are provided in Table 7.

<table>
<thead>
<tr>
<th>Water Licence No.</th>
<th>Expiry Date</th>
<th>Purpose</th>
</tr>
</thead>
<tbody>
<tr>
<td>57766F</td>
<td>31 July 2020</td>
<td>Water harvesting</td>
</tr>
<tr>
<td>57767F</td>
<td>31 July 2020</td>
<td>Water harvesting</td>
</tr>
<tr>
<td>57768F</td>
<td>31 July 2020</td>
<td>Water harvesting</td>
</tr>
<tr>
<td>57769F</td>
<td>31 July 2020</td>
<td>Water harvesting</td>
</tr>
<tr>
<td>57780F</td>
<td>31 July 2020</td>
<td>Water harvesting</td>
</tr>
<tr>
<td>51470F</td>
<td>31 July 2020</td>
<td>Water harvesting</td>
</tr>
<tr>
<td>51471F</td>
<td>31 July 2020</td>
<td>Water harvesting</td>
</tr>
<tr>
<td>51472F</td>
<td>31 July 2020</td>
<td>Water harvesting</td>
</tr>
<tr>
<td>57763F</td>
<td>31 July 2020</td>
<td>Impounding Water</td>
</tr>
<tr>
<td>57764F</td>
<td>31 July 2020</td>
<td>Impounding Water</td>
</tr>
<tr>
<td>407029</td>
<td>31 May 2020</td>
<td>Stock Intensive</td>
</tr>
</tbody>
</table>

Currently there is capacity to store 4,800 ML of water on the feedlot property. Water storages 1 and 2 hold 1,200 ML and 3,600 ML of water respectively. However, water storage 2 will contain contaminated run-off from the low-density area and by-wash from the existing effluent pond. This water is generally only used for irrigation. Water can be pumped from storage 1 into the 12 ML turkey nest at the feedlot. Assuming cattle consume 65.0 L/head/day, a 45,000 head feedlot will use 2,925,000 L/day (2.93 ML/day).

At full capacity of 45,000 SCU, 12 ML of water storage in the turkey nest will provide 4.1 days of drinking water at the feedlot in case of water pump breakdown.
3.2 Chemical and Fuel Storage

Industry codes of practice, best management practices (BMP) and regulations apply to the storage, use and disposal of agricultural chemicals and chemical containers.

The following measures are used to ensure that agricultural chemicals are stored and handled to avoid contamination. Measure include:

- Bunded storage area;
- Chemical only removed from storage area when used; and
- Order chemical only as required.

Herbicides and pesticides are applied following advice from suppliers and agronomists. Most of the crops grown on the property are used for feed in the feedlot so the use of pesticides is minimal. Fertilisers, if required, are applied based on soil testing and agronomic advice.

Veterinary chemicals will also be stored in properly designed and lockable containers. In some cases, these chemicals need refrigeration and may be stored in a dedicated locked refrigerator at the site office or farm house.
4 POTENTIAL ENVIRONMENTAL IMPACTS

4.1 Potential Environmental Impacts

The potential impacts on the existing environment caused by a development of this nature include:

- Impacts to the amenity of nearby land users;
- Impacts to the groundwater of the site and the surrounding area;
- Impacts to the surface water of the site and the surrounding area;
- Impacts to flora and fauna; and
- Impacts to soil.

4.2 Investigation of Existing and Potential Environmental Impacts

4.2.1 Impacts on Community Amenity

Impacts on amenity of nearby land users due to:

- Increased traffic – Operation of the feedlot results in an increase in traffic generation on local roads. Traffic will access the site via Comet River Road.

- Odour generation – The pens, sedimentation basin, holding pond, composting and stockpiling areas could generate some odours. Proper management and regular maintenance of these areas are the most important functions in controlling odour generation.

- Dust generation – Operation of the feedlot may result in an increase in dust around the feedlot, on internal access roads and on local roads. Construction of the proposed feedlot expansion may also generate dust.

- Noise generation – Operation of the feedlot results in an increase in noise during construction of the proposed development and during on-going operation of the feedlot.

- Visual Amenity – The existing feedlot and proposed feedlot expansion may affect the visual character of the surrounding landscape.

- Vermin and Disease – An increase in the incidence of vermin and diseases is very unlikely, as the feeding activity will maintain high health standards. Sick cattle will be quickly identified and segregated from the rest of the cattle.

According to the National Guidelines, the S-factor equation can be used to determine minimum separation distances required between various types of receptors and a beef cattle feedlot development.

An odour assessment was undertaken by Premise and indicated that the buffer distances available from the feedlot to nearby receptors was adequate. The required separation distance between the proposed development and the closest sensitive receptors are shown in Table 8 and Figure 4-1.

The feedlot has been appropriately sited to mitigate the impacts on community amenity that arise from odour, dust, noise and other possible emissions from feedlots. If complaints are made to the feedlot, a complaints register will be maintained. After complaints have been made, an internal investigation will be made to determine if the complaint was a result of the management practices. If the issue is related to facility operations and management, feedlot management will attempt to alter practices to eliminate the occurrence happening again.
### Table 8 – S-Factor Separation Distances

<table>
<thead>
<tr>
<th>Receptor Number</th>
<th>Direction</th>
<th>Receptor Type</th>
<th>Terrain Description</th>
<th>Vegetation</th>
<th>Wind</th>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
<th>Separation Distances (m)</th>
<th>Comment</th>
</tr>
</thead>
<tbody>
<tr>
<td>R 1 30/SP252477</td>
<td>N</td>
<td>Farm residence</td>
<td>Flat terrain</td>
<td>Crops only</td>
<td>Normal</td>
<td>49.1</td>
<td>0.3</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>2,953</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>6800</td>
<td></td>
</tr>
<tr>
<td>R 2 1/HT50</td>
<td>SE</td>
<td>Farm residence</td>
<td>Flat terrain</td>
<td>Crops only</td>
<td>Normal</td>
<td>49.1</td>
<td>0.3</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>2,953</td>
<td>OK</td>
</tr>
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<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8,500</td>
<td></td>
</tr>
<tr>
<td>R 3 1/HT50</td>
<td>SE</td>
<td>Farm residence</td>
<td>Flat terrain</td>
<td>Crops only</td>
<td>Normal</td>
<td>49.1</td>
<td>0.3</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>2,953</td>
<td>OK</td>
</tr>
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<td></td>
<td></td>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>8,800</td>
<td></td>
</tr>
<tr>
<td>R 4 27/DSN86</td>
<td>SW</td>
<td>Farm residence</td>
<td>Flat terrain</td>
<td>Crops only</td>
<td>Normal</td>
<td>49.1</td>
<td>0.3</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>2,953</td>
<td>OK</td>
</tr>
<tr>
<td></td>
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<td></td>
<td></td>
<td></td>
<td></td>
<td>14,100</td>
<td></td>
</tr>
<tr>
<td>R 5 1/RP619646</td>
<td>W</td>
<td>Farm residence</td>
<td>Flat terrain</td>
<td>Crops only</td>
<td>Normal</td>
<td>49.1</td>
<td>0.3</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>2,953</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>8,200</td>
<td></td>
</tr>
<tr>
<td>R 6 1/SP141302</td>
<td>NNW</td>
<td>Farm residence</td>
<td>Flat terrain</td>
<td>Crops only</td>
<td>Normal</td>
<td>49.1</td>
<td>0.3</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>2,953</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>7,500</td>
<td></td>
</tr>
<tr>
<td>R 7 12/RP845272</td>
<td>SW</td>
<td>Farm residence</td>
<td>Flat terrain</td>
<td>Crops only</td>
<td>Normal</td>
<td>49.1</td>
<td>0.3</td>
<td>1.0</td>
<td>1.0</td>
<td>1.0</td>
<td>2,953</td>
<td>OK</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11,200</td>
<td></td>
</tr>
</tbody>
</table>

**Assumptions:**
- Proposed capacity: 45,000 SCU
- Average rainfall (mm): 578 mm/yr
- Stocking density: 17.3 m²/SCU (average stocking density across the feedlot)
NOTES:

1. CADAstral INFORMATION EXTRACTED FROM
   DNM DCMB (©State of Queensland
   (Department of Natural Resources and
   Mines) 2014). ACCURACY IS LIMITED.

2. CADAstral INFORMATION IS SHOWN AS A
   GUIDE ONLY. FOR ACCURATE CADAstral
   DATA A LICENSED SURVEYOR MUST BE
   EMPLOYED.

3. OTHER FEATURES MAY HAVE BEEN RIGHTEO
   FROM PLANS OR AERIAL PHOTOGRAPHY AND
   ACCURACY IS LIMITED.

4. IMAGE SOURCED FROM GOOGLE EARTH PRO
   LICENSE = IMAGE DATE 10/07/2010.

Legend

- SUBJECT PROPERTY
- OTHER CLIENT OWNED LAND
- TENANT DOWELLING
- POTENTIAL DOWELLING

List of S Factor Assumptions

<table>
<thead>
<tr>
<th>S1</th>
<th>S2</th>
<th>S3</th>
<th>S4</th>
<th>S5</th>
</tr>
</thead>
<tbody>
<tr>
<td>46.4</td>
<td>DIMENSIONAL CHANGES TO DWELLING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>CHANGES TO DWELLING</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>NORMAL</td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The proposed S1 number is based on an average facility stocking density of 17.24 ewes per ha with an average annual rainfall of less than 750 mm.
4.2.2 Impacts on the Supply and Quality of Groundwater

Impacts to the quality of groundwater of the site and the surrounding area could occur due to contamination of groundwater. Groundwater used for the feedlot will be no more than the approved volume in their water licence.

The high-density feedlot pens, pads and drainage systems will be designed and constructed to meet the requirements of the National Guidelines and the Environmental Code of Practice. Any area in which there is a risk that soil leachate movement might contaminate groundwater will be underlain by a liner (most likely a clay liner) to satisfactorily mitigate that risk. Such areas include, but may not be limited to, the following:

- Feedlot pen surfaces;
- Sedimentation basins;
- Holding ponds;
- Manure stockpile and composting areas; and
- Drains.

The low-density area will be compacted to minimise potential leaching of nutrients. The irrigation dam was compacted with clay during construction.

4.2.3 Impacts to Surface Water

Impacts to the surface water of the site and the surrounding area could occur due to operation of the feedlot and its associated effluent irrigation and manure spreading areas. With careful management and buffer distances to the river, these activities are not likely to affect the quality of surface water moving off-property or into the Comet River. As the effluent pond will be designed to by-wash into the irrigation dam, there is a very low likelihood that effluent water will enter the Comet River without significant dilution.

With consideration of the low and high-density areas, the minimum effluent holding pond storage volume required is 1,204 ML. With the combined volume of the existing effluent holding pond and the irrigation dam, there is approximately 4,350 ML of storage.

4.2.4 Impacts to Flora and Fauna

The feedlot and associated actives (irrigation and manure utilisation) are located outside of any mapped vegetation areas. Feedlot operations are highly unlikely to have any determinantal impacts on local flora and fauna.

4.2.5 Impacts to Soils

Impacts to soils could occur due to:

- Excessive water being added to the effluent irrigation area;
- Excessive nutrients and salts being added to the effluent irrigation areas;
- Excessive nutrients and salts being added to the manure spreading areas; and/or
- Erosion of soil from the waste utilisation areas.

Background soil sampling has been undertaken and soils will be periodically sampled to ensure soil nutrient accumulation does not occur.
5 RISK ASSESSMENT

Environmental risk analysis considers the risks to the environment, ecosystems and community amenity as a result of adverse developmental impacts on the natural environment.

A risk assessment has been undertaken to ensure environmental risks from the proposed feedlot are identified and addressed up-front with management strategies in place to mitigate the possible risks. The risk assessment approach has been used to identify the hazards that are not only industry-wide hazards but also the hazards posed due to the siting and operation of the proposed development. The risk assessment allows the proponents and facility manager to be aware of the highest risks and therefore manage these risks accordingly.

There are certain Environmental Values outlined in the Environmental Protection Act 1994 (EP Act) that are required to be met when constructing and operating a development. The object of the EP Act is to protect Queensland’s environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development).

5.1 Risk Characterisation

Risk characterisation describes the likelihood of exposure and consequences of exposure. Risk is described as the "hazard characterisation X the exposure characterisation". Risks are characterised as Low, Medium or High based on the risk assessment matrix in Table 9.

Hazard characterisation and exposure characterisation are explained below.

Hazard characterisation – "Consequence"

Hazard characterisation in this report is the qualitative and/or quantitative evaluation of the potential environmental harm associated with the hazard. The scale of each potential adverse environmental effect has been evaluated in relation to specific performance objectives. The scale is expressed in quantitative or qualitative terms. Ordered descriptions of scale are:

- **Major** – Serious or material environmental impacts, e.g., major pollution incident causing significant damage to the environment.
- **Significant** – Long term or serious environmental harm
- **Moderate** – Moderate Environmental Impact
- **Minor** – Minimal environmental impact
- **Insignificant** – Little or no environmental harm
Exposure characterisation – "Likelihood"

Exposure characterisation is the estimation of the likelihood of occurrence of a hazard or an impact. The aim of the exposure characterisation is the quantitative estimation of the likely exposure of either the community or environment to the impact of the potential hazard.

Ordered descriptions of exposure are:

- **Almost certain** – Expected to occur, quite common
- **Likely** – Will probably occur
- **Possible** – May occur at some time
- **Unlikely** – Could occur at some time although unlikely
- **Rare** – Might occur at some time in exceptional circumstances

Table 9 – Risk Assessment Matrix

<table>
<thead>
<tr>
<th>Likelihood</th>
<th>Major</th>
<th>Significant</th>
<th>Moderate</th>
<th>Minor</th>
<th>Insignificant</th>
</tr>
</thead>
<tbody>
<tr>
<td>Almost certain</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Likely</td>
<td>H</td>
<td>H</td>
<td>H</td>
<td>M</td>
<td>M</td>
</tr>
<tr>
<td>Possible</td>
<td>H</td>
<td>M</td>
<td>M</td>
<td>M</td>
<td>L</td>
</tr>
<tr>
<td>Unlikely</td>
<td>M</td>
<td>M</td>
<td>L</td>
<td>L</td>
<td>L</td>
</tr>
<tr>
<td>Rare</td>
<td>M</td>
<td>L</td>
<td>L</td>
<td>L</td>
<td>L</td>
</tr>
</tbody>
</table>
5.2 Specific Performance Objectives
The siting of the development or any activity undertaken at the development site that has the potential to cause environmental risk will have a number of possible impacts to the environment or community such as: noise impact; odour impact; dust impact; light impact; and impact to groundwater or surface water. The following specific performance objectives outline the "acceptable" level of impact.

Noise
The overall noise level generated by operation should comply with the requirements of the Environmental Protection (Noise) Policy 2008. This policy states that the environmental values to be enhanced or protected under this policy are the qualities of the acoustic environment that are conducive to:

(a) protecting the health and biodiversity of ecosystem; and
(b) human health and wellbeing, including by ensuring a suitable acoustic environment for individuals to do any of the following
   (i) sleep;
   (ii) study or learn;
   (iii) be involved in recreation, including relaxation; and
(c) protecting the amenity of the community.

If a complaint (other than a frivolous or vexatious complaint) is made to the administering authority about noise from the activity, the emission of noise must not exceed the levels specified in Table 10.

Table 10 – Noise Limits at Noise Sensitive and Commercial Places

<table>
<thead>
<tr>
<th>Noise level measured in dB(A)</th>
<th>Monday to Saturday</th>
<th>Sunday and Public Holidays</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>7am-6 pm</td>
<td>6pm-10pm</td>
</tr>
<tr>
<td><strong>Noise measured at a nuisance sensitive place</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$L_{Aeq, adj, T}$</td>
<td>Background +5</td>
<td>Background +3</td>
</tr>
<tr>
<td>Max$L_{LpA, T}$</td>
<td>Background +10</td>
<td>Background +8</td>
</tr>
<tr>
<td><strong>Noise measured at a commercial place</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>$L_{Aeq, adj, T}$</td>
<td>Background +10</td>
<td>Background +8</td>
</tr>
<tr>
<td>Max$L_{LpA, T}$</td>
<td>Background +15</td>
<td>Background +13</td>
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</tbody>
</table>
Odour

In accordance with the Guideline for Odour Impact Assessment from Developments (EPA QLD 2004), the specific performance indicator is that "any release of noxious or offensive odours will not cause a nuisance at any odour sensitive place". The sensitive places around the activity are the significant receptors identified in Figure 4-1.

The activity must also meet the objective of the EP Act: "to protect Queensland's environment while allowing for development that improves the total quality of life, both now and in the future, in a way that maintains the ecological processes on which life depends (ecologically sustainable development)."

Dust

The activity must comply with the Environmental Protection Policy (Air) 2008 in that it protects "the qualities of the air environment that are conducive to human health and well-being, protecting the aesthetics of the environment, including the appearance of buildings, structures and other property; and to protecting agricultural use of the environment".

No particulate matter or visible contaminant, including dust, smoke, fumes and aerosols likely to cause environmental harm is to emanate beyond the boundaries of the property.

Therefore, the dust emissions from the activity must not cause any dust exposure of a serious and persistent nature to any sensitive place located at or beyond the boundaries of the property.

Waste

The feedlot management must conform to the management hierarchy outlined in the Waste Reduction & Recycling Act (2011), which states the following waste and resource management hierarchy:

"The waste and resource management hierarchy is the following precepts, listed in the preferred order in which waste and resource management options should be considered:

(a) AVOID unnecessary resource consumption;
(b) REDUCE waste generation and disposal;
(c) RE-USE waste resources without further manufacturing;
(d) RECYCLE waste resources to make the same or different products;
(e) RECOVER waste resources, including the recovery of energy;
(f) TREAT waste before disposal, including reducing the hazardous nature of waste;
(g) DISPOSE of waste only if there is no viable alternative."
5.3 Risk Evaluation

A summary assessment of the risks associated with operating Goonoo Feedlot is provided in Table 11. Further detailed assessment is provided in the risk assessment undertaken as part of the DA process. The choice for the likelihood and consequence ratings are based on the siting of the feedlot and particular design features that will be used to reduce the impacts.

From Table 11 it is evident that the proposed development does not pose a high risk to the environment once management strategies are applied. These risks can be mitigated or reduced by following the management strategies outlined in this report. The largest risks from the activity will be to surface water. All feasible and practicable measure will be taken to minimise the risks from the proposed development.

Table 11 - Summary of Risk Evaluation

<table>
<thead>
<tr>
<th>Potential Risks</th>
<th>Initial Risk Evaluation</th>
<th>Management Practices</th>
<th>Residual Risk</th>
</tr>
</thead>
</table>
| Air (odour, dust) | Medium | • Overview of feedlot (Section 2.3 to 2.12)  
• Environmental Procedures (Section 6) | Low |
| Surface water | Medium | • Overview of feedlot (Section 2.3 to 2.12)  
• Environmental Procedures (Section 6) | Low |
| Wetlands | Medium | • Overview of feedlot (Section 2.3 to 2.12)  
• Environmental Procedures (Section 6) | Low |
| Groundwater | Medium | • Overview of feedlot (Section 2.3 to 2.12)  
• Environmental Procedures (Section 6) | Low |
| Noise | Low | • Adequate separation distances and general operation of feedlot during daylight hours. | Low |
| Waste | Low | • Overview of feedlot (Section 2.3 to 2.12)  
• Environmental Procedures (Section 6) | Low |
| Land | Low | • Overview of feedlot (Section 2.3 to 2.12)  
• Environmental Procedures (Section 6) | Low |
| Light | Low | • Adequate separation distances and general operation of feedlot during daylight hours. | Low |
6 ENVIRONMENTAL PROCEDURES MANUAL

This section lists procedures to be followed by the feedlot’s management and staff to ensure that the environmental risk management practices outlined in Section 5 are achieved.

6.1 Pen Cleaning and Maintenance Routines and Frequency

Procedure 1 – High Density Pen Cleaning/Manure Removal

Pen cleaning operations should ensure that the highly dense, plastic, manure-soil interface layer remains intact.

• Weather permitting, pen cleaning will be undertaken at an interval of approximately every 70 days (10 weeks).
• Manure is scraped from the pen surface down to the manure interface layer. Extra gravel will be brought back into the pens to ensure the pen surface is smooth.
• Manure is removed to the stockpile area located within the controlled drainage area of the feedlot.

Procedure 2 – Low Density Pen Cleaning/Manure Removal

Pen cleaning operations in the low-density area will be undertaken periodically following the identification of a build-up of manure being observed.

• Excess manure is collected from the pen surface using a bobcat or similar machinery.
• Manure is removed to the stockpile area located within the controlled drainage area of the main feedlot.
• Cleaning will be undertaken more regularly around feed bunks and water points where cattle tend to gather.

Procedure 3 – Under fence Cleaning

Under-fence cleaning will be undertaken when required or as soon as practically possible after accumulated manure obstructs pen drainage.

• Manure is pushed from under the fence lines and collected during pen scraping/cleaning operations.

Procedure 4 – Backfilling of Pot Holes

This will be undertaken on an ongoing basis.

• Any wet or loose material will be removed from pot holes and it will be backfilled with dry gravel.
• Removed material will be rolled and compacted to ensure the pen surface retains a smooth uniform slope.
Procedure 5 – Elimination of Wet Patches in the Pens

This will be undertaken on an ongoing basis.

- Wet material is removed from the area and dry gravel will be rolled and compacted in and around the affected areas.
- Check that the water trough is not leaking. If a leak is detected, repairs are to be undertaken.

Procedure 6 – Water Trough Cleaning

Cleaning of water troughs is undertaken twice a week. The cleaning procedure for water troughs is:

- Check for any leakages in the trough.
- Turn off water supply tap to trough.
- By removing the bung, drain half of the water from the trough.
- Scrape any algal growth and other foreign matter from the sides and bottom of the trough.
- Remove the bung and drain the remaining water and foreign material from the trough.
- Replace the bung and turn the water supply tap back on.
- Check the trough has refilled with clean water.

Procedure 7 – Removal of Feed Residues from Feed Bunks

This will be undertaken on an ongoing basis.

- Spoilt or wet feed is removed from the bunks using a shovel. The material is thrown into the pen area.
- This material is then removed from the pens during pen cleaning operations.
- Feeding out equipment shall be operated to minimise spillage.

Procedure 8 – Maintenance of Pen Fencing

While undertaking pen cleaning and maintenance or water trough cleaning, ensure pen fencing is in a good state of repair. If any cables are broken or loose:

- Repair or strain the cable.

Procedure 9 – Sedimentation Basin Cleaning & Maintenance

Following runoff events, the level of the settled sediment in the sedimentation basins will be checked. If settled sediment levels are high – instigate further inspection. Sedimentation basin cleaning operations that apply are:

- Remove the sediment from the basin and the area of the weir to the manure stockpile area.
- Ensure the sedimentation basin surface retains a smooth uniform slope to the weir.
- Ensure the weir structures are operating sufficiently.
- Backfill and compact any potholes or low areas in the sedimentation basin surface.
Procedure 10 – Effluent Holding Pond

Following runoff events, the effluent holding ponds and water levels will be checked. Checking and Maintenance:

- Visibly inspect the pond walls to ensure structural integrity.
- Any sign of structural failure is to be reported to the feedlot manager.
- Determine the need for effluent irrigation.
- As the low-density area is not serviced by a sedimentation basin, the irrigation dam will be de-silted periodically to maintain volume.

Procedure 11 – Manure Stockpiling & Stockpile Management

Following rainfall events, the manure stockpile area will be checked.

- Manure stockpiles are to be constructed with the long axes perpendicular to the contours within the stockpile to ensure free drainage.
- Manure stockpiles will be shaped to avoid ponding of rain or runoff water.
- Layers of manure in the stockpile will be compacted as they are placed.
- Wet manure or sludge will not be placed in the main stockpile until it is sufficiently dry.

Procedure 12 – Manure Stockpile Area Fires

The manure stockpile areas will be checked for fires on an ongoing basis. If a stockpile has ignited, the following actions apply:

- Carefully and safely remove the ignited particles from the stockpile with appropriate machinery.
- Extinguish the ignited particles.
- Record the event and actions taken in the Environmental Data Record.

Procedure 13 – Manure Stockpile Area Maintenance

Following rainfall events, the manure stockpile area will be checked. Any pooling of water will be addressed.

- The diversion banks and drains surrounding the manure stockpile area will be checked to ensure that they are still intact.
- The stockpiles will be monitored regularly to ensure any fires are extinguished immediately upon detection. Refer to Procedure 12 – Manure Stockpile Area Fires.
Procedure 14 – Drains and Diversion Bank Maintenance

Following rainfall events, the drains, diversion banks and bunds will be checked for damage. If any damage has occurred:

- Report the damage.
- Repair diversion banks and drains as soon as practically possible.
- Remove deposited sediment from the drains as soon as practically possible after observation that the flow of effluent is being significantly impeded.
- Remove any vegetative growth from drains (except grassed waterways) which is likely to significantly impede the flow of effluent.
- Rectify any erosion damage of drains.
- Record maintenance.

Procedure 15 – Carcass Disposal

As carcasses are placed in the composting area, the following principles will apply to ensure minimal impact on the surrounding environment:

- Carcasses will be placed on a minimum of 300 mm of solids that have been scraped from the feedlot pens.
- After each carcass is placed in the windrow, at least 600 mm of solids will be placed on top of the carcass to reduce odour emission and prevent fly and vermin infestation.
- The base of the composting area will have a clay pad prepared to permeability standards to prevent leachate from contaminating groundwater resources.

Following a period of 6 – 12 months, most of the carcass, including the bones, will be completely composted. The amount of time required to fully compost a carcass depends upon temperatures achieved in the compost material and size of the carcass. After the composting process is completed, the composted material will be utilised on the property. Composted material that is to be utilised offsite will be loaded onto trucks and transported offsite.

Procedure 16 – Vermin Control

Fly and rodent bait stations are to be checked by the feedlot manager on a weekly basis.

- Bait stations are to be replaced as required.
6.2 Effluent Irrigation Procedures

Procedure 17 – Selection of Irrigation Area

- When irrigation of effluent is necessary, select an appropriate area for irrigation.
- Check the wind speed and direction.
- Do not select an area where the prevailing wind direction will carry any odours towards the closest neighbouring residence or people.
- Do not select an area that has already had its annual amount of effluent applied or areas that are showing elevated nutrient levels.
- Utilise back up irrigation area when primary irrigation paddocks are inundated with flood water.

Figure 2-3 shows the manure spreading areas on the property.

Procedure 18 – Timing of Irrigations

- Check the weather and do not irrigate when heavy rain is predicted.
- Do not irrigate during rainfall events or when flood warnings are current for the Comet River.
- Do not irrigate too soon after heavy rain has been received (less than 48 hours).

Procedure 19 – Application of Irrigation

The rate and volume of effluent applied to utilisation areas is such that surface runoff is kept to a minimum and excessive deep percolation is avoided.

- Only apply irrigation when the soil is sufficiently dry to absorb irrigation.
- Monitor the soil during irrigation to ensure that surface pooling and runoff of effluent does not occur.
- Do not apply effluent irrigation until at least 48 hours after heavy rain.
- Record the following:
  - Date of application
  - Rate of application
  - Location of land area
- Check the irrigation every two to three hours to ensure everything is operating appropriately and not potentially creating a nuisance.
6.3 Manure Spreading Procedures

Procedure 20 – Selection of Manure Spreading Area
- When manure spreading is necessary, select an appropriate area for spreading.
- Check the wind speed and direction.
- Do not select an area where the prevailing wind direction will carry any odours towards the closest neighbouring residence or people.
- Do not select an area that has already had its annual amount of manure applied or areas that are showing elevated nutrient levels.

Figure 2-3 shows the manure spreading areas on the property.

Procedure 21 – Timing of Applications
- Check the weather and do not spread manure when heavy rain is predicted.
- Do not spread manure during rainfall events or when flood warnings are current for the Comet River.
- Do not spread manure too soon after heavy rain has been received (less than 48 hours).

Procedure 22 – Application of Manure

The rate and volume of manure applied to utilisation areas is such that surface runoff is kept to a minimum and excessive deep percolation is avoided.

- Monitor the soil during applications to ensure that over application of manure does not occur.
- Do not apply manure until at least 48 hours after heavy rain.
- Record the following:
  - Date of application
  - Rate of application
  - Location of land area
6.4 Annual Procedures

Procedure 23 – Soil Monitoring

On a yearly basis, if effluent irrigation and/or manure spreading has taken place, soil monitoring samples are collected from specified depth intervals at representative sites within the manure and effluent utilisation areas.

The procedure is as follows:
- Prepare sample sheets and sample bags. Three bags are required for every sample site. These must be labelled appropriately.
- Samples to be collected at three depths in the soil profile, namely: 0-30 cm, 50-60 cm and 90-100 cm.
- Send the samples to a NATA-accredited laboratory with the relevant sample sheets.
- Samples are to be sent as soon as possible after collection.

The samples will be collected at approximately the same time every year to fit in with normal agricultural practices. The samples will be analysed as detailed in Table 12.

Table 12 – Soil Sampling Analysis Requirements

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Depth-Intervals</th>
</tr>
</thead>
<tbody>
<tr>
<td>Colwell Phosphorus (Colwell P)</td>
<td>0 - 10, 50 – 60, 90 - 100</td>
</tr>
<tr>
<td>Nitrate Nitrogen (NO₃⁻ - N)</td>
<td>0 - 30, 50 – 60, 90 - 100</td>
</tr>
<tr>
<td>Total N or Total Kjeldahl Nitrogen (TKN)</td>
<td>0 - 30, 50 – 60, 90 - 100</td>
</tr>
<tr>
<td>Exchangeable Sodium Percentage (ESP)</td>
<td>0 - 30, 50 – 60, 90 - 100</td>
</tr>
<tr>
<td>Electrical Conductivity (EC)</td>
<td>0 - 30, 50 – 60, 90 - 100</td>
</tr>
<tr>
<td>pH and chloride</td>
<td>0 - 30, 50 – 60, 90 - 100</td>
</tr>
<tr>
<td>Organic Carbon</td>
<td>0 - 30, 50 – 60, 90 - 100</td>
</tr>
</tbody>
</table>

The analysis results will be kept on record for ten years. These results will be presented to the administering authority when requested.

Procedure 24 – Sludge & Manure Monitoring

Liquid effluent samples are to be collected from the effluent holding ponds and manure stockpile area annually. These samples are to be collected just prior to commencing a period of irrigation or manure spreading.

The procedure is as follows:
- Prepare sample sheets and sample bags or bottles. Three bags or bottles are required for every manure sample site. These must be labelled appropriately.
- Send the samples to a NATA-accredited laboratory with the relevant sample sheets.
- Samples are to be sent as soon as possible after collection.
### Table 13 – Sludge and Manure Monitoring Requirements

<table>
<thead>
<tr>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus</td>
</tr>
<tr>
<td>Nitrate Nitrogen (NO₃⁻, -N)</td>
</tr>
<tr>
<td>Total Sodium</td>
</tr>
<tr>
<td>Electrical Conductivity</td>
</tr>
<tr>
<td>Total Carbon</td>
</tr>
<tr>
<td>Potassium</td>
</tr>
<tr>
<td>Total Calcium</td>
</tr>
<tr>
<td>Total Magnesium</td>
</tr>
<tr>
<td>pH</td>
</tr>
</tbody>
</table>

The analysis results will be kept on record for ten years. These results will be presented to the administering authority (DAF) when requested.

### Procedure 25 – Surface Water Monitoring

During any overtopping of the effluent holding ponds, surface water samples are to be collected from watercourses when runoff from the feedlot is entering a watercourse.

The procedure is as follows:
- Prepare three sample sheets and sample bottles for each sample site. These must be labelled appropriately.
- Send the samples to a NATA-accredited laboratory with the relevant sample sheet.
- Samples are to be sent as soon as possible after collection.

### Table 14 – Surface Water Monitoring Requirements

<table>
<thead>
<tr>
<th>Parameter</th>
</tr>
</thead>
<tbody>
<tr>
<td>Total Phosphorus (Total P)</td>
</tr>
<tr>
<td>Ortho Phosphorus (Ortho P)</td>
</tr>
<tr>
<td>Total Nitrogen or Total Kjeldahl Nitrogen (TKN)</td>
</tr>
<tr>
<td>Sodium Adsorption Ration (SAR)</td>
</tr>
<tr>
<td>Ammonium-Nitrogen (NH₄⁺ - N)</td>
</tr>
<tr>
<td>Electrical Conductivity (EC)</td>
</tr>
<tr>
<td>Potassium (K)</td>
</tr>
<tr>
<td>pH</td>
</tr>
</tbody>
</table>

The analysis results will be kept on record for ten years. These results will be presented to the administering authority (currently DAF) when requested.
Procedure 26 – Summary of Annual Monitoring Requirements

Table 15 provides a summary of the annual monitoring sampling to be undertaken at the feedlot. Samples are to be collected and analysed as follows:

<table>
<thead>
<tr>
<th>Item to be monitored</th>
<th>Required Monitoring</th>
</tr>
</thead>
<tbody>
<tr>
<td>Liquid Effluent Utilisation Area Soils</td>
<td>Annually</td>
</tr>
<tr>
<td>Manure Utilisation Area Soils</td>
<td>Annually</td>
</tr>
<tr>
<td>Waste Utilisation Area Crop/Pasture Yields</td>
<td>Seasonal Estimate</td>
</tr>
<tr>
<td>Liquid Effluent Stored in Holding Ponds</td>
<td>Annually</td>
</tr>
<tr>
<td>Stockpiled Manure</td>
<td>Annually</td>
</tr>
<tr>
<td>Surface Water</td>
<td>Event basis</td>
</tr>
</tbody>
</table>

Procedure 27 – Nutrient Loading Rates

- Estimate of crop / pasture yields on a seasonal basis and calculate a nutrient loading rate.

6.5 Procedures following heavy rain

Also refer to the following Procedures:
- Procedure 9 – Sedimentation Basin Cleaning & Maintenance
- Procedure 10 – Effluent Holding Pond
- Procedure 11 – Manure Stockpiling & Stockpile Management
- Procedure 13 – Manure Stockpile Area Maintenance
- Procedure 14 – Drains and Diversion Bank Maintenance

Procedure 28 – Solids Storage Area

- Ensure that the solids stockpile areas drain freely.
- Check that the layout of the manure stockpile(s) do not retain any runoff and that no pooling of water occurs. When conditions permit, re-configure the stockpile(s) if free drainage is not occurring.
- Check the base of the solid storage area for potholes and areas of shallow gravel cover. If inadequate, repair the base when conditions permit.
- Record any maintenance procedures performed.

6.6 On-going Procedures

Procedure 29 – Location of EMP

- A copy of the EMP will be kept at the feedlot site office at all times and must be readily available to all staff.

Procedure 30 – Dust
• Internal roads will be watered as required to reduce dust nuisance.

**Procedure 31 – Sampling Containers and Record Sheets**

• Ensure the required monitoring at the feedlot is undertaken at the appropriate time and in accordance with the cattle feedlot operating conditions.
• Ensure that an adequate supply of sampling containers (bottles and plastic bags) and record sheets are available for monitoring of effluent and manure (Procedure 24).

**Procedure 32 – Staff Training**

• Ensure that all staff are aware of their responsibilities in general environmental management.
• Ensure that all staff are aware of their procedural responsibilities.
• Provide staff with relevant technical information for reading.
• Provide staff training as required and when appropriate environmental courses, seminars or workshops are available.

**Procedure 33 – Operational Recording**

Details of the following feedlot operations are recorded:

Details of all cattle introduced to and removed from the premises, including:

• Number and actual or average live weight of cattle;
• Date of introduction/removal; and
• Cattle mortalities.

Routine operating procedures undertaken to prevent or minimise environmental harm, including:

• Pen cleaning and manure removal, storage and utilisation;
• Effluent irrigation;
• Vermin treatment and control; and
• Maintenance of the controlled drainage area within the feedlot complex.

Maintenance works carried out, including:

• Drainage channel maintenance;
• Diversion bank maintenance;
• Sedimentation system maintenance;
• Effluent holding pond maintenance.

The results of all monitoring undertaken as a condition of the Development Permit.

Details of staff training to enhance environmental management skills and awareness of environmental issues.

For each application of liquid effluent and manure, the following details are recorded:

• Date
• Rate of application
• Location of the land area receiving the effluent or manure

If any liquid or solid by-products are removed from the premises where feedlot activity is carried out, the details of the removal are kept, and include the following:
• The date, quantity and type of waste removed; and
• The name and address of the purchaser of the waste.

6.7 As-Required Procedures

Procedure 34 – Solids and Liquid Removal from the Site
When solids are removed from the feedlot site, the following details must be recorded:
• The date, quantity and type of waste removed.
• The name and address of the purchaser of the waste.

Procedure 35 – Mass Disposal of Carcasses
In the case of an excessive number of cattle deaths (any substantial increase in cattle mortalities), then the procedures outline in 2.6 should be followed.

Procedure 36 – Effluent Holding Pond Desludging
Will be undertaken as soon as practically possible after accumulated sludge builds up in the pond.
• Storage volume should not be reduced by more than 10% due to sludge build-up.

Procedure 37 – Community Consultation
Maintain a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises.

All neighbours should be encouraged to contact the feedlot manager if they have any issues or any complaints concerning the feedlot or its associated effluent irrigation and/or solids spreading practices. Feedlot management should inform immediate neighbours of proposed effluent irrigations and/or solids spreading events or any unusual activities that may be of concern to the neighbours.

Procedure 38 – Complaint Recording
All complaints will be recorded in the Complaints Register. The complaint record shall include:
• Time and date of detection and details of the complaint.
• Method of communication (telephone, fax, letter, personal visit).
• Name, contact address and contact telephone number of complainant. If complainant does not wish to be identified, then “Not Identified” is to be recorded.
• Wind direction and strength and any other relevant climatic conditions.
• Details of complaint investigation undertaken and findings.
• Any management practices that may have contributed to the complaint.
• Name of person responsible for investigating the complaint.
• Any action taken as a result of the complaint investigation and signature of responsible person.
• Details of notification of the delegate of the Administrating Authority (if applicable).
Procedure 39 – Incident Recording

Records of all incidents must be maintained in the Environmental Data Record, including the following details:

- The time, date and duration of equipment malfunctions or other operational problems which may have resulted in a direct or indirect impact on the environment.
- Any corrective measure implemented.
- Any uncontrolled release of contaminants reasonably likely to cause environmental harm.
- Results of assessments of the environmental impact of any releases of contaminants into the environment.
- Any emergency involving the release of contaminants reasonably likely to cause material or serious environmental harm including effluent holding pond overflows.
- Any substantial increase in livestock mortalities.
- Any change in management practices that may have resulted in diminished environmental performance.

Procedure 40 – Incident Reporting

In case of an incident resulting in the release of a contaminant, which has caused or is likely to cause environmental harm or any substantial increase in cattle mortalities:

- Contact DAF Environmental Regulation Unit (13 25 23) and request assistance.
- Confirm the telephone notification with a written confirmation.

6.8 Recording Requirements

- The two records that must be maintained at all times by feedlot staff are the Complaints Register and the Environmental Data Record.
- The Complaints Register will be used to record details of complaints made by the general public in relation to impacts on community amenity.
- The Environmental Data Record will be used to record any items of concern noted during ad hoc or subjective assessments by feedlot staff as well as any actions taken and the effectiveness of those actions and any items of concern noted during monitoring or assessment of laboratory analysis or other monitoring information.
- Example copies of the Complaints Register and the Environmental Data Records are maintained in the office at all times.