

ASSESSMENT REPORT 68

**MEAT PROCESSING  
FACILITY PROJECT  
(ABATTOIR)**

**AUSTRALIAN AGRICULTURAL COMPANY  
LTD**

**ENVIRONMENTAL ASSESSMENT REPORT  
AND  
RECOMMENDATIONS**

by the

Environment and Heritage Division  
Department of Natural Resources, Environment  
the Arts and Sport

March 2012

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## Glossary

AACo	Australian Agricultural Company Ltd
AAPA	Aboriginal Areas Protection Authority
ABS	Australian Bureau of Statistics
AHD	Australian Height datum
AQIS	Australian Quarantine Inspection Service
CSIRO	Commonwealth Scientific and Industrial Research Organisation
BOM	Bureau of Meteorology
DAFF	Department of Agriculture, Fisheries and Forestry (Australian Government)
DLP	NT Department of Lands and Planning
DoH	Department of Health
DoR	Department of Resources
EA Act	NT Environmental Assessment Act
ECNT	Environment Centre of the Northern Territory
EDP	Exceptional Development Permit
EHD	Environment and Heritage Division
EMP	Environmental Management Plan
Minister	NT Minister for Natural Resources, Environment and Heritage
NABL	Northern Australian Beef Ltd
NRETAS	NT Department of Natural Resources, Environment, the Arts and Sports
NT	Northern Territory
PER	Public Environmental Report
WMPC Act	NT Waste Management and Pollution Control Act

## Units and Symbols

%	percent
ha	hectares
m	metres
l/s	litres per second
L	litres
ML	million litres
N	nitrogen
P	phosphorous

## Definitions

Environment	all aspects of the surroundings of man including the physical, biological, economic, cultural and social aspects (Environmental Assessment Act, 1994)
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Environmental Asset	Naturally occurring living and non-living entities of the Earth, together comprising the bio-physical environment, that jointly deliver ecosystem services to the benefit of current and future generations.
ESD	Using, conserving and enhancing the communities' resources so that ecological processes, on which life depends, are maintained and the total quality of life now and in the future can be increased. ESD is development that aims to meet the needs of Australians today, while conserving our ecosystems for the benefit of future generations.
The Project	Refers to the proposed Meat Processing Facility, subject of this assessment under the <i>Environmental Assessment Act</i> .
The Proponent	Refers to the Australian Agricultural Company Limited, or future owner or operator.
The Minister	Refers to the NT Minister for Natural Resources, Environment and Heritage
Responsible Minister	Refers to the Minister for Lands and Planning; responsible for granting the EDP.

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## Executive Summary

Environmental impact assessment (EIA) is the process of defining those elements of the environment that may be affected by a development proposal and analysing the risks associated with the identified potential impacts. This Assessment Report assesses the potential environmental impact of the proposal by Australian Agricultural Company Limited (AACo) to construct a meat processing facility (Abattoir) in the Livingstone locality, approximately 50km south of Darwin, Northern Territory (NT).

It is proposed that the abattoir will process approximately 210 000 head of cattle per year. The facility will consist of:

- process floor;
- hot boning processing facility;
- chilling and packaging facility;
- rendering plant;
- biofilter;
- hide processing facility;
- salt recovery;
- livestock unloading facility and cattle holding yards for up to 2080 head of cattle (two days capacity);
- composting area for paunch and manure;
- effluent treatment systems consisting of anaerobic and aerobic ponds;
- fodder crop irrigation zones where treated effluent would be used to irrigate up to 84 ha of crops with storage ponds to catch stormwater runoff from irrigated areas; and
- workshop, engine room, offices, training rooms and associated facilities.

The proposed site is currently used for cattle grazing and hay production.

The Project has been assessed by the NT Government under the *Environmental Assessment Act* at the level of a Public Environmental Report (PER). This Assessment Report is based on a review of the information provided in the PER, advice provided by Northern Territory Government agencies and comments from the public.

This Assessment Report forms the basis of advice to the Minister for Natural Resources, Environment and Heritage (the Minister) on the environmental issues associated with the Project. The Minister is required to make comment and/or recommendations with regard to the proposal to the Minister for Lands and Planning (the responsible Minister) to inform the Exceptional Development Permit process under the *Planning Act*.

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## Key Risks

The key risks associated with this proposal are:

Water resources:

- Significant consumption of Darwin water supply; and
- Management of effluent and stormwater on site, which may lead to changes in surface water quality, leaching into aquifers and pollution of downstream environments.

Land management:

- Risks of negative impacts on the integrity of the soil due to irrigation activities; and
- Risk of introducing weed species to the site and the region.

Community health and amenity:

- Risks to health and amenity through odour, noise, light, dust, insects and vermin; and
- Risks to traffic and rail safety through increased traffic.

There are a number of other issues including:

- Solid waste management;
- Heritage protection;
- Greenhouse gas production;
- Operational failures; and
- Environmental management.

## Conclusion

Following review of the PER, significant uncertainties associated with the Project remain. The level of information provided in the PER has not been of a standard to enable comprehensive assessment of the risks. Information gaps also remain where management plans have not yet been submitted, or where management plans do not yet contain the level of detail to describe management and mitigation actions.

In order for the Project to proceed in an environmentally acceptable manner, the Proponent needs to prepare and submit the detailed management plans identified in recommendations in this Assessment Report. Through preparing the identified management plans, which should include detail of adequate operational protocols, it is the opinion of NRETAS that the identified potential environmental impacts of this project can be mitigated.

A consequence of the lack of content in the management plans presented in the PER is that the final management plans may require additional assessment under the *Environmental Assessment Act*.

Key information that must be provided before works commence include:

- An Irrigation Management Plan is to be developed that includes, but is not limited to, identification of appropriate fodder crop choice, irrigator type,

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irrigation zone sizing and layout, and rotational plans that utilise only one zone at a time;

- A network of monitoring bores should be established on site in accordance with recommendations made in the hydrogeology report (NOI) to facilitate groundwater analysis to develop a conceptual model that shows direction of groundwater flow, the standing level of groundwater beneath the site, aquifer hydraulic properties and an assessment of water quality beneath the site;
- Storage dam construction and design plans to be developed and lining material determined. If clay, the retention capacity is to be appropriate for preventing/ reducing leachate entering the soil substrate;
- Identification of specific actions to be taken if wastewater treatment/stormwater diversion dams overflow (imminent or actual) to prevent offsite impacts;
- Management Plans are to be developed outlining the proposed measures to be taken in the event that the community is affected by amenity or health issues from odour, noise and dust;
- A contingency plan for mass disposal of animal carcasses in the event of disease or disaster; and
- Appropriate treatment of compost, to the satisfaction of the Department of Health and the Department of Natural Resources, Environment, the Arts and Sport (NRETAS).

Due to information gaps remaining in the above management plans in this assessment, the Proponent, government and community will be reliant on post-assessment data collection to establish baseline information, determine significance of, and monitor the appropriate responses to, key impacts. These data and monitoring requirements are captured in the commitments made by the Proponent and recommendations made in this Report. The ongoing environmental monitoring and adaptive management required from the Proponent must demonstrate that any environmental impacts from the Project are no greater than those predicted in this assessment.

It is anticipated that the recommendations made in this Report, including recommendations requiring the development of detailed management and monitoring plans, are considered for inclusion as conditions/ conditions precedent on the Exceptional Development Permit should the Minister for Lands and Planning choose to approve the Project under the *Planning Act*.

Consistent with provisions of clause 15(1) of the Environmental Assessment Administrative Procedures, the Project may be subject to review throughout its operational life. The review will examine environmental aspects particularly relating to the effectiveness of the safeguards and standards adopted or applied for the protection of the environment, and for the accuracy of the forecasts of the environmental effects of the Project, as stated in the PER.

Based upon review of the PER and consultation with stakeholders, the EH Division concludes that environmental impacts of the Project can be managed at an acceptable level. This is provided that the above identified information gaps are adequately addressed and the environmental safeguards and recommendations detailed in the PER, this Assessment Report and in the final management plans, are implemented and managed to the high standard committed to by the Proponent, and are subject to regular monitoring and review.

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## List of Recommendations

### 1. Recommendation

The proponent shall ensure that the proposal is implemented in accordance with the environmental commitments and safeguards:

- Identified in the Australian Agricultural Company Ltd, Meat Processing Facility Project Public Environmental Report;
- Recommended in this Assessment Report (No. 68).

All safeguards and mitigation measures outlined in the Public Environmental Report are considered commitments by the Proponent and are to be included in their Environmental Management Plans for the project.

### 2. Recommendation

The proponent shall advise the Minister of any changes to the proposal in accordance with clause 14A of the Administrative Procedures of the *Environmental Assessment Act*, for determination of whether or not further assessment is required.

### 3. Recommendation

The Proponent is to incorporate relevant and practical wastewater reuse options into the operational procedures to limit the potential cumulative impacts that this project may have on the Darwin region water supply. Additional water efficiency measures should be developed in consultation with Power and Water Corporation, and in keeping with the principles of Ecologically Sustainable Development.

### 4. Recommendation

Detailed plans of all water holding dams on site should be developed to the satisfaction of NRETAS including construction materials and lining method. The proponent must demonstrate to the satisfaction of NRETAS and DoR that the proposed treated effluent and stormwater runoff storage dams have sufficient capacity to contain all potentially contaminated runoff and waste water in a Q100 storm event. Contingency measures in the event of imminent discharge or leakage from these dams should be included in the Environmental Management Plan and Water Quality Monitoring Plan (to the satisfaction of NRETAS).

### 5. Recommendation

Prior to commencement of works, the Proponent is to establish a network of bores within the site boundaries in order to conduct a site specific hydrogeological assessment. This will inform development by the proponent of a conceptual model to enable assessment of the potential impacts to groundwater and surrounding receptors.

During operation, the bores will then serve as monitoring bores. Groundwater monitoring (establishing bores and collecting data), including its frequency, should be in accordance with suitable guidelines such as those of the Victorian EPA, and to the satisfaction of NRETAS.

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The Proponent must demonstrate that its operations will not affect the beneficial uses of Berry Creek. Any approval should be conditional upon the design and implementation of a comprehensive groundwater monitoring program to the satisfaction of NRETAS and DoR.

**6. Recommendation**

Prior to commencement of works, an erosion and sediment control plan (ESCP) is to be developed and implemented to the satisfaction of NRETAS. The plan should detail control measures for construction and operational phases.

**7. Recommendation**

Prior to commencement of works, a detailed irrigation management plan (IMP) is to be developed to the satisfaction of DoH, DoR and NRETAS that includes, but is not limited to:

- the fodder crop species to be used,
- the type of irrigator and the actual size, orientation and layout of the irrigation zones, including scaled plans; and
- the potential for redundancy in irrigation zones where the indicated crop performance levels are not being achieved with respect to nutrient uptake and soil integrity.

If the IMP indicates that management and risk mitigation measures differ from the PER such that the environmental significance of effluent disposal is changed, the IMP should be submitted to the Environment and Heritage Division of NRETAS under clause 14A of the Environmental Assessment Administrative Procedures for consideration of whether further assessment is warranted.

**8. Recommendation**

The Proponent is to undertake a targeted survey of weed species on the project site prior to works commencing, to inform the weed management plan. Ongoing weed monitoring and management is to be consistent with obligations under the *Weeds Management Act*.

**9. Recommendation**

Management plans should be developed, to the satisfaction of NRETAS, for odour, noise and dust prior to commencement of works. These plans should be included as part of the Project Environmental Management Plan (EMP). A mechanism to facilitate the reporting of amenity and health issues by the community, such as the Environmental Management Committee, should be detailed in the EMP.

**10. Recommendation**

An Integrated Pest and Disease Management Program shall be developed that includes mosquito, fly, vermin and pest management measures. This program should be included in the EMPs for the project.

**11. Recommendation**

A pesticide management and storage protocol is to be prepared to the satisfaction of NT WorkSafe in accordance with the relevant legislation.

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**12. Recommendation**

The design plans for ponds and dams, the irrigation area and the stormwater system for the development should be provided to the Department of Health – Medical Entomology Branch for approval prior to works commencing. This is to ensure that the proponent is not inadvertently creating conditions or habitats that will encourage the breeding of mosquitoes and other biting insects.

**13. Recommendation**

The proposed composting area shall be covered, to the satisfaction of the Department of Health, to prevent the composting material being exposed to rainfall. The floor surface of the composting area is to be a concrete hardstand to prevent leaching into the soil substrate.

**14. Recommendation**

The Proponent shall develop a disposal plan for mass mortality events. The appropriate agencies (DoH, DoR – Primary industries) are to be consulted to inform best practice methods for carcass disposal.

**15. Recommendation**

The Project must be operated in accordance with a current EMP. The EMP and monitoring programs may be subject to periodic review, in accordance with clause 15(1) of the Environmental Assessment Administrative Procedures.

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# 1 Introduction and Background

This Assessment Report assesses the environmental impact of the proposal by Australian Agricultural Company Limited (AACo) to construct a meat processing facility (Abattoir) in the Livingstone locality, approximately 50km south of Darwin, Northern Territory (NT).

AACo (the Proponent) intends to develop the facility on Lot 4, Hundred of Cavenagh and Section 5410, Hundred of Strangways (Figure 1). The combined area is 601ha and is currently used for cattle grazing and hay production. The proposed site is approximately 50km south of Darwin and 8km south of Noonamah in the Livingstone locality. The Stuart Highway and the Alice Springs to Darwin railway forms the eastern boundary. The southern and western boundaries are comprised of predominantly 2 and 8 ha rural residential properties and the northern boundary is shared with a cattle holding property. Access to the site is from the Stuart Highway and crosses the railway line. The site is zoned Rural under the NT Planning Scheme. Under the Scheme an abattoir is a prohibited use on rural zones, which led to the Proponent lodging an Exceptional Development Permit (EDP) application under the *NT Planning Act*.

The site falls within the Blackmore River catchment area, and has three second order streams that contribute to Berry Creek, which flows through Lake Deane and the Berry Springs Nature Reserve as well as numerous properties before flowing into the Blackmore River and subsequently, Darwin Harbour. The wetland area in the southwest corner of the site is seasonally waterlogged.

It is proposed that the abattoir will process approximately 210 000 head of cattle per year. The facility will consist of:

- process floor;
- hot boning processing facility;
- chilling and packaging facility;
- rendering plant;
- biofilter;
- hide processing facility;
- salt recovery;
- livestock unloading facility and cattle holding yards for up to 2080 head of cattle (two days capacity);
- composting area for paunch and manure;
- effluent treatment systems consisting of anaerobic and aerobic ponds;
- fodder crop irrigation zones where treated effluent would be used to irrigate up to 84 ha of crops with storage ponds to catch stormwater runoff from irrigated areas; and
- workshop, engine room, offices, training rooms and associated facilities.

This Environmental Assessment Report assesses the environmental impact/risk of the Proponent's project and is based on a review of the Public Environmental Report (PER) and comments from the public and Northern Territory Government agencies on the PER.

The PER can be viewed on the Department of Natural Resources, Environment, the Arts and Sport (NRETAS) website at:





**Figure 1 – Location of the proposed site**

## **1.1 Environmental Impact Assessment Process**

Environmental Impact Assessment (EIA) should:

- Identify the potential impacts on the environment (where environment is defined broadly according to the *Environmental Assessment Act*); and
- Evaluate the risks of those impacts occurring.

Through its assessment of Project risks the Proponent must demonstrate:

- That these risks can be satisfactorily managed within acceptable levels e.g. impacts would not result in long term environmental detriment; and
- The effectiveness/ feasibility of management measures in a precautionary/ risk management framework.

Assessment gives weighted consideration to:

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- Values and risks;
  - Estimation of the likelihood of success of preventative and remedial measures; and
  - The validity and comprehensiveness of programs established to provide ongoing measures of the environmental effects of the proposed development.

This assessment considers that risks can be more reliably evaluated where there is a substantial baseline of relevant information. Where this information is limited or not available, risk assessment is inevitably constrained and far less precise, and it is appropriate to use the precautionary principle in the evaluation of possible impacts. If potential impacts are understood with a reasonable degree of certainty, monitoring programs can be better informed to detect impacts, and management measures can be more effectively targeted to address those impacts.

This Report describes the adequacy of the PER submitted by the Proponent in achieving environmental outcomes. The Report also evaluates the adequacy of the commitments and environmental safeguards proposed by the Proponent in order to avoid or mitigate potential impacts caused by the Project.

A list of commitments made by the proponent in the PER is provided in Appendix 2.

The contents of this Assessment Report form the basis of advice to the NT Minister for Natural Resources, Environment and Heritage (the Minister) under the *Environmental Assessment Act* (EA Act).

## **1.2 Regulatory Framework**

Environmental assessment was undertaken in accordance with the requirements of the Northern Territory EA Act. This Report forms the basis of advice to The Minister on the environmental issues associated with the Project and informs the decision as to whether or not the Project should proceed. The Minister is required to make comment and/or recommendations with regard to the proposal to the Minister for Lands and Planning (the responsible Minister). The responsible Minister will then make a determination as to whether or not an EDP will be issued to the Proponent to develop the meat processing facility under the NT *Planning Act*. The responsible Minister may also incorporate the recommendations made in this report as relevant conditions on the development permit to form a basis for developmental and environmental safeguards and commitments.

Under the Environmental Assessment Administrative Procedures, the effectiveness of mitigation measures, safeguards and environmental standards applied to this facility are subject to review by NRETAS and advisory bodies.

A more complete list of Government approvals and relevant legislation for the regulation of the proposal is provided in Chapter 2.8 of the PER.

## **1.3 Environmental Impact Assessment History**

On the 30 September 2011, an application for an EDP was lodged with the Department of Lands and Planning and was referred to the Minister for consideration under the EA Act. The EDP application was circulated as a Notice of Intent (NOI) to NT Government advisory bodies to assist in identifying the key risks associated with the Project. On 5 December 2011, the Minister determined that the Project required formal assessment at the level of a PER. Draft Guidelines for the preparation of the

PER were prepared by this Department and advertised on the 10 December 2011 for a period of 14 calendar days, during which time, key stakeholders provided advice and comments on the content of the guidelines. On 13 January 2012, the Minister issued the Final Guidelines and instructed the Proponent to prepare the PER. The PER was placed on public exhibition for a period of 28 days from 4 February 2012 and circulated to key government advisory bodies for review.

Ten submissions were received from Government agencies, and seven submissions were received from the community expressing concern over the impacts to environment and amenity. The issues raised in the submissions are detailed at Appendix 1.

On 16 March 2012, the Environment and Heritage Division of NRETAS prepared this Report, and provided the Report to the Minister. The Minister issued final advice and recommendations on the Project to the responsible Minister.

## 1.4 Ecologically Sustainable Development

Australia developed the National Strategy for Ecologically Sustainable Development (ESD) identifying four national principles. The Strategy also identified ways to apply the principles to a range of industry sectors and issues such as climate change, biodiversity conservation, urban development, employment, economic activity, and economic diversity and resilience.

In December 1992 the NT Government endorsed the National Strategy and agreed, along with all other States and Territories, to the Intergovernmental Agreement on the Environment. The Strategy defines ESD as:

*'Using, conserving and enhancing the communities' resources so that ecological processes, on which life depends, are maintained and the total quality of life now and in the future can be increased.'*

*ESD is development that aims to meet the needs of Australians today, while conserving our ecosystems for the benefit of future generations.'*

The principles of ESD as defined in the National Strategy are:

ESD Principle	Definition
Precautionary principle	Where 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- and intra-generational equity	The present generation should ensure that the health, diversity and productivity of the environment is maintained or enhanced for the benefit of present and future generations.
Conservation of biological diversity and ecological integrity	The conservation of biological diversity and ecological integrity should be a fundamental consideration in decision-making
Improved valuation, pricing and incentive mechanisms	Should be promoted to ensure that the costs of environmental externalities are internalised and that the polluter bears the costs associated with environmental

	pollution.
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Subsequent decision-making processes by approval bodies also must be guided by ESD principles and the continued project design and development, as well as the development and implementation of management and monitoring programs by the Proponent, should all aim to meet the objectives of ESD.

## 1.5 Territory 2030 Strategy

Territory 2030 is a 20-year strategic plan for the Northern Territory developed by an independent Steering Committee and was produced as a road map for the future. Developed in consultation with the Territory community, Territory 2030 is a means for setting priorities and guiding government's efforts over the next two decades.

As the principal policy document for the NT it is appropriate that this Project is considered, assessed and implemented within the framework of Territory 2030. Identified as one of the issues requiring immediate focus is the priority "kick-starting key projects and initiatives", recognising the lasting difference of key initiatives and projects to the community because of their ability to create benefits beyond their initial investment. The Economic Sustainability objectives relevant to this Project include:

Objective 1: the Territory invests for long term growth

- Increase Indigenous labour force participation rates.

The Territory 2030 document also identifies Environment objectives and some of those relevant to the Project include:

Objective 1: Custodians of our natural heritage

- Ensure no deterioration in the health of biodiversity in the Northern Territory;
- Reduce the impact of weeds and other invasive species, including feral animals and disease organisms; and
- Manage the Northern Territory's natural resources according to the principles of Ecologically Sustainable Development.

Objective 2: Sustainable living

- Ensure efficient use of water by business and industry;
- Continue to meet or better national air quality standards across the Territory; and
- The Northern Territory contributes to the national target for greenhouse gas reduction.

The NT Government aims for a balanced decision making model that considers the economic, social and environmental impacts of every funding and policy decision made by government. This ensures that policy and decision-makers critically examine the tensions that exist between and across some of the targets. Accordingly, when decisions are made, all impacts (positive and negative) across targets are taken into consideration.

It is appropriate to apply these same decision making principles when making an assessment and decision on the Project. Where appropriate, the Report will draw

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from, and refer to, the targets contained in the Territory 2030 plan when reviewing and assessing the key elements of the Proponent's proposal.

It is anticipated that the private and community sectors will share ownership of, and become directly involved in, progressing targets within the plan. Industries and organisations will be encouraged to "own" targets and contribute to them in meaningful ways. This provides the opportunity for the Proponent to offset some of the challenges that arise through its Project by contributing to other targets (such as employment, and investment in "green energy" targets).

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## **2 The Proposal**

### **2.1 The Proponent**

The Proponent is the Australian Agricultural Company Limited (AACo). The facility will be operated by a currently 100% owned subsidiary of AACo, Northern Australian Beef Limited (NABL).

AACo currently owns eight Pastoral stations in the NT, operates 18 pastoral stations across NT and QLD and operates three feedlot facilities. It is the largest producer of beef cattle in Australia. The main market for AACo cattle is live shipment (NT), store market cattle and grain finished Wagyu and cross breed slaughter cattle.

### **2.2 Project objective**

Through the proposed facility, the Proponent aims to strengthen the Northern Australian cattle industry and therefore the local economy that is directly and indirectly affected by the industry. As the industry currently has only two main markets for its cattle, the live export trade and trucking cattle to southern meat processing facilities, it is considered vulnerable. The PER indicates that a local processing facility could enhance the industry's resilience to market risks (oil prices and live trade restrictions), provide the industry with new value-added market options, and reduce costs, carbon emissions and animal welfare concerns associated with the current long distance transportation of cattle to interstate facilities.

The Proponent summarises the objectives of the Project as:

- Increase market options for the Northern Australia cattle industry;
- Operate in an environmentally sustainable manner;
- Improve the economic and environmental sustainability of the NT cattle industry; and
- Create and support socio-economic opportunities for the local communities.

### **2.3 Project location and description**

The application site comprises Lot 4 Hundred of Cavenagh and Section 5410 Hundred of Strangways (270 Blyth Road, and 2660 Stuart Highway, Livingstone). The site has a total area of approximately 601ha and is surrounded by predominantly 2 and 8ha rural residential properties (Figure 1).

The proposed site was chosen out of five potential sites in the NT based on the following selection criteria (PER):

- Land tenure;
- Sufficient land area for the operation and its associated activities;
- Relatively short distance to Stuart Highway;
- Accessibility to sealed road transport to bring live cattle to the site and take product off the site;
- Relative proximity to East Arm Port;
- Distance from sensitive land uses;
- Suitable topography and soils for drainage and waste water systems;



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- Proximity to water, electricity and gas services;
  - Relative proximity to workforce and housing;
  - Relative proximity to community services;
  - Avoidance of sites with significant populations of threatened species; and
  - Avoidance of sites of archaeological, heritage or Aboriginal significance.

An additional criterion for site selection that has been applied for proposed abattoirs in other parts of the country, which was not met in this instance, was avoidance of sites in close proximity to watercourses and wetlands. The site chosen by the Proponent contains both streams and wetlands with the streams flowing into an ecologically sensitive environment (Berry Springs). Water quality monitoring of fresh and estuarine waters of the downstream Blackmore River catchment has indicated that this catchment is already experiencing degradation through the cumulative effects of pressures in its catchment (Darwin Harbour Region Report Cards, 2011).

Precise details regarding alternative sites were not provided by the Proponent due to privacy reasons, therefore, the Project could not be assessed for site comparison.

The built facility will occupy approximately 4ha in the eastern portion of the site. This contributes to a footprint area of approximately 14ha that includes the effluent treatment and water storage dams, cattle yards and community centre. Additional area is required to irrigate the treated effluent onto fodder crops. Three of these irrigation zones are proposed to be constructed, each with a stormwater catchment dam down slope to catch runoff from the zones to supplement irrigation water requirements for nutrient balance. Only one irrigation zone will be utilised at a time, given the limiting factor of water availability (pers. comm. Stewart Cruden, General Manager NABL, 10 February 2012) with the other zones utilised if the soils begin showing signs of stress from irrigation practices.

Construction of the facility is expected to take approximately eight months, with the aim to become operational by the end of 2012.

It is proposed to construct the Project in two phases with the final processing capacity of 500 cattle per shift operating two shifts per day (1000 cattle per day). During the initial phase it is expected the facility will operate only one shift (8 hours), processing 240 head of cattle. Operations will be increased within the earliest possible time frame depending on staff availability, training, livestock, and market logistics and operations. Firstly, operation will be increased to an 8 hour shift processing 500 head and then on to the full operating capacity of 1000 head (processing 500 head per shift over two, eight hour shifts). The Proponent intends to supply approximately 35% of the proposed annual cattle processing numbers when operating at full capacity, the remainder would be sourced from pastoral and cattle stations in the NT.

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## **3 Regional Setting**

### **3.1 Land Tenure**

The Proponent has secured the option to purchase the subject site (that is Lot 4, Hundred of Cavenagh and Section 5410, Hundred of Strangways) subject to the granting of the EDP.

### **3.2 Climate**

The 'Top End' climate of the Northern Territory is characterised by extreme weather conditions in the Wet season including severe electrical storms, cyclones, and flooding. Approximately two-thirds of the average annual rainfall occurs between January and March. The Dry season is characterised by low humidity and very little rainfall which can present hazardous fire conditions depending on the vegetation present. These extreme differences in conditions often provide challenges to the environmental management of industrial sites.

Records from the Bureau of Meteorology for the nearby weather station at Noonamah (8km north of the site) show that mean maximum temperature is 34 degrees celsius, and the mean minimum temperature is 21 degrees.

Rainfall records (from Noonamah and Elizabeth Valley) show that average rainfall is 1660mm at Elizabeth Valley and 1900mm at Noonamah. The PER states that rainfall datasets were used for the Noonamah and Elizabeth Valley stations given the proximity to the site, but that the pattern for mean monthly rainfall was taken from the Batchelor district station as it has a longer period of recorded data (17 years). This is contradicted in the Environmental Management Plan (EMP) where it is stated that Elizabeth Valley has recorded data for 26 years, significantly longer than that stated for the Batchelor District in the NOI. The dataset used in the EMP is from Elizabeth Valley, not Batchelor as suggested by the climate section in the Water Quality Monitoring Plan (Appendix D).

During the Wet season, north-west winds up to a speed of 10-30 kilometres per hour (kph) are experienced, while in the Dry season, winds of a similar speed are experienced from the south-east.

### **3.3 Landform features**

In general, the site is gently undulating cropping and pastures land with a centrally-located, wet area draining to the west. Elevation decreases from 54 AHD in the east to 24 AHD in the west, and the gradient is approximately 1.5%. A significant proportion of the site contains streams and land units characterised by waterlogged soils. The meat processing plant, water treatment ponds, treated water and stormwater storage dams; and irrigation areas are situated within the relatively higher and well drained eastern portion of the site. These areas all drain towards the headwaters of Berry Creek.

### **3.4 Surface Water**

Three second order (Strahler's Order) streams associated with the Berry Creek system are present on the site. The east branch runs on an east-west alignment through the centre of the site, while the southern branch runs from a point near the intersection of Scrutton and Cornock Roads outside the site, through Lot 4 and to the



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south-western corner of Section 5410. The north branch runs roughly parallel to the western boundary. Some of the western stream margins are well vegetated.

Berry Creek flows into the Blackmore River 15km downstream of the site, which flows into the Darwin Harbour 8km further downstream. The lower reaches of Berry Creek and Blackmore River are tidally influenced, but are considered to be poorly flushed despite the large tidal ranges experienced in the Darwin Harbour.

A site visit conducted by NRETAS staff in September 2011 identified a spring on the site on the middle stream branch that is currently at risk of degradation due to cattle accessing it for water. Refer to Section 4.2.2 for further discussion of surface water.

### **3.5 Groundwater**

There are a number of bores in the vicinity of the site, used mainly for domestic and agricultural uses, although no registered bores are on the Project site. Records of bores drilled on rural living allotments around the site indicate that water bearing zones are between 27 and 95m in depth, with yield varying between 0.5 to 5.0 litres per second. Records indicate that water is of good quality.

Lack of groundwater monitoring in the area has made it difficult to determine the Project site's potential influence on adjacent groundwater quality.

The Proponent intends to utilise some of the bores on surrounding properties for its groundwater monitoring program and establish one bore on the site down gradient of the proposed infrastructure. Refer to Section 4.2.2.3 for further discussion of groundwater resources.

### **3.6 Vegetation**

No threatened flora species are recorded on the land. Common vegetation found on the site includes improved pasture grasses, Humidicola and Jarra. *Pandanus spiralis* is also present on the site.

### **3.7 Weeds**

A number of weed species are identified to occur in the vicinity of the site, and are likely to be found on the Project site. Weed information was sourced from a desk top study utilising readily available regional weed species information. Further discussion of weeds is found at section 4.3.2.

### **3.8 Fauna**

Three fauna species listed as vulnerable in the NT threatened species list are recorded on land surrounding the site. These are *Ardeotis australis* (bustard), *Dasyurus hallucatus* (northern quoll) and *Conilurus pennicillatus* (brush tail tree rat).

### **3.9 Archaeology and heritage**

A search of the NT Heritage database indicates that there are no registered heritage sites on the land. World War II Livingstone Airfield, Camp and associated Anti-aircraft Gun Sites are located on sites or properties neighbouring the site. The Airfield to the east of the property between the rail corridor and Stuart Highway was nominated for inclusion on the NT Heritage Register in 2001, but in 2007 the Heritage Advisory Council decided that, although the site possessed some heritage significance, it did not warrant inclusion on the register. A request for information

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from records held by the Aboriginal Areas Protection Authority returned advice that the Authority has no record of sacred sites within the property.

### **3.10 Socio-economic**

The total population in the NT in 2006 was estimated to be 192 898 with approximately 106 000 of those people living in the Darwin region. Based on 2004 population estimates, by 2021 the Northern Territory's population is expected to grow to between 215 300 and 279 200 people with the greater part of this growth likely to occur in the Darwin region. The nearest population centre to the Project site is Noonamah with a population of approximately 476. The Project site is bounded by residential properties consisting of predominantly 2ha and 8ha blocks.

Besides rural residential living, the land surrounding the Project site is used for farming and cattle holding yards. Further downstream along Berry Creek and Blackmore River, land use includes horticulture, aquaculture, 'hobby' farming, tourist parks and attractions, the Berry Springs Village and Berry Springs Nature Reserve that serves as a popular swimming destination for tourists and locals in the Dry Season.

Based on 2006 census data, the unemployment rate for Noonamah is relatively low at 3.93%. Of those employed, 68% are employed on a full-time basis and 23% are employed part time (ABS, 2006).

The Project expects to employ up to 240 construction staff for the eight month construction phase and up to 300 employees during the operational phase. Ideally, the Proponent would source the majority of its employees from the local community and aims for the target of 10% Indigenous staff employment. However, it also expects that workers may need to be sourced from further afield in Australia and internationally.

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## 4 Environmental Impact Assessment

### 4.1 Introduction

The main purpose of this Report is to evaluate the Project and to determine whether the proposal can proceed without unacceptable environmental impacts. This is achieved by identifying any potentially significant risks of environmental impacts occurring associated with the Project and evaluating the corresponding safeguards or prevention measures suggested by the Proponent. Where the proposed safeguards are considered insufficient, or where a safeguard is significantly important, recommendations are made in this Report to add to or emphasise those commitments made by the Proponent.

The environmental acceptability of this Project is based on consideration of the following from the PER:

- Adequacy of information outlining the proposal (particularly which structures or activities are likely to impact the environment);
- Adequacy of information on the existing environment (particularly environmental sensitivities);
- Adequacy of information on the range and extent of potential impacts and the risks of those impacts occurring as a result of the Project; and
- Adequacy of the proposed safeguards to avoid or mitigate potential impacts.

Conclusions and recommendations are then based on comments from the review of the PER by relevant government agencies and the public. Each recommendation (in **bold**) is preceded by text that identifies concerns, suggestions and undertakings associated with the Project. For this reason, the recommendations should **not** be considered in isolation.

Subject to decisions that authorise/permit the Project to proceed, the primary recommendations of this assessment are:

#### 1. Recommendation

**The proponent shall ensure that the proposal is implemented in accordance with the environmental commitments and safeguards:**

- **Identified in the Australian Agricultural Company Ltd, Meat Processing Facility Project Public Environmental Report;**
- **Recommended in this Assessment Report (No. 68).**

**All safeguards and mitigation measures outlined in the Public Environmental Report are considered commitments by the Proponent and are to be included in their Environmental Management Plans for the project.**

#### 2. Recommendation

**The proponent shall advise the Minister of any changes to the proposal in accordance with clause 14A of the Administrative Procedures of the *Environmental Assessment Act*, for determination of whether or not further assessment is required.**

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## 4.2 Water resources

### 4.2.1 Significant consumption of Darwin water supply

The Project outlines a maximum consumption of the Darwin water supply of two million litres (ML) per day, five days per week. Correspondence between Power and Water Corporation (PWC) and the Proponent provided in the NOI outlines the infrastructure upgrades required in order to deliver this volume, and expresses the view that the Proponent should investigate additional options for water efficient measures, which will result in reducing the impact on Darwin's water resources and cost savings to the Proponent. The Proponent advised that treating water onsite to a potable standard for reuse in the production process has not been considered citing Australian Quarantine Inspection Service (AQIS) regulations as the reason (pers. comm., Stewart Cruden, NABL General Manager, 10 February 2012). However, this should be considered further as the documentation provided by the Proponent and separate advice sought from the relevant Australian Government Department of Agriculture Fisheries and Forestry (DAFF) indicated that water recycled on site using advanced treatment to a potable standard could be acceptable in production activities depending on market requirements (pers. comm. Paul Vanderlinde, Residues and Food Safety Branch, DAFF).

The Proponent has outlined a number of other reuse options and water efficient measures that are to be utilised, including water efficient spray nozzles, facility layout to reduce water wastage and efficient cleaning practices, reusing captured stormwater on site and irrigating treated effluent onto fodder crops. These methods should be incorporated into the operating procedure plans wherever practicable in accordance with the ESD principles and the Territory 2030 target of ensuring efficient use of water by business and industry to limit the cumulative impact this project may have on Darwin's water resources in the long term, given the projected population increases and potential industrial growth in the Territory. The Proponent should commit to continually improving its water efficiency measures in keeping with best practice and the ESD principles.

### 3. Recommendation

**The Proponent is to incorporate relevant and practical wastewater reuse options into the operational procedures to limit the potential cumulative impacts that this project may have on the Darwin region water supply. Additional water efficiency measures should be developed in consultation with Power and Water Corporation, and in keeping with the principles of Ecologically Sustainable Development.**

### 4.2.2 Stormwater and effluent management

The key risks relating to stormwater and effluent management include changes in surface water quality, leaching into aquifers and impacting downstream environments. In the first instance, this can be managed through appropriate site selection. In selecting a site that is suitable for this land use, avoidance of waterways and wetlands is considered a relevant criterion. Where these features exist on a selected site, mitigation and avoidance measures should be developed commensurate with the level of risk.

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Concerns were raised by key government advisory bodies during consultation on the NOI regarding the potential risks to surface water, groundwater and downstream environments as a result of the Project. The Proponent included a surface water monitoring program in the PER that is considered to adequately meet requirements. It should be noted that the selected control site for surface water monitoring may be subject to influences by the Railway line and corridor that may impacts its suitability as a control site. Contingencies for more extreme conditions need to be considered, however, as well as impacts to groundwater, which may affect the downstream environment. These issues are discussed further in the following sections.

#### **4.2.2.1 Irrigation management**

The Proponent intends to manage the nutrient-rich secondary effluent produced in the processing facility by using the effluent to irrigate suitable crops. These crops would be grown within designated irrigation zones on the Project site. The PER indicates that crops would be selected to optimise nutrient uptake and hay production. Appropriate crop selection for this purpose is discussed in Section 4.3.1 of this Report.

Three irrigation zones have been identified to allow rotation practices when soil nutrient levels within a particular zone exceed acceptable limits. If the effluent application rates on the crops are well managed, it could be expected that nutrient loads in surface runoff and via groundwater infiltration from these irrigation zones would be minimal. As a further measure, excess surface runoff from the irrigated areas is to be intercepted by a stormwater storage dam and this water is then used to supplement the effluent and so allow for a more balanced nutrient load when irrigating. Stormwater storage is discussed in Section 4.2.2.2 of this Report.

The Environmental Management Plan (EMP) contains information on typical effluent nutrient loads, nutrient uptake characteristics of some soils on the site and proposed crop varieties, and the expected water balance for the site, including seasonal stormwater inputs. It is unclear, however, whether sufficient area of land suitable for achieving the Proponent's effluent disposal objectives. For example, a minimum area of land is needed for designated crops and soil to take up the estimated concentrations of nitrogen (N) and phosphorus (P) in the irrigated effluent. The irrigation area ultimately required will vary depending on the crop grown and complex interactions of soil physicochemical characteristics. Whilst the PER is flexible in terms of the irrigation zone size, it is understood that the entire irrigation zone, which constitutes large areas of the Project site, will be needed to effectively treat the effluent each year. Information from Government advisory bodies indicates that some areas within the irrigation zones proposed may be constrained in terms of suitability, further limiting the area available for cropping.

The Proponent's required land area calculations rely significantly on the potential of the soil matrix to adsorb Phosphorous (P), which is a key limiting nutrient in aquatic pollution. Balancing the P level from year to year in the cropping system between labile (plant-available) and non-labile forms, that is, P that is adsorbed to soil particles, is critical in maximising crop uptake and minimising mobilisation into surface and groundwater. The P-sorption factor used appears to have been calculated for the clay substrate on the Project site but not the overlying, light, sandy, soils. This presents a number of potential issues. Firstly, it is likely that significant infiltration of the low permeability clay layer by irrigation water may not occur and P would therefore not be adsorbed by the clay fraction as anticipated by the Proponent. The Proponent's P-sorption estimate in the PER could then be significantly overestimated and the required size of irrigation zones underestimated. Secondly, it is likely that the light, permeable soil overlying the clay will not have a high capacity to adsorb P. This means that the proportion of P attributed in the PER to the non-

labile pool, that is P that is soil-bound, would actually be labile. In the absence of a crop substantial enough to utilise all the labile P, a significant proportion would remain in soil pore water and is likely to flow down through and possibly laterally into the adjacent drainage depressions at the headwaters of Berry Creek. Some of this shallow groundwater may be intercepted by cut-off drains and the stormwater runoff storage dams (discussed in Section 4.2.2.2 of this Report) but some may also leach into a Wet season perched water table and possibly interact with groundwater during the Wet season. Runoff water could become increasingly concentrated with subsequent irrigation activities as continual applications of effluent would add to the incremental accumulation of P in the soil water from previous irrigation; a positive feedback loop. The Proponent would then need very large areas of hay production to uptake P adequately.

It is probable that the P adsorption capacity of the soil and substrate matrix will decline over time with subsequent irrigation regimes as the pool of non-labile P and unavailable P complexes in the soils increase. How long this might take is unknown. Regardless, no matter how much adsorption capacity there is, heavy rain may still wash P through the soil profile into surface and groundwater. Hence, there is significant uncertainty about the sustainability of the irrigation disposal method over time before groundwater resources down gradient could become contaminated with P. It is essential that the proponent has a good understanding of the soils and hydrogeology to ensure P is prevented from leaving the Project site and contaminating sensitive receptors. Hydrogeological issues are discussed further in Section 4.2.2.3 of this Report.

The guidelines required that an Irrigation Management Plan (IMP) be included in the PER to demonstrate that the irrigation option would be effective in reducing the risk of eutrophication of Berry Creek. The information that was presented is considered to be insufficient and does not provide adequate certainty that the Project will not have significant downstream impacts. The Proponent will need to undertake significant further work in its IMP as part of any approval condition to demonstrate that its proposed effluent treatment system is sustainable, in accordance with Recommendation 7 in Section 4.3.1 of this Report. Alternative methods of effluent disposal should also be considered as a contingency in the event that significant issues are experienced with the proposed system.

#### **4.2.2.2 Storage dam capacity**

The Proponent intends to store treated effluent and contaminated runoff from the facility in an effluent storage dam. Additionally, three stormwater runoff storage dams would be constructed to intercept runoff from irrigation zones and supplement water for irrigating effluent.

The PER indicates that these dams will be designed to contain a 1 in 100 year rainfall event in addition to the average rainfall expected for a typical Wet Season. This means that each dam should be able to accommodate runoff from a storm event that has a 1% chance of occurring in any given year.

A number of concerns were raised with respect to the potential for the water storage dams (stormwater and effluent) to overflow in extreme weather events leading to pollution of downstream environments (Lake Deane and Berry Creek). Although a design capacity of Q100 (1% Annual Exceedence Probability or 100 year Average Recurrence Interval design storm level) is considered adequate, the PER did not contain sufficient information to give confidence that this capacity would be met. As discussed in Section 4.2.2.1 of this Report, irrigation zones have not been properly defined; therefore, catchment sizes are undetermined, there is no detailed analysis of

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likely surface water flows, and the stormwater catchment dam locations and efficacy of interception is uncertain. There were also a number of inconsistencies in the PER regarding the additional dam depth required to buffer storage dams against such an event. Given that large areas of the Project site would have to be irrigated to treat the effluent under the proposed management scenario, considerably larger than projected stormwater dams may be required to intercept a Q100 event and prevent contamination of Berry Creek.

The PER provided little information on contingency measures that would be employed in the event of an impending overflow or loss of containment from storage dams. The Proponent indicated that it may apply for a waste discharge licence (WDL) under the *Water Act* if the effluent treatment process proved ineffective. Due to the sensitivities associated with Berry Creek, all possible alternatives to limit discharge would need to be explored before a WDL would be considered. The Proponent must demonstrate that it can implement appropriate mitigation to ensure wastes and nutrients are contained on the site in the first instance and should be aware of its obligations with respect to waste water under the *Water Act* and the WMPC Act.

Further, the Proponent may be subject to licensing requirements for dam construction under the *Water Act*. More detailed plans will indicate if this is required.

#### **4. Recommendation**

**Detailed plans of all water holding dams on site should be developed to the satisfaction of NRETAS including construction materials and lining method. The proponent must demonstrate to the satisfaction of NRETAS and DoR that the proposed treated effluent and stormwater runoff storage dams have sufficient capacity to contain all potentially contaminated runoff and waste water in a Q100 storm event. Contingency measures in the event of imminent discharge or leakage from these dams should be included in the Environmental Management Plan and Water Quality Monitoring Plan (to the satisfaction of NRETAS).**

##### **4.2.2.3 Groundwater**

Groundwater resources have the potential to be impacted by leaching of effluent/nutrients into the underlying aquifer. The protection of the environment, culture (aesthetic, recreational and cultural), agriculture, and rural stock and domestic water supply are the declared beneficial uses of water that apply to all natural waterways in the Darwin Harbour catchment, including all named and unnamed springs, creeks, rivers, lakes, lagoons, swamps or marshes.

A number of assumptions were made by the Proponent regarding the nature and behaviour of the aquifer including the direction of flow of the aquifer, the quality of water and the depth of the water. The potential impacts to the groundwater cannot be adequately assessed based on these assumptions or the information provided in the PER. There is no certainty that the beneficial uses assigned to downstream environments such as Berry Springs will not be compromised by the Project through contamination of groundwater at the site.

The hydrogeological report prepared by Zinga (2011) recommended that implementation of an exploratory drilling program, including establishment of a network of monitoring bores (piezometers) on site, would provide useful hydrogeological information for:

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- benchmarking groundwater depth and quality;
  - siting and designing effluent treatment and storage ponds;
  - managing irrigation operations; and
  - to help ensure local beneficial use of groundwater is not compromised.

The PER stated that baseline sampling would be undertaken early in 2012, but it is apparent that only one bore was sampled. This is not adequate to demonstrate the nature and behaviour of the groundwater. Hydrogeological properties including the direction of groundwater flow, the standing water level of groundwater beneath the site, aquifer hydraulic properties and an assessment of water quality beneath the site are not currently known and therefore the potential risk to groundwater cannot be adequately assessed.

A site-specific hydrogeological assessment with conceptual model is required to determine these properties and enable a robust assessment of the potential for impacts to groundwater and surrounding receptors. Once a conceptual model has been developed, the potential risk to groundwater can be established and a meaningful monitoring regime can be developed accordingly, similar to that presented in Appendix D of the PER but with amendments to reflect site conditions.

Monitoring bores established to determine hydrogeological properties in the investigation phase are recommended as part of an on-going monitoring program; however, the proposal to use off-site monitoring bores is not supported as there would be no early warning of contamination migrating off-site. Hence, a series of bores drilled for the site investigation and development of the conceptual model should be used for monitoring throughout the Project. The "Groundwater Sampling Guidelines, EPA Victoria, 2000" (EPA Victoria publication 669) provide an acceptable basis for the design of a groundwater sampling regime.

The Proponent must be able to demonstrate that its operations will not affect the beneficial uses of groundwater in the area and Berry Creek as a result of groundwater contamination. A comprehensive monitoring program must be designed to support this. Consent to the Project should be contingent on the above information being provided to the satisfaction of relevant Government agencies.

Again, the proponent must be aware of its obligations under the *Water Act* and WMPC Act with respect to contamination of groundwater.

## **5. Recommendation**

**Prior to commencement of works, the Proponent is to establish a network of bores within the site boundaries in order to conduct a site specific hydrogeological assessment. This will inform development by the proponent of a conceptual model to enable assessment of the potential impacts to groundwater and surrounding receptors.**

**During operation, the bores will then serve as monitoring bores. Groundwater monitoring (establishing bores and collecting data), including its frequency, should be in accordance with suitable guidelines such as those of the Victorian EPA, and to the satisfaction of NRETAS.**

**The Proponent must demonstrate that its operations will not affect the beneficial uses of Berry Creek. Any approval should be conditional upon the design and implementation of a comprehensive groundwater monitoring program to the satisfaction of NRETAS and DoR.**



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### 4.3 Land Resources

The proposed irrigation of treated effluent water onto fodder crops has the potential to impact on soil integrity and groundwater resources. The risks to groundwater are discussed above (Section 4.2.2.3). Risks to soils associated with this proposal include structure decline, sodification, salinisation, chemical contamination and erosion.

The Erosion and Sedimentation Control Plan (ESCP) that was provided in the PER is not considered to contain adequate detail. The Proponent is advised to consider the Best Practice Erosion and Sediment Control Guidelines (IECA, 2008) or similar as a guide for the type of information expected in an ESCP.

### 6. Recommendation

**Prior to commencement of works, an erosion and sediment control plan (ESCP) is to be developed and implemented to the satisfaction of NRETAS. The plan should detail control measures for construction and operational phases.**

#### 4.3.1 *Irrigation zones*

The irrigation zones should be appropriately sized and sited to avoid encroachment on any of the prescribed riparian buffer areas or seasonally waterlogged areas. The type of irrigator to be used should also be determined as this may dictate the orientation of the irrigation areas. An area of concern regarding the proposed irrigation zones is the potential to impact on the integrity of the soils through the irrigation activities. The plans provided identified three irrigation zones, but the Proponent advises that only one will be utilised at a time, with rotation occurring if the soils show signs of exhaustion. The water management issues associated with the irrigation practices are discussed in Section 4.2.2.1. It is important that appropriate soil monitoring is carried out to ensure that the integrity of the soils is maintained and that no permanent or long lasting degradation occurs. Effective management measures should be in place to provide a framework for maintaining soil integrity.

With regard to containing run-off, all irrigation zones are required to have full containment (including the southern irrigation zone). The catchment drain should extend all the way across the western end of the zone to prevent any runoff from flowing into the creek system (contours indicate that this is a possibility).

The Proponent outlines a number of possible crop choices, however, more consideration may be required to select a crop that will be suitable for the environment. Advice sought by NRETAS from pasture specialists from the Department of Resources (DoR) indicated that a number of the selected crops were not suitable for the Top End and the proposed purpose. The proponent had highlighted the potential for lucerne to be used as research by CSIRO showed that it was effective at reducing methane emissions from herds. While this may be beneficial for the overall greenhouse gas emissions attributable to the Project, lucerne is not considered an appropriate choice for this climate. Agnotes, readily available on the DoR website, state that lucerne is slow growing over the winter months, does not tolerate waterlogged soils and is unable to persist due to the rotting of crowns during hot moist summers. This suggests that the tropical climate of the region is not conducive to productive growth (Cameron, 2010). Another crop choice was Blue Pea, a legume usually planted to enhance soil nitrogen levels and to boost protein for stock. As the irrigated effluent is nitrogen rich, it would appear

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unnecessary to include Blue Pea in the pasture mix. Tropical grasses may be a more viable option for fodder and DoR should be consulted to determine the best option. Weeds Branch (NRETAS) should also be consulted on crop choice to ensure the weed potential of selected species is considered.

#### **7. Recommendation**

**Prior to commencement of works, a detailed irrigation management plan (IMP) is to be developed to the satisfaction of DoH, DoR and NRETAS that includes, but is not limited to:**

- **the fodder crop species to be used,**
- **the type of irrigator and the actual size, orientation and layout of the irrigation zones, including scaled plans; and**
- **the potential for redundancy in irrigation zones where the indicated crop performance levels are not being achieved with respect to nutrient uptake and soil integrity.**

**If the IMP indicates that management and risk mitigation measures differ from the PER such that the environmental significance of effluent disposal is changed, the IMP should be submitted to the Environment and Heritage Division of NRETAS under clause 14A of the Environmental Assessment Administrative Procedures for consideration of whether further assessment is warranted.**

#### **4.3.2 Weeds**

The Project will have the potential for introducing weeds to the site and surrounds through a number of vectors. Weeds may be introduced to the site from Western Australia, South Australia, Queensland and other parts of the Territory via livestock (hooves, hides and manure), the transport trucks, and construction and operation vehicles. Additionally, weed species may be transported off site if composted materials are inadequately treated or included in the harvested fodder crop. Additionally weeds can be transported downstream if stormwater retention is found to be inadequate.

An initial study found that there are a number of weeds that occur in the vicinity of the Project site and therefore may also be present on the site. A Weed Management Plan was developed as part of the PER and it is planned that weed colonisation within the site will be controlled through prevention, monitoring and early eradication. A number of weed management measures have been provided in this plan and it is recommended that this plan be incorporated into operating procedures and actively implemented to ensure that weeds are not introduced, are controlled and eradicated to protect surrounding properties and downstream environments.

It is preferable that the fodder species selected are not recognised weed species in the Top End and do not have the potential to colonise downstream environments.

The PER states that 50m native vegetation buffers will be established along the riparian areas. These areas are currently in a degraded state and will require active management to improve the structure and function of the vegetation and stream margins. The Proponent intends to fence the buffer zones to exclude cattle to assist the land to recover from grazing pressures. The Weed Management Plan states that the established riparian zones will discourage weed growth, however, it should be noted that weed control may be necessary in the early stages of establishment. The drainage features over the site are generally broad non-incised drainage floors that generally have no banks; therefore, it may be more beneficial to assign appropriate

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buffers based on the outer margins of the drainage features to offer better outcomes for the catchment.

#### **8. Recommendation**

**The Proponent is to undertake a targeted survey of weed species on the project site prior to works commencing, to inform the weed management plan. Ongoing weed monitoring and management is to be consistent with obligations under the *Weeds Management Act*.**

### **4.4 Community Health and Amenity Impacts**

The concept of amenity is defined in the Planning Scheme and is a standard consideration in the decision making process under the *Planning Act*, therefore impacts on the amenity of the community in the vicinity of the Project site should be taken into account by the responsible Minister when determining if the Project should proceed or not. The site selected by the Proponent has the potential to create amenity issues due to the presence of rural residences in the vicinity of the Project. If the Project is not carefully managed, there is a high risk that the amenity of the nearby residents and, potentially, stakeholders along Berry Creek could be impacted and this will need to be carefully considered in the EDP decision.

Impacts to community health and amenity were considered as part of this assessment process as they provide important indicators regarding the effectiveness of the management measures proposed to mitigate impacts of the Project. The potential impacts that this Project may have on the health and amenity of the community include odour, noise, dust, light, insects and vermin, increased traffic and rail safety.

The PER identifies the potential sources of health and amenity impacts associated with the Project and states that management measures will be undertaken; however, these measures were not clearly identified or discussed. The risk assessment outlines a number of acceptable measures, but the proponent has not included any specific management plans to deal with amenity issues. It is preferred that such plans would be developed as part of the EMP and implemented prior to construction and operation of the facility to ensure that management measures are in place in the event that unforeseen issues are experienced and complaints are received.

The Proponent intends to form an Environmental Management Committee to deal with issues that arise regarding community health and amenity complaints. This is considered to be a positive approach to local community engagement, and is strongly supported. In the first instance, the Proponent should be implementing all practicable measures to limit the Project's impact on community health and amenity. The Environmental Management Committee would facilitate communication between the community and the Proponent where, for whatever reason, impacts to the community are occurring. The makeup of the committee will require careful consideration to ensure that community members are represented and the community is able to be heard. Provisions will be required in the EMP for a complaints management process in the event that the Environmental Management Committee receives complaints.

It would also be beneficial to the Proponent to develop a communication tool (e.g. web site) that demonstrates the performance of the Project EMP to the community.

Specific issues associated with amenity and health are discussed further in the following sections of this Report.

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## 9. Recommendation

Management plans should be developed, to the satisfaction of NRETAS, for odour, noise and dust prior to commencement of works. These plans should be included as part of the Project Environmental Management Plan (EMP). A mechanism to facilitate the reporting of amenity and health issues by the community, such as the Environmental Management Committee, should be detailed in the EMP.

### 4.4.1 *Odour*

A number of the nearby residents raised concerns in submissions regarding the proposed safeguards to prevent odour impacts (Appendix 1). Given the perceived close proximity of the facility to the neighbouring properties, residents are seeking assurances that they will not be impacted by odour emissions. The PER was generally lacking in contingencies in the event that odour is found to be an issue. An Odour Management Plan should be developed that outlines the measures to be taken to contain odours and should also contain contingency plans for mitigation measures if impacts occur on sensitive receivers.

The Proponent has identified a number of sources of potential odour emissions from the Project. These include the rendering plant, biofilter, cattle holding yards, and water treatment and retention ponds. In addition to this, the composting area and hide curing facility may also emit odours that could cause health and nuisance issues. The meat processing plant itself is not expected to generate any odours as the building would be mechanically ventilated to prevent odour penetration into the facility. The Proponent has taken steps to address odour concerns in the PER and these should be incorporated into the Odour Management Plan.

The rendering plant will be fully enclosed and designed such that a negative air pressure will be created to prevent odours from escaping into the surrounds. Waste air from the rendering plant will be ducted to a biofilter, a structure comprised of an open bed of rice hull or woodchip and compost that filters odours from the air. The CSIRO reports odour removal efficiencies of 95 – 98% using this method (CSIRO, 2002). The PER states that extreme wet/dry conditions should not affect the biofilter operation, but does not provide justification to these claims. The PER states actions to be taken in the event that the biofilter materials becomes too dry, but does not provide information on the actions to be taken during extreme wet periods, typical of the Top End (refer Section 3.2), which may compromise the effectiveness of the biofilter materials.

The Proponent intends to design, construct and operate the effluent treatment ponds in accordance with best practice guidelines. To mitigate odour generation from anaerobic ponds, a stable crust will be established on the surface. The proponent has not detailed how long this takes or the susceptibility of this crust to extreme weather events (i.e. if it will break up in heavy rainfall or windy conditions). It is intended that desludging the anaerobic treatment ponds will occur every 8-10 years and this activity has the potential to emit odours. Another source of odour is from the storage ponds. If nutrient rich water is stored (treated effluent storage pond) there is potential for algal growth to generate odours. It is important that design parameters incorporate measures to reduce the opportunities for odours to be emitted.

The cattle holding yards will be part of the controlled drainage area and will be regularly cleaned out to reduce odour. Manure/waste will be collected from the yards and taken to the composting area along with paunch from the meat processing facility. There is potential for this area to produce odours given the numbers of cattle proposed to be held and the high amount of waste produced by these cattle.

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Operational procedures should include provision for adequate regular cleaning of the cattle holding yards (and pre slaughter pens) to reduce the occurrence of odours generated from this area.

The proposed composting operation would compost manure, paunch and sludge from the treatment ponds over approximately six weeks. The materials will be piled into windrows and turned as required. The composting and turning activities have the potential to emit odours and attract insects, vermin and scavengers that may impact on the health and amenity of the community. The Proponent does not intend to construct a roof over the composting area, which may have consequences on the composting operations during the Wet season when extreme rainfall periods may saturate the compost material, compromising the effectiveness of the process. No specific odour control measures for the composting operation were included in the PER. However, the proponent suggested that an alternative, approved facility such as an existing fertilizer manufacturer might be considered as an option for disposal of organic waste in the event that odours from composting affect sensitive receptors. NRETAS is not aware that an operating fertilizer manufacturer exists in the Darwin region, however, there may be an opportunity on site to establish a fertilizer manufacturing operation as an alternative to the composting method. As a contingency, the Proponent would need to determine a viable disposal alternative for the manure, paunch and sludge before commencing operations.

A key consideration for the management of the composting facility is that wind conditions are monitored before and during each turning activity to reduce impacts on the community. If it is found to be producing offensive odours that impact sensitive receptors, the proponent should consider alternative locations for the composting activities.

If the composting process is effective, the odour from the finished, composted material is not expected to be offensive. The product should not be used if offensive odours are still apparent (refer to Section 4.5.1 for further discussion of composting operations).

There is also the potential for odour generation within the irrigation infrastructure. High temperatures and biological oxygen demand can generate hydrogen sulphide (known as rotten egg gas) within pipes, which would be released upon re-initiation of the irrigator. Although this is likely to be a minor source, the Proponent should identify an acceptable method to prevent this occurring, for example, draining the irrigator immediately after use and/or flushing with cleaner water.

The proponent is reminded that they are obligated under the WMPC Act to not cause an environmental nuisance, which includes odour. A management plan for odour management should be developed in accordance with Recommendation 9 of this Report.

#### **4.4.2 Noise**

The ambient noise levels are likely to increase as a result of this project with an accumulation of noise level sources including audible train signals, high cattle densities, and heavy vehicle movements. The proposed audible train warning signals have the potential to be the most significant source of nuisance noise to nearby residents. Public submitters expressed the importance of noise levels on their lifestyle and community amenity and stated that while the train can be heard, currently it is generally short lived and non offensive. However, it is likely that the frequency of train movements will increase significantly along the Adelaide to Darwin rail line due to unrelated freight transport requirements. This would increase the occurrence and potentially the nuisance of audible signals to sensitive receptors.

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A noise management plan should be developed in accordance with Recommendation 9 of this Report, outlining the likely noise sources as a result of the Project and the mitigation measures and treatments to be implemented to reduce the impacts of noise on sensitive receptors.

The proponent is reminded that they are obligated under the WMPC Act to not cause an environmental nuisance, which includes noise.

#### **4.4.3 Light**

Concern was raised during consultation that the light sources at the facility will cause light pollution.

The facility is to have security lighting installed around the buildings. It is proposed that lights will be downward and inwards facing towards the facility and will be of a lighting spectrum that will minimise the attraction of flying insects.

Overhead lighting will also be installed at the intersection on the Stuart Highway and flashing lights will be installed at the relocated railway crossing.

The PER does not discuss the methods proposed to protect the community amenity from light spill, however, the proposed community committee could be responsible for keeping records of light spill complaints and providing advice for the continual improvement of light management.

#### **4.4.4 Dust**

Dust may arise during construction, cattle and vehicular movement, and crop harvesting activities. Dust suppression activities should be carried out where dust may cause issues. If dust proves to be an issue, the Proponent should take steps to characterise the dust, including particle size to ascertain the potential health impacts it may have on nearby residents and employees.

A dust monitoring program should be developed and implemented to monitor the levels of dust being generated by the Project and incorporating response mechanisms to treat dust issues for the protection of health of staff and nearby residents.

The proponent is reminded that they are obligated under the WMPC Act to not cause an environmental nuisance, which includes dust.

#### **4.4.5 Insects, vermin, pests and diseases**

The Proponent does not anticipate having issues with vermin given the strict regulations associated with food processing facilities. It is proposed that vermin baits will be set around the facility in accordance with the Australian Quarantine Inspection Service (AQIS) requirements.

The Proponent has committed to developing an Integrated Pest and Disease Management Program that will include:

- strategic use of crop rotations;
- use resistant varieties of fodder crops;
- pest monitoring and beneficial insects;
- cultural measures (e.g. to disrupt pest lifecycles); and
- selective pesticides (e.g. systemic seed dressings).

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The Proponent has provided limited information about this program. There is the potential for issues to arise in the composting area with insects, vermin and scavenging birds. As well as being a concern for the integrity of the composting piles and possibly the local community, bird numbers could become problematic for local air traffic, particularly with large, scavenging birds such as ibis and kites utilising overhead thermal air masses. The Proponent will need to determine the risks of this potential impact occurring and develop appropriate controls for these risks accordingly.

The mosquito management plan for the development, as part of the Integrated Pest and Disease Management Program, should include specific instructions for the management of various components of the development that pose a potential mosquito breeding risk, i.e. drains, dams, effluent ponds, water ponds, sediment traps, irrigation areas, compost areas, wash down areas, water holding pits and any other structures likely to pond water. Consideration should be given to lining the margins of all water storage facilities with concrete to prevent vegetation that could facilitate mosquito breeding.

Additionally, suitable insecticides should be listed in case mosquito breeding is located. Any mosquito breeding site should be rectified as soon as possible. Fly prevention and control measures should also be specified in the Integrated Pest and Disease Management Program as fly breeding could become a major problem in the manure composting area. Some flies can transmit disease-causing organisms including salmonella and intestinal worms. It is a requirement of the Public Health (General sanitation, mosquito prevention, rat exclusion and prevention) Regulations for businesses to prevent flies breeding (DoH, 2011).

#### **10. Recommendation**

**An Integrated Pest and Disease Management Program shall be developed that includes mosquito, fly, vermin and pest management measures. This program should be included in the EMPs for the project.**

#### **11. Recommendation**

**A pesticide management and storage protocol is to be prepared to the satisfaction of NT WorkSafe in accordance with the relevant legislation.**

#### **12. Recommendation**

**The design plans for ponds and dams, the irrigation area and the stormwater system for the development should be provided to the Department of Health – Medical Entomology Branch for approval prior to works commencing. This is to ensure that the proponent is not inadvertently creating conditions or habitats that will encourage the breeding of mosquitoes and other biting insects.**

#### ***4.4.6 Traffic and rail safety***

An area of concern raised through public consultation is the potential for the increased road traffic, particularly heavy vehicles, to impact on the community. The Stuart Highway at the site intersection is dual carriageway with the speed limit at 110

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km/h, changing to 130 km/h just south of the site. The traffic impact study found that approach speeds to the intersection were closer to 120 km/h. The increased number of trucks turning from and into the highway may cause traffic safety issues during the acceleration/ deceleration distance. It is recognised that the Proponent does not intend to utilise local roads such as Cornock or Livingstone roads and that all traffic to the site will be from the highway. The Proponent intends to place overhead lighting at the intersection to increase visibility. The traffic impact study made recommendations regarding upgrades required to the intersection (and the railway crossing) to ensure safety of road users. The Proponent intends to implement these recommendations, pending the granting of funds requested of government (Federal and Territory).

Any upgrades to the intersection of the Stuart Highway and the access road must be approved by the Road Network Division (DLP).

The railway crossing is expected to be upgraded to an active crossing that has audible and visual signals. This should improve safety at the intersection but may increase the incidence of nuisance noise for local residents.

Any upgrade to the site access alignment is to be approved by Road Network Division (DLP).

## **4.5 Other risks**

### **4.5.1 Solid waste management**

#### **4.5.1.1 Salt waste**

The Proponent proposes to salt hides in a separate, fully contained and bunded hide curing shed located adjacent to the rendering plant. The salt laden washdown water would be taken to evaporating pans for salt recovery. The volume of waste salt water produced per day is expected to be approximately 1000L, and does not appear to have been taken into consideration in the facility water balance.

Two evaporation pans are proposed, with an additional two pans outlined on the plans for use if necessary. Each pan will have a concrete base and will be covered with a roof structure to prevent exposure to rainfall. It is unclear if the sides of this structure will be enclosed to further prevent rain from entering the pans. This will need to be clarified in the relevant management plan. Dried salt will be collected and removed from the pan by an authorised contractor.

The Proponent aims to recycle or reuse the salt, but indicates that if this option is not available it would be disposed of at an approved waste disposal facility. Details of what options are available for the reuse or recycling of the salt have not been provided. A contingency should be developed in the event that the salt will have to be disposed of. An approved waste disposal facility will need to be identified to facilitate this disposal.

#### **4.5.1.2 Compost**

The composting operation remains a significant concern. Issues associated with odour formation, pests and scavenging birds have been considered previously in this Report (Sections 4.4.1 and 4.4.5 respectively) and will need to be resolved by the Proponent. Some of these issues could be resolved by covering the composting area. To date, the proponent has advised that the composting area would not be covered, but that insect control measures would be implemented if heavy fly breeding proves to be an issue. The PER compost management plan states that monitoring of



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the windrows will be conducted for heat and moisture content and this will inform the turning frequency. It states that should the pile become too dry, water will be added. There was no mention of a requirement for management if the piles become too wet, as may be the case during monsoonal activity in the Wet Season. A saturated pile will not compost effectively and is likely to lead to odour generation and other problems.

The compost area should be covered to protect the compost material from climatic extremes such as high rainfall. It may also have the added advantage of reducing the volumes of contaminated water reporting to the sedimentation system and, depending on design, protect the pile from scavenging birds and other animals.

### **13. Recommendation**

**The proposed composting area shall be covered, to the satisfaction of the Department of Health, to prevent the composting material being exposed to rainfall. The floor surface of the composting area is to be a concrete hardstand to prevent leaching into the soil substrate.**

#### ***4.5.2 Contingency plans for disease outbreak***

A desk top analysis of the requirements for abattoir developments in other jurisdictions indicated the need for developing a contingency plan for mass mortality events and the necessary considerations (Environment and Heritage NSW, 2008). Given the lack of information provided on this matter, it was deemed necessary to ensure the Proponent develops a plan to manage a mass mortality or disease outbreak event. The Proponent considers the rendering plant to be an option for carcass disposal, depending on the nature of the event. It is recommended that the contingency plans be fully developed to the satisfaction of relevant NT Government agencies and are incorporated into the management plans for the facility.

### **14. Recommendation**

**The Proponent shall develop a disposal plan for mass mortality events. The appropriate agencies (DoH, DoR – Primary industries) are to be consulted to inform best practice methods for carcass disposal.**

#### ***4.5.3 Heritage protection***

The Project is not expected to impact on nearby heritage sites, however, any sites of heritage significance should be documented and incorporated into the management plans to ensure the ongoing protection of these sites from impacts of the Project.

#### ***4.5.4 Greenhouse gas emissions***

The Project is expected to produce approximately 26 600 tonnes per year of greenhouse gases which is reportedly within the Meat Industry's Key Performance Indicators for beef plants. The Proponent aims to reduce its carbon emissions by 60% over a 10 year period by improving herd and pasture efficiency.

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The PER indicates that growing fodder crops will be regarded as a carbon sink. Carbon sequestration is a process that results in the isolation of carbon dioxide from the atmosphere for a period that is significant in terms of influencing the global warming effect. The growing of fodder crops is therefore not considered a carbon sink as they remain in the landscape for only a short period before the carbon is liberated to the atmosphere. NRETAS recognises the research conducted by CSIRO regarding crop types and potential reductions in greenhouse gas emissions from livestock. The Proponent should consider these research outcomes in crop selection, subject to other crop selection considerations (discussed in Section 4.3.1 of this Report). Additionally, the improvement of soil in the irrigation zones through good management practices could lead to higher soil carbon content, which would have net benefits in sequestering carbon.

In accordance with the Territory 2030 target, reducing greenhouse gas emissions, the Proponent has committed to minimise greenhouse gas emissions to as low as reasonably practicable. In addition to this, the Proponent plans to adopt the following measures in accordance with the Australian Government's guidelines and National Carbon Offset Standard:

- Implement an ongoing program to monitor levels of emissions;
- Report emissions in accordance with government requirements;
- Periodically investigate the opportunity to further reduce emissions; and
- Identify and consider national and state eligible offset schemes for residual emissions.

It is recommended that the proponent investigate other practical emission reduction methods that can be implemented to further reduce emissions.

#### **4.5.5 Operational failure**

The facility will be powered by gas powered generators. The PER indicates that in the event of a failure in the management of the site or infrastructure (e.g. gas supply interruption) continual processing would cease and the exposed product would be "runoff" and processed to a safe state. Backup power will be sourced from mains electricity to maintain important activities. These activities include:

- Beef already on the processing chain;
- Meat cuts;
- Offal and by products;
- Maintain freezer temperature; and
- Environmental functions.

These areas will be targeted and allocated power until full power from the gas generators is restored.

Concerns raised by Power and Water Corporation highlight the unreliability of the electricity supply in the Livingstone locality. There is a risk that power outages could occur and affect Project operations and the Livingstone locality in general.

#### **4.6 Environmental Management Plan**

A number of management plans have been proposed through the course of this assessment for the Meat Processing Facility at Livingstone. All management plans

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and procedures proposed to be developed for the Project must be approved by, or developed to the satisfaction of, relevant government agencies (as discussed through the body of this Report). These approved plans and procedures will together form the Environmental Management Plan (EMP) for the Project as one of the primary tools by which the Proponent will implement management and monitoring commitments made in the PER and the recommendations detailed in this Report.

#### **15. Recommendation**

**The Project must be operated in accordance with a current EMP. The EMP and monitoring programs may be subject to periodic review, in accordance with clause 15(1) of the Environmental Assessment Administrative Procedures.**

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## 5 Environmental Offsets

As defined by the draft Northern Territory Environmental Offsets Policy, environmental offsets are actions taken by developers to ensure that their developments cause no net loss of environmental quality. Offsets are proposed where impacts are reasonably unavoidable or cannot be mitigated.

One of the core obligations of the NT draft Environmental Offsets policy is that the developer is to report reasons for believing that the offset benefits exceed the residual detriment at the development site.

Impacts of this project that appear unavoidable, as stated in the PER, are:

- Clearing of vegetation to facilitate construction of facilities;
- Temporary odour impacts;
- Temporary and localised reductions in downstream water quality; and
- Net increase in waste (compared to a non development scenario)

However, through effective management practices and appropriate facility and infrastructure design, a number of the above mentioned impacts may be avoided, e.g. odour impacts and reductions in water quality. The extent of residual environmental impact that may require offsetting cannot be determined at this stage.

The Proponent has committed to consult with land owners, Government and the general public to determine the most appropriate offsets for the proposed abattoir project.

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## 6 Conclusion

Following review of the PER, significant uncertainties associated with the Project remain. The level of information provided in the PER has not been of a standard to enable comprehensive assessment of the risks. Information gaps also remain where management plans have not yet been submitted, or where management plans do not yet contain the level of detail to describe management and mitigation actions.

In order for the Project to proceed in an environmentally acceptable manner, the Proponent needs to prepare and submit the detailed management plans identified in recommendations in this Assessment Report. Through preparing the identified management plans, which should include detail of adequate operational protocols, it is the opinion of NRETAS that the identified potential environmental impacts of this project can be mitigated.

A consequence of the lack of content in the management plans presented in the PER is that the final management plans may require additional assessment under the *Environmental Assessment Act*.

Key information that must be provided before works commence include:

- An Irrigation Management Plan is to be developed that includes, but is not limited to, identification of appropriate fodder crop choice, irrigator type, irrigation zone sizing and layout, and rotational plans that utilise only one zone at a time;
- A network of monitoring bores should be established on site in accordance with recommendations made in the hydrogeology report (NOI) to facilitate groundwater analysis to develop a conceptual model that shows direction of groundwater flow, the standing level of groundwater beneath the site, aquifer hydraulic properties and an assessment of water quality beneath the site;
- Storage dam construction and design plans to be developed and lining material determined. If clay, the retention capacity is to be appropriate for preventing/ reducing leachate entering the soil substrate;
- Identification of specific actions to be taken if wastewater treatment/stormwater diversion dams overflow (imminent or actual) to prevent offsite impacts;
- Management Plans are to be developed outlining the proposed measures to be taken in the event that the community is affected by amenity or health issues from odour, noise and dust;
- A contingency plan for mass disposal of animal carcasses in the event of disease or disaster; and
- Appropriate treatment of compost, to the satisfaction of the Department of Health and the Department of Natural Resources, Environment, the Arts and Sport (NRETAS).

Due to information gaps remaining in the above management plans in this assessment, the Proponent, government and community will be reliant on post-assessment data collection to establish baseline information, determine significance of, and monitor the appropriate responses to, key impacts. These data and monitoring requirements are captured in the commitments made by the Proponent and recommendations made in this Report. The ongoing environmental monitoring and adaptive management required from the Proponent must demonstrate that any

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environmental impacts from the Project are no greater than those predicted in this assessment.

It is anticipated that the recommendations made in this Report, including recommendations requiring the development of detailed management and monitoring plans, are considered for inclusion as conditions/ conditions precedent on the Exceptional Development Permit should the Minister for Lands and Planning choose to approve the Project under the *Planning Act*.

Consistent with provisions of clause 15(1) of the Environmental Assessment Administrative Procedures, the Project may be subject to review throughout its operational life. The review will examine environmental aspects particularly relating to the effectiveness of the safeguards and standards adopted or applied for the protection of the environment, and for the accuracy of the forecasts of the environmental effects of the Project, as stated in the PER.

Based upon review of the PER and consultation with stakeholders, the EH Division concludes that environmental impacts of the Project can be managed at an acceptable level. This is provided that the above identified information gaps are adequately addressed and the environmental safeguards and recommendations detailed in the PER, this Assessment Report and in the final management plans, are implemented and managed to the high standard committed to by the Proponent, and are subject to regular monitoring and review.

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## Appendix 1 – Submissions

A summarised list of comments raised from public review of the PER corresponding with the individuals / organisations responsible for raising those issues.

Issues - Impacts	Raised By
<p><b>General</b></p> <p>The PER fails to address a number of information requirements of the guidelines and does not provide anything more substantial than information provided in the NOI.</p> <p>Some of the proposed management measures (Noise, Odour management plan and <i>Waste management and pollution control act</i>) are not management plans, just documents that will describe the management measures.</p> <p>The guidelines required a list of persons involved in preparing the PER, with academic qualifications and level of experience. These parameters were not included in the PER.</p> <p><b>Site selection:</b></p> <p>The proposed project site is surrounded by rural residential properties and threatens the livelihoods and amenity of the area.</p> <p>Nurse/ paramedic/ childcare centre are not deemed attractive benefits to the community. Residents have coped without these facilities previously.</p> <p>Anecdotal evidence that the site is seasonally waterlogged and hence inappropriate for the proposed use.</p> <p>People should be able to choose if they want to live near a facility like an abattoir.</p>	<p>Jen Crowley</p> <p>ECNT</p> <p>TS Lee</p> <p>Sharon McAlear</p> <p>Sigrid Walter</p> <p>Alex Walter</p>
<b>Biodiversity</b>	
<p>Anecdotal evidence of Brolgas and Jabiru present in the floodplain at Wheewall road. This could be jeopardised if contaminants/ pollution is released from the facility.</p>	<p>Jen Crowley</p>
<b>Community health and amenity</b>	
<p><b>Noise:</b></p> <p>Noise from the construction and operation of the facility will be significantly more than is currently experienced. The PER did not provide a Noise Management Plan, although required by the guidelines.</p> <p>The PER states that a Noise Management Plan will be developed if a noise complaint is received.</p>	<p>Jen Crowley</p> <p>ECNT</p>
<p><b>Odour:</b></p> <p>Odours will be carried to neighbouring properties by seasonal winds. The PER has not provided an odour management plan, although required by the guidelines.</p> <p>The potential odour impacts associated with this development appear to be downplayed and management measures are general.</p>	<p>Jen Crowley</p> <p>ECNT</p>



Issues - Impacts	Raised By
<b>Dust:</b> Anecdotal evidence that during the dry season, winds pick up dust and particulates and transport it to neighbouring properties.	Jen Crowley
<b>Light:</b> Security lighting will cause light spill onto neighbouring properties, compromising the amenity	Jen Crowley
<b>Traffic:</b> Increases in traffic on the Stuart Highway may cause increased traffic accidents	Jen Crowley
<b>Insects and vermin:</b> The mosquito management section of the EMP is lacking in specific implementation measures and should describe specific inspection regimes and details on the types of insecticides to be used. The PER does not address other pest species such as flies or vermin. The management measures associated with pests and vermin focus on mosquito control and do not provide certainty. Other insects that should be addressed include house flies, buffalo flies and marsh flies as they are prevalent in the area. The name or use of chemicals in the eradication of disease bearing insects should have been included in the PER	ECNT TS Lee
<b>Water management</b>	
The inherent risks to water resources without management actions are extreme and intolerable according to Table 5-4. No details of the management measures to reduce the risk to water resources are provided in the PER. Many people in the area rely on groundwater for all domestic uses including drinking water It is unclear what rainfall events the dam capacity design has been based on. The PER refers to 1 in 20 year rainfall events and 1 in 100 year rainfall events. Concern that the EMP has replaced references to the word effluent with the word process water. Is potentially misleading with respect to the importance of managing the effluent generated.	Jen Crowley ECNT TS Lee Sharon McAlear
<b>Waste/ Pollution issues</b>	
<b>Effluent management:</b> It is assumed that disinfectants and cleaning products will be used in the facility, as waste is treated onsite, what is the process of disposing of cleaning water that contains these chemicals? Operational monitoring in Section 14.2 of the EMP does not state the purpose of the monitoring and does not include any contingencies in the event that monitoring indicates exceedance of identified limits. The water quality monitoring plan describes proposed sampling and monitoring, but fails to state what contingencies will be implemented in the event that monitoring shows that impact is occurring.	Jen Crowley ECNT TS Lee

Issues - Impacts	Raised By
The plans for the safe supply and storage of hazardous chemicals should have been included in the PER.	
<b>Land Management</b>	
<p><b>Weeds:</b></p> <p>Weeds seeds carried by both the vehicles and cattle may be introduced into the environment and transported downstream.</p> <p>The name or use of chemicals for the treatment and eradication of invasive weeds should have been provided in the PER.</p> <p><b>Irrigation:</b></p> <p>Information on how to irrigate (and when) in order to minimise environmental impact has been deferred to an irrigation management plan, which has not been provided, although requested in the guidelines.</p> <p>The EMP fails to demonstrate what irrigation application controls will be used to prevent spray drift (i.e. the particular safeguards and public health controls).</p>	<p>Jen Crowley ECNT TS Lee</p>
<b>Downstream impacts</b>	
<p>Berry Springs Nature Reserve is already under threat from pollution and algae problems.</p> <p>Attractive Tourism places like Berry springs should be protected and development sited in other areas.</p>	<p>Jen Crowley Sigrid Walter</p>
<b>Sustainability issues</b>	
<p>Concern over the volume of cattle being transported to and held on the site and the amount of infrastructure.</p> <p>Questions the sustainability of answering to the needs of the immediate export market for cheap hamburger meat concerned that the business as usual attitude of AACo will result in further degradation to land and environment.</p>	<p>Greg Chapman</p>

A summarised list of comments raised from review of the PER by key NT Government Stakeholders corresponding with the individuals / organisations responsible for raising those issues.

<b>Comments -- NT Government</b>
<b>Department of Natural Resources, Environment, the Arts and Sport</b>
<p>An issue that should be addressed is the speed of oxygen depletion and the onset of anaerobic processes of high BOD strength wastewater held in an enclosed irrigation system at high temperatures and the associated generation of high odour compounds in the contained wastewater. These compounds can be released when the irrigator is next initiated.</p> <p>Concerns over the proposed irrigation areas. The PER reports that run off will be collected over the three irrigation areas to store the additional 600ML needed for irrigating. The</p>

## Comments -- NT Government

area reported for all three areas is 107 ha, this suggests that each area is not the 84 ha reportedly needed for nutrient uptake. It was stated by the proponent that only one area would be utilized at a time to allow for rotation if one zone becomes exhausted.

Contained compost: The PER provides little information on the permeability of the composting area and how leachate will be captured and managed.

Storage dams overflow contingencies: the PER provides little information on what specific actions will be taken in the event of an overflow (imminent or actual) from storage dams.

Irrigation zones: An Irrigation Management Plan should be developed and implemented. The documentation provides inadequate information to determine the adequacy and appropriateness of the stormwater runoff dams, particularly in terms of a detailed analysis of surface water flows, the dams' location & how runoff water will be directed into them.

## Water Monitoring

(see Appendix D: Water Quality Monitoring Program):

Surface Water Monitoring.

Selection of SW6 (Control Site).

- Little information provided on how this stream was compared with that on-site to determine that it is an "equivalent type stream" (eg surrounding land use, stream flow etc.).
- The location of SW6 adjacent to the railway line & corridor may result in localised impact on the water quality at that site thereby impacting on its suitability as a control site.

## Groundwater Monitoring.

There is no contingency outlined for the event that landowners subsequently refuse access to bores (eg. a change in land ownership may result in the new owner refusing access).

Using bores located off-site means that if an issue is detected the problem has already moved outside the boundary of the facility which may have implications for the operators.

Support for Hydrogeology Report by Zinga & Associates Pty Ltd which recommends a network of monitoring bores be implemented on-site.

## General Environmental Duty

Support for commitments made to abide by the *Waste Management & Pollution Control Act*, specifically: the duty to report a potential or actual pollution incident.

## Waste Discharge Licence (WDL)

Based on the information provided the facility will not require a Waste Discharge Licence under the *Water Act* as all wastewater is to be discharged to land via irrigation of crops and contained on-site.

Comments (p.19 of PER) that it may be decided that a WDL may be required should the waste water treatment process prove not to be effective are not supported. In the event that the effectiveness of the waste water treatment system is reduced, other options would need to be explored before a WDL is considered and the proponent should not rely on, or expect, that one would be granted. The proponent is reminded of their obligations under the *Water Act* for no waste to come into contact with water.

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## Comments -- NT Government

### Environmental Nuisance (Noise, Odour, Dust).

The proposed project has the potential to create environmental nuisance and the proponent is reminded of their obligations under the *Waste Management & Pollution Control Act* not to cause an environmental nuisance.

### Land resources:

The broad drainage floors which feature over the site serve an important function in transmitting water both as shallow surface flows and as receiving environments for subsurface lateral flows from upland areas. A more detailed and accurate delineation of these areas would provide a more appropriate basis on which to refine the layout of the proposal as well as assist in the design of environmental monitoring programs and buffers. The north-east and north-west corners of the northern irrigation zone and the western and southern corners of the central irrigation zone appear to extend into these areas.

The provision for buffers 50m from the channel bank is not a practical option for many of the drainage features over the site as they are broad, non-incised drainage floors and generally have no banks. Assigning appropriate buffers based on the outer margins of these features may offer more beneficial outcomes for the catchment.

### Erosion and sediment control:

The Erosion and Sediment Control Plan (ESCP) is the same document provided in the NOI. As previously stated a condition should require an ESCP to be developed (based on the plan provided), approved and subsequently implemented to the satisfaction of the Consent Authority.

Information regarding erosion and sediment control and ESCP content is available on the NRETAS website:  
<http://www.nretas.nt.gov.au/nationalresourcemanagement/soil/management>

### Water resources:

There are significant issues with water quality maintenance, and it is recommended that further work is undertaken before a permit is granted.

The declared beneficial uses for both surface and groundwaters in the development area are as follows:

"The protection of environment, cultural (aesthetic, recreational and cultural), agriculture and rural stock and domestic to be the beneficial uses of water that apply to all natural waterways in the Darwin Harbour catchment, including all named and unnamed springs, creeks, rivers, lakes, lagoons, swamps or marshes."

The proposed site, whilst within the Darwin Rural Water Control District, is not located inside the boundary of a water planning area. There are currently no registered bores on the proposed site, and the proponent has stated that water will be sourced from reticulated mains, therefore, there are no issues to report in relation to the water supply.

### Flooding

There are no significant issues identified or predicted in terms of flooding or drainage provided that downstream water flow and quality are maintained. There are three second-order streams, associated with the Berry Creek system, within the proposed site.

The location of the proposed beef processing facility is unlikely to be affected by riverine

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flooding, and is outside Elizabeth/Blackmore Rivers (Weddell Flood Study) area;

The facility is not subject to storm surge; and

It is proposed that stormwater from the plant & surrounds will be captured in a dam for use as irrigation on three pasture paddocks which form an integral part of the waste management system (see plan on page 27 of volume 1 of PER).

### Groundwater

There are significant issues identified with the PER on this topic. The impact to off-site users has not been satisfactorily addressed and the proposed monitoring regime appears unsuitable. It is recommended that these issues are addressed before approval to develop is granted. Detailed points below set out the main issues:

- Appendix D of the PER makes assumptions regarding the hydrogeological properties at the site but does not provide evidence of how such properties have been determined. If the work recommended in the hydrogeological report (Zinga, 2011) has not been undertaken it is strongly recommended that the recommendations contained within the "Hydrogeological Assessment (Groundwater Quality) Guidelines, EPA Victoria, 2006" (EPA Victoria publication 668) be followed. A site specific hydrogeological assessment with conceptual model is required in order to be able to assess the potential impact to groundwater and surrounding receptors.
- Hydrogeological properties including the direction of groundwater flow, the standing water level of groundwater beneath the site, aquifer hydraulic properties and an assessment of water quality beneath the site are required to assess potential project impacts. These elements are not currently known therefore the potential risk to groundwater cannot be assessed.
- Once a conceptual model has been developed, the potential risk to groundwater can be established and a monitoring regime can be developed accordingly. Such a monitoring plan would be similar to that presented in Appendix D, with amendments to reflect site conditions.

Monitoring bores established to determine hydrogeological properties in the investigation phase are recommended as part of an on-going monitoring program.

The proposal in Appendix D to use off-site monitoring bores is not satisfactory as there would be no early warning of contamination migrating off-site. Hence, a series of bores drilled for in the development of the conceptual model would continue to be useful throughout operation. The "Groundwater Sampling Guidelines, EPA Victoria, 2000" (EPA Victoria publication 669) provide an excellent basis for the design of a groundwater sampling regime.

The list of analytes should be carefully considered to reflect all operations at the site. The current proposed list misses some analytes that are listed as being proposed for use. It may not be necessary to test for all analytes at all bores.

Sampling may be required at a higher frequency in the event of a pollution event/spill.

Monitoring bores should be sited down hydraulic gradient of site infrastructure such as waste settling ponds and waste water irrigation areas.

It should be further noted that the hydrogeological report (Zinga, 2011) recommends a network of monitoring bores for the provision of hydrogeological data: *"Implementation of an exploratory drilling program, including establishment of a network of monitoring bores (piezometers) on site, will provide useful hydrogeological information eg. benchmarking groundwater depth and quality siting [sic] and designing*

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*effluent treatment and storage ponds managing irrigation operations to help ensure local beneficial use of groundwater is not compromised."*

Assessment of the PER indicated that the work recommended by the consultant has not been undertaken, and there is no evidence of plans to undertake the recommended work in the future.

### Biodiversity

It is unclear whether there are additional measures to prevent run-off from irrigation areas entering the Berry Creek headwaters. The use of native vegetation buffers appears to be the primary management strategy for filtering run-off prior to entering the streams. It is likely that additional measures will be required to divert run-off away from the streams to limit impacts on the aquatic ecosystem.

The EMP associated with the Draft EIS does not contain sufficient monitoring of the riparian vegetation and aquatic ecosystem. It's stated that native vegetation buffers will be used to mitigate impacts (see above). These areas are currently in a degraded state and require management (e.g. fencing, weed control) to improve the structure and function of the vegetation. It will be necessary to implement monitoring to demonstrate the condition of these environments improves over time and is not impacted by run-off from the irrigation areas.

### Environmental Offsets

There is confusion between management of risks and the proposed environmental offsets. The proponent states that native vegetation buffers will be used to mitigate the risk of runoff into Berry Creek headwaters. However, the restoration of riparian vegetation associated with the creek is claimed as a potential environmental offset. Offsets are actions taken by developers to ensure that their developments cause no net loss of environmental quality. Offsets are designed to compensate for significant residual damage that cannot be avoided, reduced or mitigated at reasonable cost at the development site. It's recommended that the proponent contact NT Offsets Working Group for advice.

## Department of Justice -- NT WorkSafe

Section 5.4.4 Discusses operational failure mode whereby power is initially supplied by gas and in the event of failure, power main. Electrical supply in Livingston has not been demonstrated as reliable. It is considered that power failure of both systems is a likely risk which needs to be addressed. Failure may lead to product spoilage and potential leakage of contaminants from the site.

There is no discussion of any safety or hazardous substances within the report. Pesticides used in crop generation needs to be identified and commitments to appropriate legislation made.

The following legislation will apply the AACo's operations in the NT:

- *Work Health and Safety (National Uniform Legislation) Act 2011* and its regulations;
- *Transport of Dangerous Goods by Road and Rail (National Uniform Legislation) Act* and its regulations; and
- *Electricity Reform Act* and its regulations.

Details available at [www.worksafe.nt.gov.au](http://www.worksafe.nt.gov.au)

## Power and Water Corporation

**Initial comment** - Provided advice to AACo in regard to what local infrastructure upgrades

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are necessary to deliver the volume requested. In terms of water conservation, abattoirs in Victoria may be operating under more stringent and water conservative technologies. May be worth some follow up.

**Department of Health and Families****Mosquito breeding**

Comments provided on the NOI and Guidelines still apply to the design phase and management of the proposed facility.

**Table 5.4 Risk Assessment of proposed facility – Health and amenity**

Management measures to prevent mosquito breeding also include designing wastewater treatment ponds, the effluent storage dam, storage dams and ponds, and stormwater drains to minimise the potential for mosquito breeding. Designing effluent and other water ponding structures and drains, with a view of minimising mosquito breeding and associated maintenance requirements, should be given a high priority. In the long term, appropriate design should minimise maintenance requirements and potential need for insecticide control.

Appropriate management of irrigation area would also be required to prevent mosquito breeding. Ground waterlogging could be an issue with effluent irrigation, alternating spray areas on a week on/ week off basis could be a management option to prevent waterlogging and effluent ponding. Relevant guidelines still apply.

There should be mention of flies in this section. Fly breeding could be a major problem in the manure composting area. Flies can transmit disease causing organisms including salmonella as well as intestinal worms. It is also a requirement of the Public Health (general sanitation, mosquito prevention, rat exclusion and prevention) Regulations for businesses to prevent fly breeding.

The mosquito management plan for the development, as part of the Integrated Pest and Disease Management Program, should include specific instructions for the management of various components of the development that poses a potential mosquito breeding risk, i.e. drains, dams, effluent ponds, water ponds, sediment traps, irrigation areas, compost areas, wash down areas, water holding pits and any other structure likely to pond water. Also suitable insecticides should also be listed in case mosquito breeding is located. Any mosquito breeding site should be rectified as soon as possible.

Fly prevention and control measures should also be specified in the Integrated Pest and Disease Management Program.

Medical Entomology officers have field experience in inspecting abattoirs and sewage ponds throughout the NT for mosquito breeding, therefore have on-ground knowledge of mosquito issues that have previously occurred. Therefore, it is requested that Medical entomology review and provide comment on the design plans of all ponds and dams, the irrigation area and the stormwater systems for the development.

**Department of Business and Employment**

No major issues or concerns. The PER could have been further strengthened by the inclusion of additional information on the economic and social benefits and values of the project, particularly its value adding and export potential.

**Department of Lands and Planning****Route for Transports - including Public Roads**

The PER states that the Stuart Highway intersection has capacity for 7-8 36.5 metre triple

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road trains (carrying up to 1,000 head per day), 22 other heavy vehicles and 30 cars during the expected heavy vehicle peak hour. There is a potential for up to 299 vehicle movements per day to and from the site (using the potential worst case scenario figure of 255 cars) during a shift change. The capacity of this intersection, in regards to this type of traffic volume entering and leaving the site, needs to be considered (especially in the event of a traffic hold up – eg a railway crossing closure due to a train passing or a road accident).

Most triple road trains are significantly longer than indicated in the earlier NOI (and this PER). Under current NT legislation triples can be up to 53.5 metres (ie much larger than the stated 36.5m length).

### **Intersection Treatments**

The PER states that the intersection has the capacity for the expected traffic (p.14). The TIS states that:

- The existing road intersection has been assessed as having spare capacity to safely accommodate the expected increased traffic; and
- All of the required sight distances at the existing road intersection are met or exceeded (p.41).

It is also stated in the PER that Byrne Design is currently 'preparing drawings and a cost estimate for the upgrades to the entrance intersection as required by NT Roads' with this exercise expected to be completed by early 2012 (p.44). The PER also states that overhead lighting of the intersection with the Stuart Highway will be provided (p.44).

- Pending the results of the drawings by Byrne Design it should be noted that any required work in relation to the intersection with the Stuart Highway shall be to the standards and approval of Road Network Division.

### **Peak Periods for Traffic**

The Traffic Impact Study identified the peak vehicle period as between 2pm and 5pm (p.22) ie when the shift change occurs. This peak will also coincide with other workers and school children returning home to the rural areas.

The Traffic Impact Study (TIS) states that there will be two different vehicular peak hours:

- Light vehicle peak hour: 2pm to 3pm weekdays; and
- Heavy vehicle peak hour: 4pm to 5pm weekdays (assuming half the two-hour volumes) (p.13 of TIS).

### **Hours of Operation**

The PER states that there will be "two daily shifts" (p.10) and the plant "will employ about 270 people in two shifts" (p.11). The hours of these two shifts are not known (but it can be assumed that the end of one shift and the start of another is between 2 and 3pm - hence the light vehicle peak).

### **Staffing and Staff Transport**

There is a potential (ie worst case scenario) for up to 299 vehicle movements per day to and from the site (including a potential worst case scenario figure of 255 workers' vehicles) with 'spikes' during shift change periods.

### **Other issues missing in the PER concerning transport on public roads include:**

Load restraint issues (Transport requires all trucks to be loaded and loads constrained in such a manner as to prevent the dropping or tracking of materials onto streets. This includes ensuring that all wheels, tracks and body surfaces are free of mud and other



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contaminants before entering onto the sealed road network (ie the Stuart Highway));  
Noise mitigation measures for haulage vehicles along the route (including trafficking into and out of the AACo facility);  
Dust control from road train vehicles on public roads; and  
Details of safety measures to be used to reduce transport risks (including safety awareness measures and driver fatigue management).

*Note: Further to the above comments, the Transport Division of DLP is increasingly concerned at the cumulative effect that this and other proposals (ie a combination of proposals) will have on the NTG road network in terms of the need for increased road maintenance and upgrading and safety issues. Notably much of the road traffic from these proposals consists of heavy vehicles travelling to the Port of Darwin. The impact of heavy vehicles on the road network is likely to be significant in terms of environmental, social and economic impacts.*

**Department of Resources**

The Department of Resources (DoR) supports the development of a new meat processing plant in the north by the Australian Agricultural Company (AACo) Ltd.

DoR has played a facilitator role for this development, assisting AACo to access NT Government services and to advise processes for approvals .

The Department has also provided technical information regarding selection of suitable pastures to support review of the PER.

The development of a new plant will provide Northern Territory pastoralists with an alternate local market for their out of specification cattle (steers and heifers over 350kgs) and cull for age cows and bulls.

The provision of a local slaughter facility may over time result in changes to the composition of the herd in the north, with improved breeding and age structure efficiencies.

The suspension of the live cattle export trade for 1 month mid-2011 and recent media attention regarding meat processing in Indonesia highlights the difficulties that the NT pastoral industry faces and the need for identification of alternate viable markets.

The plant could also provide the pastoral industry with a risk mitigation strategy if export markets are not accessible.

Australian Quarantine Inspection Service (AQIS) standards will need to be met for the plant to be licensed by DoR as an export facility. DoR is also the licensing body if the plant were to be registered for domestic supply, with AQIS standards being sufficient to attain that licence.

AQIS will monitor animal welfare at the plant. DoR will be responsible for the establishment of and compliance with animal welfare standards for cattle on property and during transport to the plant.

## Appendix 2 – Commitments Register

It should be noted that the proponent did not provide a commitments register in full. The following commitments have been extracted from the PER and appendices.

Subject	Description	Commitment/Safeguard	Section in PER
<b>Economic Contribution</b>	Employment Opportunities	<p>AACo is committed to employing Indigenous staff and has a target of 10% Indigenous staff employment.</p> <p>AACo has a firm commitment to training staff and aims to employ long term residents as the facility will provide a stable employment option.</p>	<p>Employment and Business Opportunities</p> <p>Section 3.5</p>
	Source of cattle	AACo will supply 35% of cattle to the facility at full operating capacity. The rest coming from other pastoral/ cattle stations in the NT	<p>Financial Viability of the Project</p> <p>Section 3.6</p>
<b>Protection of Land resources</b>	Weeds	<p>AACo commits to develop a weed management plan that includes:</p> <ul style="list-style-type: none"> <li>• Reducing current weed infestations;</li> <li>• Develop networks with appropriate weed control/ management groups and organisations;</li> <li>• Prevent weed seed spread;</li> <li>• Encouraging sub catchment approach to weed control/ management;</li> <li>• Manage composting to prevent weed seed spread.</li> </ul> <p>Pest populations will be managed to minimise localised damage to the environment and protect against greater threats from the spread of exotic diseases or weeds.</p>	<p>EMP- Appendix A, Environmental Structure, 1.2 Land Management Action</p>
	reporting	Annual reporting of land management commitments, including all monitoring results to be included in the Operational Management Plan.	<p>Appendix E, Section 2.5 - Weed Management Specific</p>

Subject	Description	Commitment/Safeguard	Section in PER
			Measures
	Weed control measures	<p>AACo will incorporate weed control measures to prevent weed spread from and within the facility, associated infrastructure and across the whole property. This includes, the infrastructure zone (clearing, construction, access, livestock and vehicle wash down and waste treatment), the streams and riparian zone (fencing, replanting, monitoring, restricted access), the wetlands area (stormwater management, waste management, prevent grazing, revegetate, monitoring), grazing areas (weed treatment, controlled grazing, monitoring) and the pasture zone (inspections and management).</p> <p>Any infestations found during the operation phase will be actively managed and potentially fenced to prevent spread by stock</p>	Appendix E, Section 2.3
	monitoring	Weed identikits will be produced for and used by, on site staff and managers, with formal training provided on the use of the kits.	Appendix E, Section 2.4
		<p>Manual or chemical control programs will be implemented wherever new weed species or infestations are identified within the site.</p> <p>Photographs of problematic weed species in the area will be posted on work notice boards</p>	Appendix C – EMP, Section 2.1
<b>Protection of Water Resources</b>	monitoring Surface water	A monitoring program will be undertaken including land conditions and soils in the irrigation area	Project Overview Section 1.3
		Commencement of weed monitoring will coincide with commencement of site development and will be ongoing for the life of the project.	Appendix C - EMP Section 2.1

Subject	Description	Commitment/Safeguard	Section in PER
		A riparian buffer will be established and maintained 50m from the channel bank.	Project Overview Section 1.3
		AACo commits to protecting water in the area	Responses to Issues Raised Section 7.2.5
	monitoring	A monitoring program will be undertaken including regular monitoring of treatment ponds, ground water.	Project Overview Section 1.3
<b>Road and Transport Management</b>	Road use	AACo has committed to limited truck movements to 6am to 7pm Monday to Saturday and 9am to 3pm on Sundays (the facility is reported to only operate 5 days per week)	Responses to Issues Raised Section 7.2.5
<b>Community Amenity and Health Management</b>	Noise	<p>AACo will undertake measures to ensure that noise does not impact on the amenity of nearby residents.</p> <p>Noise will be controlled through:</p> <ul style="list-style-type: none"> <li>• The refrigeration engine room will have noise attenuation measures</li> <li>• The rendering plant will be a complete packaged plant</li> <li>• The admin, staff amenities and community buildings will be of masonry construction with colorbond roof.</li> <li>• Animal holding pens will be located as far away from houses as practical</li> <li>• Heavy vehicles will only access the site during daylight hours.</li> </ul>	Community Health and Amenity Section 5.3.3.2
		The Noise Management Plan will be reviewed and monitoring commitments update as required.	Appendix C – EMP, Appendix A – Environmental Structure Section 1.4



Subject	Description	Commitment/Safeguard	Section in PER
<b>Greenhouse Gas Emissions</b>	Odour	<p>AACo will undertake desludging in accordance with best practice guidelines so as to ensure the ponds are not overloaded. Expected to occur 8-10 years</p> <p>Odours will be suppressed from animal yards in line with best practice guidelines including, regular cleaning out of wastes, inclusion of the yards in controlled drainage area, collection of manure for composting activities.</p>	<p>Community Health and Amenity</p> <p>Section 5.3.3.1</p>
	Contingencies	AACo will develop a contingency plan for mass carcass disposal.	<p>Other Risks</p> <p>Section 5.4</p>
	Pasture efficiency	AACo has committed significant resources into pasture research. The knowledge gained will allow the company to graze its pasture resources in a way that will reduce methane emissions	<p>Other Risks</p> <p>Section 5.4.3</p>
	emissions	<p>AACo will undertake to minimise greenhouse gas emissions as practicable in accordance with NT governments objectives.</p> <p>AACo will:</p> <ul style="list-style-type: none"> <li>• Implement an ongoing program to monitor levels of emissions;</li> <li>• Report emissions in accordance with Government requirements;</li> <li>• Periodically investigate the opportunity to further reduce emissions; and</li> <li>• Identify and consider national and territory eligible offset schemes for residual emissions.</li> </ul>	<p>Other Risks</p> <p>Section 5.4.3</p>

Subject	Description	Commitment/Safeguard	Section in PER
<b>Insect and vermin management</b>	Plans	<p>AACo will develop an Integrated Pest and Disease Management Program.</p> <p>AACo will ensure all areas around the plant as well as infrastructure are well drained to eliminate shallow/ standing water.</p> <p>Grassed and vegetated areas around the plant will be regularly slashed/ mown.</p> <p>Vegetation establishment in the treatment ponds will be prevented.</p> <p>Routine inspections and monitoring of areas that have potential for insect breeding.</p> <p>Control operations will be conducted as needed including spraying of insecticides.</p> <p>The findings of the ongoing inspection program will be recorded including control actions taken.</p>	Community Health and Amenity Section 5.3.3.5
	Development	AACo are committed to developing the facility in accordance with environmental and industry best practice, facilitating robust management and mitigation of potential environmental impacts	Not Proceeding with the Proposal Section 4.1
<b>Environmental Management</b>	Plans	Details the safeguards and controls to be employed to prevent, manage and monitor identified and potential impacts of the project.	Introduction of the Draft EMP Section 6.1.2

Subject	Description	Commitment/Safeguard	Section in PER
	Management techniques	<p>Committed to incorporating state of the art technology and best environmental management practices in both the facility design and management strategies.</p> <p>The EMP will be reviewed annually to evaluate performance against the environmental management commitments, reassess risks and identify and incorporate improvements to best practice methods.</p> <p>AACo will establish a community committee to raise concerns in regards to the operations of the facility</p>	Environmental Management Techniques- Section 4.4
	Compliance and Auditing	AACo will conduct monitoring, auditing and inspection internally as well as externally with relevant authorities.	Environmental Management Section 6.1.1
	Offsets	Consideration will be given to contributing to better management of other pressing environmental issues. Delivery of offsets will utilise skills and physical infrastructure locally available where possible. AACo will give particular regard to offsets that have benefits for local land managers, local communities and the management of pastoral land in the NT	Identification of Appropriate Offsets Section 5.5.3

