



# Pilbara Cattle Holding Yard Feasibility Assessment





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# **Executive Summary**

The Pilbara Development Commission's (PDCs) *Pilbara Regional Investment Blueprint* (PDC 2015), identified agriculture as an opportunity for the Pilbara (PDC 2015). Studies have since been undertaken to investigate options for investing in agricultural development in the region. This process has indicated that expansion of the Port Hedland livestock export industry is a potential option for agricultural development in the Pilbara. However, constraints such as lack of appropriate Port infrastructure, holding yard infrastructure, and pastoralist and exporter confidence, are preventing the industry from operating at its potential capacity.

As part its ongoing investment in agriculture, the PDC engaged FSA Consulting Pty Ltd (FSA) to conduct a feasibility assessment into the expansion of existing or development of new holding yard infrastructure in Port Hedland. This feasibility assessment report presents the outcomes of an information review, stakeholder engagement process, site selection, and engineering design and costing of required infrastructure into potential holding yards in Port Hedland. This study has investigated, through review of existing information, stakeholder engagement, site investigations, and engineering design and costing, the feasibility of expanding existing or developing new holding yards to service live cattle exports from the Port of Port Hedland.

A site selection process identified two sites that would be optimal locations including the development of the existing South Hedland holding yards and development of new yards at Pippingarra Station. The existing holding yards require minimal investment in order to re-establish operations and the operator of these yards is currently in consultation with exporters regarding potential cattle shipments in the near future.

A number of scenarios were analysed to assess the potential public and private returns on investment in:

- Re-establishment of existing yards at South Hedland;
- Expansion of existing yards at South Hedland; and
- Development of new yards at a greenfield site on Pippingarra Station.

The analysis identified that, from a public perspective, investment in re-establishing the existing South Hedland yards would have substantial benefits to the Western Australian pastoral industry. Furthermore, investing in an expansion to the existing yards would achieve a positive economic return within 5 years of investment, assuming a guaranteed throughput of at least 40,000 per annum in both cases. In contrast, investment in developing a greenfield site would not achieve a positive return until between 15 and 25 years after the initial investment and would rely on a guaranteed throughput of at least 64,000 head.

From a private perspective, it was found that, in order for an investment in any of the scenarios to be viable, operators would need to charge a yard holding fee of \$50 per head to cover costs (including the current assumed cost of feed) and would require a throughput of 40,000 head for the yard re-establishment, 64,000 head for the yard expansion, and 80,000 head for the greenfield development.

While it is evident that there is a strong potential benefit associated with re-establishing or increasing exports from Port Hedland, this report indicates the industry itself needs to be re-established through increasing confidence in users of the port prior to committing to substantial investment in holding yard infrastructure.

If growth in the live export sector eventuates, warranting increased investment in live export infrastructure, opportunities to co-locate related operations and develop backgrounding facilities should be investigated. Many of the sites identified in this study would likely be suitable for such opportunities, depending on export market restrictions around distances to the Port of the various supply chain sectors.

From the perspective of environmental and planning constraints, there is opportunity for a range of vertically integrated and complimentary agricultural development to occur in the Pilbara and, specifically, around Port Hedland. However, this study has indicated that a significant amount of confidence and relationship building of people involved in the industry is a vital prerequisite to growth ensuring that future investment has a benefit to the overall region.



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# 1. Introduction

The Pilbara Development Commission's (PDCs) *Pilbara Regional Investment Blueprint* (PDC 2015) identified agriculture as an opportunity for the Pilbara (PDC 2015). A number of other studies have been undertaken to investigate options for investing in agricultural development in the region. This process has indicated that expansion of the Port Hedland livestock export industry would be a potential option for agricultural development in the Pilbara region. However, certain constraints to the industry, such as lack of appropriate Port infrastructure, lack of holding yard infrastructure, and lack of pastoralist and exporter confidence in the industry, are considered to be preventing the industry from operating at its current and potential future capacity.

As part its ongoing investment in agriculture and the Port Hedland livestock export industry, PDC engaged FSA Consulting Pty Ltd (FSA) to conduct feasibility assessment into the expansion of existing, or development of new, holding yard infrastructure in Port Hedland. This feasibility assessment report presents the outcomes of an information review, stakeholder engagement process, site selection, and engineering design and costing of required infrastructure into potential holding yards in Port Hedland. The report is structured as follows:

- Section 2 Background information on the location and climate in Port Hedland
- Section 3 The need for the project based on information review and stakeholder engagement
- Section 4 Overview of holding yard site selection and design considerations in terms of legislation and export market requirements
- Section 5 Potential sites and constraints analysis
- Section 6– Priority sites
- Section 7 Site specifications and preliminary costing
- Section 8 Conclusions



# 2. Site Description

# 2.1. Project location

PDC identified a radius of 200 km around Port Hedland for holding yard site selection.

# 2.2. Climate

Port Hedland is an arid climate with very dry winters and less than 350 mm annual mean average rainfall (Table 2-1). The majority of rain falls in the January to March period often resulting in flooding events. Port Hedland is known to experience more cyclones than any other part of Australia (BOM, 2017).

Table 2-1. Rainfall and temperature statistics for Port Hedland. Source: DSITIA (2017)

Statistic	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Mean R/F (mm)	64.1	76.5	59.3	19.9	26.1	24.8	9.7	6.1	1.1	1.0	2.1	15.4
Mean Daily Max Temp (°C)	36.6	36.5	36.8	35.2	30.7	27.4	27.0	29.2	32.3	34.8	36.5	37.0
Mean Daily Min Temp (°C)	25.8	25.7	24.8	21.6	17.4	14.3	12.6	13.7	15.9	19.0	22.0	24.5

# 2.3. Project description

This project was undertaken to assess the feasibility of expanding existing, or developing new, live export cattle holding yards in Port Hedland. In addition to assessing site constraints and design and construction costs associated with holding yards, the project aimed to assess the potential for backgrounding or colocation opportunities to be associated with the holding yard infrastructure. This project is being undertaken in conjunction with a project to assess the options and feasibility of constructing a truck wash-down facility in Port Hedland. A separate report has been prepared for the truck wash-down assessment.



# 3. Need for the project

# 3.1. Information review

A number of studies have been undertaken as part of investment into the potential economic growth of the Pilbara region. Some of the key studies related to the potential expansion of the live export industry in Port Hedland are summarised below.

# 3.1.1. Pilbara regional investment blueprint

The Pilbara Regional Investment Blueprint (PDC 2015) sets out the vision for the Pilbara region based on a population target of 200,000 by 2050. The Blueprint identified agriculture, and particularly cattle exports, as underdeveloped in the region.

## 3.1.2. Livestock options paper

The Pilbara Ports Authority (PPA) and PDC released a Livestock Options Paper in 2015 (Pilbara Ports Authority 2015). The paper identified that the Port Hedland live cattle trade is expected to expand due to increased demand from importing countries and recently signed free trade agreements and recognised that:

- Upgrades to infrastructure, such as cattle holding yards, are required to meet increased live cattle trade from Port Hedland; and
- Existing infrastructure is required for smaller cattle consignments so that pastoralists in the Pilbara and northern Western Australia are supported in building up the herd to meet the anticipated expansion.

# **3.1.3.** Northern Beef Futures

Northern Beef Futures (NBF) is a 4 year, \$15 million project funded by the State Government's Royalties for Regions program and led by the Department of Agriculture and Food, Western Australia (DAFWA, 2016). Similarly to the livestock options paper, NBF projections showed that:

- There are significant growth opportunities for the northern live cattle export market;
- Measures need to be put in place now to ensure that the Pilbara is ready to meet the new demands of the market when they arise; and
- Backgrounding operations, holding yards, and truck wash-down facilities are identified as measures to meet new market demands.

## **3.1.4.** Northern Beef Infrastructure Review

As part of NBF, a review of the infrastructure supporting the northern beef industry in the Pilbara and Kimberley regions (referred to as the northern beef region) was commissioned by DAFWA and Meat and Livestock Australia (MLA), with the aim of encouraging and supporting the development of the beef industry in the northern beef region (ACIL Allen Consulting, 2016). Phase four of the review (referred to as the Northern Beef Industry Review; NBIR) involved development of a 10 year Northern Beef Infrastructure Plan to create a framework for implementing identified priority projects. Development of holding yard infrastructure, in combination with a truck wash-down facility, to support live export out of the Port of Port Hedland was identified as one of fifteen priority projects. NBIR identified that:

- Improvements to the Port of Port Hedland would potentially result in transport cost savings to the industry of \$2.4 million per year;
- Construction of holding yards would potentially be associated with reduction in road transport costs from the current levels of \$36 per head to under \$28 per head; and
- Construction of export holding yards and wash-down facilities would facilitate the industry in meeting market and regulator standards, such as biosecurity obligations;



- 318,000 cattle were turned off from within the northern beef industry in 2014;
- 179,500 cattle entered the live export market in 2014, with 89,400 of these being exported through the Port of Broome and the remaining exported through the ports of Wyndham, Fremantle, and Geraldton (MLA & LiveCorp 2016);
- No cattle were exported from Port Hedland in the 2014-15 or 2015-16 financial years;
- Development of holding yards and truck wash-down facilities at Port Hedland would facilitate some redirection of cattle usually exported through ports in the north such as Broome or Wyndham or in the south through Fremantle or Geraldton;
- If the port infrastructure supported it, there was potential for 65,000 cattle to be exported through Port Hedland under a baseline scenario that assumed all cattle would travel to the closest market, however this estimation is not an indication of market demand.

#### 3.1.5. Irrigation in the Pilbara

Trials are currently underway to investigate the potential for irrigation opportunities for cropping, horticulture, and improved pasture in the Pilbara Region as part of DAFWA's Pilbara Hinterland Agriculture Development Initiative, a Royalties for Regions program (DAFWA 2016a). The establishment of irrigated agriculture in the region may facilitate growth of the Port Hedland live export industry because it may establish a local feed source for cattle fattening, holding yard maintenance diets, and export feed requirements.

# **3.2.** Market considerations

There has been increased global demand for beef over the last decade, particularly in Asia (Pilbara Ports Authority 2015). Urban population is expected to grow from 3.9 billion currently to 6.3 billion in 2050. This is related to a growth in affluence and an anticipated associated growth in consumption of red meat (Pilbara Ports Authority 2015). The Federal government recently negotiated trade agreements with China, Thailand, Cambodia, Lebanon, Bahrain, Egypt, and Iran.

# **3.3.** Port Hedland Livestock Export Industry

#### **3.3.1.** Existing holding yards

There are two existing export depots that service the Port Hedland port:

- 1. The South Hedland yards, which are located approximately 22 km south west from the port. These yards are currently operational but have not been used in recent years in line with the lack of live exports. The existing capacity of these yards is 5,000 head and there is land available to expand the yards to 8,000 head and construct a truck wash down facility.
- 2. The Patterson yards, which are located approximately south west 30 km from the port. These yards are not currently operational due to unresolved tenure and lease agreement issues. However, infrastructure at the yards is sufficient to support re-establishment of operations. The Patterson yards have a capacity of 6,000 head.

#### 3.3.2. Throughput

Live cattle export has been occurring at Port Hedland since the 1970s, with the industry operating between March and October. Historically, mostly smaller (approximately 1,000 - 2,000 head capacity) and medium (approximately 3,000 – 5,000 head capacity) livestock carriers use Port Hedland and the port is generally considered to be a "top-up" port (Walsh Pers. Comm., 2015). However, there are records of an estimated 20,000 head shipment occurring in the 1980s. Table 3-1 shows the livestock carriers that have visited the Port in recent years. No cattle exports have occurred from the port since 2014.



Vessel	Capacity / Cattle pen area (m <sup>2</sup> )	Length (m)	Breadth (m)	Tonnage Gross	Operator
Lincoln Express	2,211 m <sup>2</sup>	85	14	3,183	Livestock Express
Kerry Express		86	14	3,246	Livestock Express
Devon Express	3,291 m <sup>2</sup>	117	16	6,171	Livestock Express
Bison Express	3,506 m <sup>2</sup>	122	16	6,442	Livestock Express
Shorthorn Express	3,841 m <sup>2</sup>	116	16	6,872	Livestock Express
Dareen	8,000 cattle	139	20	12,959	Livestock Shipping Services
Bader III	110,000 Sheep (or 75,000 sheep & 10,000 cattle)	204	26	36,387	Livestock Shipping Services
Ghena	85,000 sheep (or 18,000 cattle & 16,000 sheep)	190	32	40,035	Livestock Shipping Services

Table 3-1. Livestock carriers that have visited Port Hedland in recent years. Source: Walsh Pers. Comm. (2015)

# **3.3.3.** Barriers to export throughput

Based on the background information review, current infrastructure at the Port and the South Hedland holding yards would support throughput of up to 40,000 head of cattle per year. This is a conservative estimate based on the existing capacity of the South Hedland yards and an assumed 8-month per year operation with one full consignment per month. Despite this, exports from Port Hedland have historically been substantially lower than this and there have been no exports from Port Hedland since 2014. The information review and stakeholder engagement identified causes for this as follows:

- There is a perception that the Port of Port Hedland is primarily a mineral export port. Pastoralists and cattle exporters generally believe that live cattle are not given priority access or use of the Port due to perceived higher priority demands of mineral export activities. Specific concerns around the commitment of the Port to support the live export industry are based on perceptions that:
  - Until recently, only one berth at the Port was available for cattle loading and unloading
  - Cattle truck operators and handlers are required to operate under operational health and safety requirements for the mining industry, which can prevent efficient loading and unloading of cattle
  - There is inadequate space for truck turning, which also prevents efficient loading and unloading of cattle
  - The Port is only able to accommodate medium livestock carrier vessels rather than larger vessels (with a capacity of approximately 15,000 head), which limits the number of cattle that can be exported through the Port at any one time
- There is a perception that use of the existing South Hedland yards is not appealing due to expensive holding fees and contractual demands and that it is more cost effective and less risky for pastoralists to send their cattle south for export or for slaughter in the domestic market.

The Port is currently able to accommodate vessels with a capacity of 20,000 head if required (Jon Giles Pers. Comm. 2017). Furthermore, in an endeavour to increase pastoralist and exporter confidence in use of the Port, PPA have recently invested in new cattle loading infrastructure consisting of moveable and modular multi-deck ramps that will enable cattle to be loaded and unloaded from Berths 1 and 2 at the Port (Wood



2016). Despite this and other measures to increase usability by cattle producers and exporters, the cattle export capacity of the Port is currently underutilised.

Based on the above, the barriers to throughput of live export through Port Hedland are likely based on perceptions rather than lack of financial investment in port or holding yard infrastructure.

# 3.4. Stakeholder engagement

A stakeholder engagement process for this feasibility assessment was conducted to determine:

- Industry preferences for development of holding yards and wash-down facility; and
- Whether there was interest in developing backgrounding facilities in the target area.

Potential sites identified by PDC were included as suggested sites for public comment in the stakeholder engagement process. Stakeholders representing Government, pastoralists, exporters, transport operators, energy, and mining were contacted. The key findings of the stakeholder engagement process are summarised in Table 3-2.

Stakeholder feedback		
<ul> <li>rds should be:</li> <li>3,000 – 6,000 head in line with existing capacity</li> <li>7,000 - 8,000 head in line with potential expansion based on ability to source consignments and assemble for shipment</li> <li>10,000 - 15,000 head to match the capacity of large livestock carriers or</li> <li>2 x 20,000 head yards to match significant industry expansion</li> </ul>		
<ul> <li>Vantages:</li> <li>Capacity to be multiple use</li> <li>Close to the Port</li> <li>Accessible to stations</li> <li>Infrastructure already exists</li> <li>Accessible from the highway</li> <li>Away from human habitation</li> <li>Room for expansion</li> <li>sadvantages:</li> <li>Visible to the public and susceptible to scrutiny</li> <li>Too small for competitive use</li> <li>No opportunity to diversify the business case</li> <li>Cost of transporting feed and freight is high</li> <li>Feed available near the holding yards is not good for cattle performance</li> <li>Too far from the Port for the cattle to walk straight onto the boats (double handling)</li> <li>Poor security</li> <li>Not designed to best practice standards</li> <li>No road-train access</li> </ul>		



Parameter	Stakeholder feedback					
Waste Water treatment plant	Advantages: Close to port Accessible Access to water Environmental studies have already been completed Some existing infrastructure Disadvantages: Not within cattle walking distance of Port Potential restrictions on use of recycled water Tenure constraints					
Truck wash	<ul> <li>The truck wash should:</li> <li>Be at the same site or very close to the holding yards</li> <li>Be restricted to use by agricultural vehicles (and not mining vehicles)</li> <li>Be cost effective to use</li> <li>Be strategically located to capture cattle traffic to and from Broome because there is currently no truck wash facility servicing the Port of Broome.</li> </ul>					
Potential greenfield sites	<ul> <li>Mundabullangana (Munda) Station, Pardoo Station, Pippingarra Station, Namagoorie Yard, De Grey Station, Mallina Station Yards, Sherlock Yard, and Pardoo Station.</li> <li>An ideal situation would include the holding yards located at the Port itself so that cattle could walk straight from the holding yards onto boats.</li> <li>Lumsden Point could be developed to accommodate holding yards with a view to having the vessel loading operation also undertaken at the same site, reducing double handling.</li> </ul>					
Backgrounding and co-location facilities	It is expensive transporting feed to cattle so there would be advantages in producing feed for the holding yards at a site within the target area.					
Concerns and objections	<ul> <li>Investor should be partnered with a landholder</li> <li>Lack of feed production in the Pilbara.</li> <li>Lack of confidence in willingness of the Port to support agriculture relative to mining. This is based on anecdotal evidence of: (1) boats being removed from berths part way through loading to make way for mining ships or due to the tide, (2) cattle having to wait an unacceptable amount of time prior to loading, (3) cattle falling into the water because tides were too low, (4) not being able to load full boats and (5) cattle needing to wait for tides prior to loading.</li> <li>Weed spread is a concern for pastoralists</li> <li>Operating model should be developed prior to investing</li> </ul>					



Parameter	Stakeholder feedback
Additional information	<ul> <li>The whole logistics chain should be developed in a staged manner which allows for future expansion and non-duplication or double handling for future expansion.</li> <li>Holding yards should operate as a feedlot sometimes and then holding yards at other times.</li> <li>Cost of water is a key consideration in the development of the truck wash because these facilities often operate on a 'user-pays' basis and if the water were too expensive, the facility may not be affordable to many operators.</li> <li>Cattle export facilities in Geraldton and Broome were good operations.</li> <li>Need for Port Hedland facility questionable</li> <li>Port Hedland could support live export from the other ports if required.</li> <li>Significant transport cost savings by developing a facility in Port Hedland.</li> <li>Live export industry is very volatile and associated with high risk and that, therefore, producers are worried about relying on it.</li> <li>Operating model should be built that models what the operation will be like so that the functionality, feasibility, logic, and equity can be assessed and users can be identified prior to investing in development.</li> <li>Pelletisation does not make sense in Port Hedland because there is nothing to pellet.</li> </ul>
Potential investors	Private, public, State government, private development supported by government or industry assistance via funds and grants, DAFWA, MLA, and AQIS.

## 3.4.1. Potential options

From the stakeholder engagement process, a range of sites were identified as potential sites for the proposed holding yards development. These include:

- Existing South Hedland yards;
- Paterson yards;
- Yindjibarndi;
- Waste Water Treatment Plant (WWTP);
- Pippingarra Station;
- Mundabullangana Station;
- Pardoo Station;
- Namagoorie Yard;
- De Grey Station Yard;
- Malline Station Yard; and
- Sherlock Yard.

Many of these sites were found to be inappropriate based on their distance from Port Hedland. From this list, 7 preliminary potential options for the holding yards were identified:

• Option 1: Upgrade and expand existing South Hedland Yards.



- Option 2: Upgrade existing Paterson Yards.
- Option 3: Combination of options 1 and 2.
- Option 4: Use WWTP for holding yards, truck wash, backgrounding/irrigation of fodder/grain.
- Option 5: Use of portion of Pippingarra Station adjacent to WWTP for holding yards, truck wash backgrounding/irrigation of fodder/grain.
- Option 6: Use other portions of Pippingarra Station for holding yards, truck wash backgrounding/irrigation of fodder/grain
- Option 7: Use Lumsden Point for holding yards

These options will be compared and discussed in detail later in this report.



# 4. Holding Yards in Australia

# 4.1. Legislative context

# 4.1.1. Export Control Act 1982

Live export holding yards must be accredited and registered as registered premises in accordance with the *Export Control Act 1982.* They provide secure assembly premises for pre-export animals. Holding cattle in registered premises allows time for the animals to recover from land transport, be tested and treated by AQIS personnel to ensure that they meet importing country requirements, and be inspected and deemed fit to travel by appropriately qualified veterinarians. Registered premises need to meet a number of requirements in order to obtain and maintain a Department of Agriculture and Fisheries (DAF) licence as a registered facility (Commonwealth of Australia 2011). For example, the facility must:

- Be within 8 hours' journey (~ 800 km) from the port of embarkation;
- Employ sufficient staff to ensure effective day to day operation of the facility;
- Have the capacity to provide the minimum feed requirements which, for cattle, equates to 2.5% of their body weight of a quality feed able to meet daily requirements;
- Have enough contingency water for 2 days;
- Be constructed and located in such a manner as to control drainage, surface water, groundwater, and effluent run-off;
- Be constructed or located in such a manner as to provide animals with protection from extreme climatic conditions by means of shade, windbreaks, shelter etc.; and
- Have fences that are appropriate to hold livestock and prevent the entry of livestock and that are maintained in a good state of repair (this requires inspection before entry of each consignment and twice a week while livestock are occupying the registered premises).

Exporters must be able to demonstrate to the Australian Government that the management of the livestock at the registered premises is in accordance with the risk management plan for the consignment and the importing country requirements for the registered premises.

## 4.1.2. ASEL and the National Guidelines for Beef Cattle Feedlots

Design of live export holding yards must comply with the Australian Standards for the Export of Livestock (Version 2.3) 2011 and the Australian Position Statement on the Export of Livestock (ASEL). Where ASEL does not cover a particular aspect of holding yard design and operation, such as separation distances to sensitive receptors, the National Guidelines for Beef Cattle Feedlots in Australia (MLA 2012) is often referred to for applicable criteria.

## 4.1.3. Other legislation

#### 4.1.3.1. Federal

The Commonwealth Government *Export Control Act 1982* sets parameters around the requirement for livestock to be assembled at Department of Agriculture and Water Resources (DAWR) registered premises for preparation for export. Additional importing country requirements are also required to be complied with under this Act. Registered premises activities include inspection by accredited third party veterinarians as well as DAWR veterinarians, who must issue a 'permit to leave for loading' before the consignment can be transported to the Port (Pilbara Ports Authority 2015).

The Animal Health Australia Act, 2012 sets out loading rates for cattle of various live weights. Other Federal legislation that must be considered includes:

- Australian Meat and Livestock Industry Act 1997
- Australian Meat and Livestock Industry (Export Licencing) Regulations 1998



- Australian Meat and Livestock Industry Regulations 1998
- Export Control (Animals) Order 2004
- Australian Meat and Live-stock Standards Order 2005
- Environment Protection and Biodiversity Conservation Act 1999.

#### 4.1.3.2. State

The *Code of practice for the transportation of cattle in Western Australia* (Department of Agriculture and Food, Western Australia, 2003) guides the transportation of cattle in order to minimise transport stress and injury. It promotes reducing the distances between properties and feedlots and feedlots and ports as important for improving animal welfare, reducing driver fatigue, improving safety, and saving on transport costs. It includes the following recommendations:

- Cattle should be transported as quickly as possible within legal requirements;
- Only cattle fit for travel are to be selected by the owner or agent; and
- Cattle need access to water unless the total transportation time is less than 36 hours.

Other State legislation that must be considered includes:

- Environmental Protection Act 1986
- Planning and Development Act 2005
- Environmental Protection (Noise) Regulations 1997
- Agriculture and Related Resources Protection Act 1976
- Agricultural and Veterinary Chemicals (WA) Act 1995
- Animal Welfare Act 2002
- Biological Control Act 1986
- Biosecurity and Agriculture Management Act 2007
- Soil and Land Conservation Act 1945
- Veterinary Chemical Control and Animal Feeding Stuffs Act 1976
- Western Australian Meat Industry Authority Act 1976.

#### 4.1.3.3. Local

Local legislation that needs to be considered includes:

- Pilbara Planning and Infrastructure Framework 2012
- Shire of East Pilbara Public Health Plan 2014
- Shire of East Pilbara Town Planning Scheme
- Town of Port Hedland Local Laws
- Pilbara's Port City Growth Plan
- Town of Port Hedland Planning Scheme No. 5 (currently under review).

# 4.2. Potential export market

#### 4.2.1. China

The Chinese Australia Free Trade Agreement (ChAFTA) began on 20 December 2015 and China currently imports more of Australia's agricultural produce than any other country. Despite this, live cattle exports to China are low; while approximately 90,000 head of beef and dairy breeder cattle was exported to China in both 2015 and 2016, only 338 head of slaughter cattle was exported to China in the 12 months ending December 2016 (MLA 2017). With ChAFTA, there are hopes to improve this by eliminating beef tariffs by 1 January 2024.

According to the Australian Department of Agriculture and Water Resources, additional requirements for pre-export protocols for cattle being exported to China are still under negotiation (DAWR pers. comm., 2017).



Therefore, there is no real clarity on what the conditions will look like in the future. Currently, northern Australian exports to China are somewhat restricted by China's Blue Tongue Virus (BTV) protocols (Beef Central 2015). The Blue Tongue Virus (BTV) Zone consists of the area north of a trajectory extending from Broome to Sydney in to China. Port Hedland is south of the BTV zone and, as such, is not subject to BTV related export restrictions. However, there are additional requirements for all cattle being exported from Australia to China that are relevant for exports from Port Hedland including:

- Cattle need to be individually inspected by Government approved veterinarians in the registered premises before commencement of pre-export quarantine (PEQ);
- Cattle cannot have been treated with hormone growth promotants (HGPs);
- Cattle must be treated for external parasites;
- Cattle from tic-infested zones must be plunge dipped;
- Cattle must be resident on the farm of origin for 3 months;
- Cattle must not be cull (old or poor conditioned) animals;
- Cattle must not be pregnant; and
- Cattle are to be prepared for export in a Registered Premises on an all-in/all-out basis (one consignee). No other livestock can be held on the premises during the preparation of a consignment for China (Beef Central 2015).

Full requirements for cattle truck washing for cattle being exported to China need to be confirmed once the negotiation on the agreement has been finalised.

# 4.3. Thailand

In 2015, DAFWA and AEC Group Pty Ltd prepared a paper on new and innovative opportunities for beef trade between Thailand and Western Australia (DAFWA & AEC Group 2015). It recognised that significant potential benefits could be incurred by the Western Australian live export industry by diverting existing live export feeder cattle into a new, dedicated supply chain through Thailand for finishing, processing, and distribution. Exports of feeder and slaughter cattle from Australia to Thailand commenced early in 2015 and 9,000 head had been exported to the end of September 2015. However, this declined by 84% in 2016, with a total of 1,461 feeder and slaughter cattle exports to Thailand in the year ending December 2016 (MLA 2017).

The Thailand-Australia Free Trade Agreement (TAFTA) allows tariff-free live cattle export from Australia into Thailand (DAFWA & AEC Group 2015). The ASEAN Economic Community and the ASEAN-China Free Trade Agreement may further enable Thailand to access regional Asian beef markets. There are also incentives for investment in beef feed lotting and processing in Thailand through the Thailand Board of Investment.

Quarantine and Registered Facility requirements are in accordance with ASEL (2011) and the *Terrestrial Animal Health Code* (OIE 2016). In Australia, AQIS provides a health certificate and an export permit when it is satisfied that the livestock for export meet the requirements of the importing country.

# 4.4. Vietnam

Vietnam accounted for the largest market by volume (28%) and value (29%) for Western Australian live cattle exports in 2015 (Department of Agriculture and Food 2016). The Vietnamese market is second to Indonesia in terms of the number of exports from Australia (Pilbara Ports Authority 2015). Due to the growing population, urbanisation and increasing incomes, meat consumption in Vietnam has risen considerably since 2004 and this growth is expected to continue. Beef cattle live exports to Vietnam totalled 333,981 and 245,551 in the years ending July 2015 and 2016 respectively and accounted for almost 25% of Australia's live cattle exports. The demand for live cattle in Vietnam is primarily for slaughter cattle weighing > 420 kg to > 500 kg (Kaus, Pers. Comm, 2016) (DAF, Pers Comm, 2016).



# 4.5. Malaysia

Exports of cattle from Western Australia to Malaysia comprised 11% (by number of cattle) of total live cattle exports in both 2014 and 2015 respectively (Department of Agriculture and Food 2016).

Live exports to Malaysia peaked at 95,000 head in 2002-03. Demand for Australian cattle has reduced as a result of currency depreciations and competition with beef exports from India (Gleeson et al. 2012). Live cattle exports to Malaysia totalled 34,150 in the year ending July 2016, down 34% from the previous year (MLA 2017).

# 4.6. Indonesia

Indonesia is the most frequent destination for live cattle from Australia with 171 voyages undertaken to Indonesia in 2014 (Pilbara Ports Authority 2015). During 2014, Indonesia was the largest market for Western Australia's live cattle exports, accounting for 43% of cattle exported (Department of Agriculture and Food 2016). In 2015, Indonesia was the second largest market for live cattle from Western Australia accounting for 28% of exports.

Indonesia has been the major importer of Australia's live export cattle and has shaped the northern Australian live export trade by its heavy demand for feeder steers; close to 700,000 head per year of cattle were exported to Indonesia from 2008 to 2010 (Gleeson et al. 2012). In December 2010, Indonesia enforced a 350 kg weight limit and 500,000 head/year import limit (Gleeson et al. 2012). The import limit was further reduced to 283,000 head during 2012 and the restrictions for the first trimester of 2016 were 200,000 head (Burton 2016). The weight limit on cattle being exported to Indonesia has recently been increased to a maximum average of 450 kg (Nason 2017). The age limit has also increased from 30 months to 48 months of age and import permits will be valid for 12 months.

Despite the intention to achieve self-sufficiency and reductions in import quotas, live export to Indonesia remains an important market for northern Australia with total exports of 720,141 and 569,853 in the 12 months to July 2015 and 2016 respectively (LiveLink, August 2016). The new export restrictions include a requirement for Indonesia to import one breeding heifer for every five feeder cattle imported.

The main markets for live export cattle to Indonesia are large commercial feedlots, where Australian feeder cattle spend between 60 and 100 days fed on by-products before being sold for slaughter. Beef is generally sold into the wet market and slaughtered the night of purchase (Gleeson et al. 2012). The type of cattle that are exported to Indonesia are generally the Brahman or Droughtmaster breeds. Due to the demand for light, Brahman type cattle, this market remains vitally important for northern Australian beef producers.

Indonesia has the most relaxed requirements and shortest required stay in pre-export holding yards. The duration in holding yards can be from 48 hours to 1 week, depending of the consignment, size of the trucks, and distances travelled.

# 4.7. Israel

Exports of cattle from Western Australia to Israel were 27% (by number of cattle) and 22% in 2014 and 2015 respectively (Department of Agriculture and Food 2016). Cattle being exported to Israel are subject to the full range of pre-export protocols and, therefore, can be held in holding yards for up to three weeks (Pilbara Ports Authority 2015).

# 4.8. Egypt

Exports of cattle from Western Australia to Egypt were 9% (by number of cattle) and 7% in 2014 and 2015 respectively (Department of Agriculture and Food 2016).



# 5. Potential Sites

This section compares a selection of the preferred sites identified in the stakeholder engagement process (Section 3.4) for their suitability as potential holding yard and truck wash-down locations. Four of the potential sites identified in the Stakeholder engagement process were not investigated further in this study due to distance from Port Hedland. These include Namagoorie Yard, De Grey Station Yard, Mallina Station Yard, and Sherlock Yard. These sites may still be useful for backgrounding facilities for the live export industry. Lumsden Point was not investigated further in this assessment because it was found that the Lumsden Point project is not a priority project for the new Western Australian Government and would be a long term, rather than a short term option. There would be advantages in co-locating holding yards at Lumsden Point if it does go ahead because of efficiencies with being able to walk cattle directly from the yards onto export vessels.

# 5.1. Site 1 – South Hedland Yards

The South Hedland Yards are located on Lot 364 on Deposited Plan (DP) 42164 and Lot 702 on DP 400624 (Figure 5-1). The lots are both zoned rural under the Town of Port Hedland Planning Scheme No. 5, and are surrounded on all sides by strategic industry. The existing South Hedland Yards have a maximum area availability of 6.8 ha. According to the Town of Port Hedland (ToPH Pers. Comm., 2015), there is no option for expansion of this site. However, according to the Pilbara Ports Authority (2015), the South Hedland Yards have secured additional land to expand its facilities to a capacity of 10,000 head if required. Lot 364 has an existing approval as a cattle yard. However, Lot 702 has no current approval in place. Cattle yards are a permitted use on this lot, but planning approval requirements, and other land use constraints, should be clarified prior to proceeding with continued use or further development at this site. It will be the responsibility of the lease holder to clarify and address all planning requirements prior to proceeding with an expanded facility).

There is an existing capacity for 5,000 head of cattle and there is room within the 6.8 ha site to expand the yard infrastructure to accommodate 8,000 head and to construct a truck wash-down facility. It is a registered premises holding yard facility. The DAWR accreditation has recently been renewed and the facility and is operational despite not having been used in over two years. The equipment and staff to feed, draft and sort cattle are readily available. The yards have access to veterinarians to inspect and sign off on livestock, as well as the equipment to scan and record movements of cattle for the National Livestock Identification System (NLIS).

# 5.1.1. Site inspection

A site visit was conducted in March 2017 and it was found that the yard infrastructure would need minimal improvement in order to be re-established as an operational facility. The major constraint to the operation is the overgrowth of weedy vegetation that requires removal. If this constraint is addressed, it is assumed that the yards could operate at a capacity of 5,000 head.

The site inspection and discussions with the current operator of the yards indicated that:

- The site is AQIS accredited.
- The facility is currently sized for 5,000 head, but the expansion pens to the south would provide an additional 3,000 head if they were completed (currently posts loosely in ground and no cable or rail). This would bring the total to 8,000 head which is the maximum of the existing license.
- A new 21 year lease has recently been signed and the operator is interested in expanding the yards.
- The operator is currently working with the Department of Lands to take ownership of the site from the Shire.
- The operator has recently signed a Memorandum of Understanding (MOU) with Chinese investors and is considering operating as yards for cattle exported exclusively to China.



- The operator is considering including a truck wash in the expansion plans due to Chinese requirements.
- The site has ample water and has access to a main water pipeline. There are tanks onsite that provide 2 days of contingency storage. There is potential access to groundwater.
- The site is located above the flood waters.
- Pen grades throughout the facility are minimum and there is a lack of effluent management controls.
- The site has an adequate feed bunk system (conveyor belt), that will require maintenance.
- The site entrance from the highway is adequate but could be improved through a construction of a better turning lane. An alternative may be to use the Boodarie Access Road, which is a nearby side road identified by Main Roads WA as a preferred access.
- There is adequate power supply.
- There is lighting to allow load out at night in the existing yards.
- A water spray system is in place to be used to control dust.
- There is an existing manual crush and a single loading ramp.



Figure 5-1. Tenure map showing location of the existing yards on two lots (P400624/702 and P42164/364). Source: PPA (2015).

#### 5.1.2. Compliance with industry standards

The existing export holding yards must comply with ASEL (2011). An overview of the relevant standards for Division 2 "Standard for Management of Livestock in Registered Premises" is provided below in Table 5-1.

The assessment outcome listed in Table 5-1, provides four (4) overall outcomes for each of the assessment criteria: Compliant, Non-Compliant, Information Required and Operational. In this instance "Operational" means that the assessment criterion is not met from the physical facility, but is met through the operational management of the facility.



#### Table 5-1. Existing Port Hedland Yards - compliance with ASEL Standards

Section		Criteria	
\$3.0		The location of the registered premises, used for inspection for 'leave for loading', must not be more than 8 hours' journey time from the port of embarkation, except for camels for export through northern ports, unless approved by a relevant Australian Government agency.	Compliant
S3.1		The operator of registered premises must employ sufficient appropriately trained staff for the effective day-to-day operation of the premises and management of the livestock.	Operational
S3.2		Livestock handling facilities and sheds at registered premises must comply with the following:	
	А	Sheds must be constructed with sufficient drainage and ventilation to ensure that the shed is free draining.	N/A
	В	Sheds with slatted or mesh floors must be designed and maintained to prevent entrapment of feet.	N/A
	С	Livestock handling facilities must be constructed to handle the number of livestock (i.e. the number of stock at the premises, whatever that may be, depending on the consignment size) with a minimum of stress and injury.	Operational
	D	Floors of yards, sheds, pens and loading ramps must have non-slip surfaces.	Compliant
S3.3		Isolation of livestock:	
	A	Where a period of pre-export quarantine or isolation is required by the importing country, animals forming the consignment must always be physically isolated from all other animals (whether for an alternative export market or domestic use) to prevent contact.	Operational
	В	Where handling facilities used for loading, holding, treating or inspecting livestock (including roadway and lanes) are to be used for both domestic and export livestock (including livestock of differing export status), the operator of the premises must have procedures in place to ensure that:	N/A
	B(i)	handling facilities are not used simultaneously by livestock of differing pre-export quarantine or isolation status;	Operational
	B(ii)	a minimum livestock traffic separation of 2 m is maintained at all times, or livestock are separated by a physical barrier such as a fenced road or lane or a fully fenced empty paddock, unless specified otherwise by the importing country; and	Operational
	B(iii)	handling facilities and equipment used by different consignments of animals are managed in accordance with the pre-export quarantine or isolation requirements of each importing country.	Operational



Section		Criteria	
S3.4		To control drainage, surface water, groundwater and effluent run-off, the premises must be located or constructed in such a manner that:	
	А	surface water and livestock effluent are directed away from laneways, livestock handling areas, livestock confinement areas and feed storage areas;	Area for improvement
	В	the livestock confinement area of the registered premises is free draining and remains firm under foot; and	Compliant
	С	the surfaces around feeders and water troughs are evenly graded and compacted to form a hard, durable surface that readily sheds surface water.	Area for improvement
S3.5		The registered premises must be either constructed or located in such a manner as to provide animals with protection from extreme climatic conditions by means of:	
	А	shade;	No, but not required
	В	windbreaks;	No, but not required
	С	shelter; or	No, but not required
	D	other means approved by the registration authority.	No, but not required
S3.6		Fencing at registered premises must:	
	А	be appropriate to hold livestock and to prevent the entry of livestock;	Compliant
	В	be maintained in a good state of repair;	Operational
	С	be inspected before the entry of each consignment and twice a week while livestock are in the registered premises; and	Operational
	D	be consistent with the importing country requirements.	Operational
S3.7		To ensure adequate supply of feed and water:	
	А	where feeders, self-feeders and water troughs are used, they must be of a design that allows for complete cleaning of all surfaces, prevents spoilage of feed during inclement weather, and minimises faecal contamination and injuries	Compliant
	В	all livestock feed for use at the registered premises must be stored in a manner that maintains the integrity and nutritional value of the feed, and protects it from weather, pests and external contaminants (including chemical spray drift) and from direct access by animals	Compliant
	Е	the quantity of feed available should meet at least minimum feed requirements, which are:	
	E(i)	cattle/buffalo — 2.5% of their bodyweight, of a quality feed able to meet daily maintenance requirements;	Compliant
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Section		Criteria	Outcome	
	F	all livestock in the registered premises must have access to drinking water at all times (unless under curfew)		
	G	water troughs must be:		
	G(i)	positioned apart from hay and feed sources to prevent fouling; and	Operational	
	G(ii)	kept clean.	Operational	
	Н	the water quality must be suitable for the livestock and there must be sufficient backup storage or a contingency plan to ensure continuity of supply at peak demand for 2 days.	Compliant	
S3.8A		The minimum length of time that livestock must remain in a registered premises prior to departure is as follows:		
	А	for cattle or buffalo:		
	A(i)	a long haul voyage — 2 clear days;	Operational	
	A(ii)	for a short haul voyage in a vessel with multiple port loadings or multiple port discharges — 1 clear day;	Operational	
	A(iii)	for a short haul voyage in a vessel with 1 port of loading or 1 port of discharge — 24 hours;	Operational	
S3.10		The operator of the registered premises must have arrangements in place at the premises to prevent unauthorised entry and access to the feed when livestock are being prepared for export. Access to the premises must be controlled at all times, with:		
	А	all entry points to premises being clearly signed;	Compliant	
	В	only those persons necessary for the day-to-day operation of the premises and state and territory government officials having direct access to the area of the premises; and	Operational	
	С	all non-employees reporting to reception for appropriate biosecurity checks relevant to the requirements of the facility.	Operational	
S3.11		Stocking density at registered premises must provide at least the following minimum space per head (cattle with horns must be provided with additional space), unless a variation is required and approved by the relevant Australian Government agency:		
	А	for cattle or camels held for 30 days or more, a minimum of 9 m2, based on an individual liveweight of 500 kg (this allowance can be varied by 0.09 m2 for each 5 kg change in individual liveweight)	Operational	
	В	for cattle or camels held for less than 30 days, a minimum of 4 m2, based on an individual liveweight of 500 kg (this allowance can be varied by 0.04 m2 for each 5 kg change in individual liveweight)	Operational	



Section		Criteria	
\$3.12		When receiving and identifying livestock, the operator must obtain a copy of the vendor declarations regarding the property of source and health and welfare status of the livestock before accepting the livestock for the purpose of preparation for export.	Operational
S3.13		Unloading and inspection:	
	А	Livestock must be unloaded as soon as possible after arrival at the registered premises. Facilities must enable safe and efficient unloading of livestock.	Operational
	В	Livestock must be individually inspected at unloading to determine whether they are suitable for preparation for export.	Operational
	С	Livestock for export must be held and assembled at the registered premises in accordance with the relevant approved NOI and CRMP.	Operational
S3.14		All livestock accepted into the registered premises must be offered water and feed as soon as possible and no more then 12 hours after arrival.	Operational
S3.15		Livestock must be penned in accordance with the criteria in S2.10 (a) to (e).	Operational
S3.16		Daily monitoring of health, welfare and mortality must include the following:	Operational
	А	All livestock must be inspected daily by a competent stock person	Operational
	В	All sick or injured livestock must be given immediate treatment, and veterinary advice must be sought if the cause of a sickness or injury is not obvious, or if action taken to prevent or treat the problem is ineffective	Operational
	С	Investigation by a registered veterinarian must be conducted if mortalities in any one paddock or shed exceed 0.1% or 3 deaths, whichever is the greater, on any one day for cattle and buffalo, or 0.25% or 3 deaths, whichever is the greater, on any one day for cattle and buffalo, or 0.25% or 3 deaths, whichever is the greater, on any one day for any other species of livestock. Dead livestock must be collected and disposed of on a daily basis. Animals must not be able to access the area for disposal of carcasses.	Operational
	D	Records of each consignment must be kept for at least 2 years after the date of export.	Operational
S3.17		Any livestock identified at unloading as being distressed, injured or otherwise unsuitable for export must be marked by a permanent method and isolated from the rest of the consignment. A record must be kept that details identity, the method of treatment or euthanasia and disposal of all rejected animals. Criteria for rejection are outlined in Appendix 3.1.	Operational



# 5.1.3. Current access and use

The existing Port Hedland Yard is located to the west of the Great Northern Highway and is currently accessed directly from the road (Figure 5-2). If the facility is to be used in the future, it is recommended that a turning lane be added to the Great Northern Highway for both northern and southern access.

The facility has not operated since 2015 and is currently over run with long grass and small regrowth vegetation.

# 5.1.4. Operational structure

While a complete site audit could not be undertaken, a desktop review indicated that the existing infrastructure surrounding the pens would satisfy the requirements outlined in ASEL (2011).

The existing stock proof fence surrounding the yards is likely adequate and would not require an upgrade. The existing effluent management and drainage across the site may be insufficient and may need some attention to reach compliance. It also identified that the existing loadout ramp was a single deck ramp. In an attempt to increase efficiencies and decrease loading times it is recommended that the loading ramp be upgraded. However, these recommendations are not vital for the yards to re-establish operation.

## 5.1.5. Capacity

The existing facility has a maximum capacity of 5,000 head. This capacity is maintained in the main pens and the paddocks to the southwest of the main pens and loadout facility. Due to the restricted size of the existing lot upon which the facility sits (6.8 ha), it has been advised that the facility is unable to expand beyond 8,000 head.

#### 5.1.6. Throughput

Prior to the 2011 live export ban, the yards had seen yearly increases in use from about 9,000 head to a maximum throughput of 28,000 per year. It is perceived that the facility now has a capacity to achieve a throughput of 28,000. If the facility was at full capacity and was used to hold one consignment of cattle per month for 8 months of the year, the existing throughput would be 40,000 head per year.





Figure 5-2. Aerial imagery of the existing Port Hedland Yards showing the loading and unloading infrastructure, pens, and proximity to the Great Northern Highway. ArcGiS<sup>®</sup> software by Esri.

# 5.2. Site 2 – Paterson Yards

The Paterson Yards include 140 ha and a dual loading ramp and yards with a capacity of 6,000 cattle.

## 5.2.1. Site audit

FSA Consulting undertook a desktop review of the existing, privately owned Paterson Yards that are located approximately 30 km south of Port Hedland.

The high-level desktop analysis did not allow for a complete audit on all the relevant industry standards. To ensure a comprehensive site audit, an onsite inspection would be required.

#### 5.2.2. Compliance with industry standards

The relevant industry standards that the existing export holding yards must comply with are the Version 2.3 Australian Standards for the Export of Livestock (April 2011). An overview of the relevant standards for Division 2 "Standard for Management of Livestock in Registered Premises" is provided below in Table 5-2. Note that the outcomes presented in Table 5-2 are based on a desktop assessment only and need to be confirmed by conducting a formal site audit. These yards are not being considered as potential sites for this assessment due to unresolved issues surrounding the tenure and lease agreement.



#### Table 5-2. Existing Paterson's cattle holding yards - compliance with ASEL Standards

Section		Criteria	Outcome
S3.0		The location of the registered premises, used for inspection for 'leave for loading', must not be more than 8 hours journey time from the port of embarkation, with the exception of camels for export through northern ports, unless approved by a relevant Australian Government agency.	Compliant
S3.1		The operator of registered premises must employ sufficient appropriately trained staff for the effective day-to-day operation of the premises and management of the livestock.	Operational
S3.2		Livestock handling facilities and sheds at registered premises must comply with the following:	
	А	Sheds must be constructed with sufficient drainage and ventilation to ensure that the shed is free draining.	Information required
	В	Sheds with slatted or mesh floors must be designed and maintained to prevent entrapment of feet.	N/A
	С	Livestock handling facilities must be constructed to handle the number of livestock (ie the number of stock at the premises, whatever that may be, depending on the consignment size) with a minimum of stress and injury.	Operational
	D	Floors of yards, sheds, pens and loading ramps must have non-slip surfaces.	Information required
S3.3		Isolation of livestock:	
	A	Where a period of pre-export quarantine or isolation is required by the importing country, animals forming the consignment must at all times be physically isolated from all other animals (whether for an alternative export market or domestic use) to prevent contact.	Operational
	В	Where handling facilities used for loading, holding, treating or inspecting livestock (including roadway and lanes) are to be used for both domestic and export livestock (including livestock of differing export status), the operator of the premises must have procedures in place to ensure that:	N/A
	B(i)	handling facilities are not used simultaneously by livestock of differing pre-export quarantine or isolation status;	Operational
	B(ii)	a minimum livestock traffic separation of 2 m is maintained at all times, or livestock are separated by a physical barrier such as a fenced road or lane or a fully fenced empty paddock, unless specified otherwise by the importing country; and	Operational



Section		Criteria	Outcome
	B(iii)	handling facilities and equipment used by different consignments of animals are managed in accordance with the pre-export quarantine or isolation requirements of each importing country.	Operational
S3.4		To control drainage, surface water, groundwater and effluent run-off, the premises must be located or constructed in such a manner that:	
	А	surface water and livestock effluent are directed away from laneways, livestock handling areas, livestock confinement areas and feed storage areas;	Information required
	В	the livestock confinement area of the registered premises is free draining and remains firm under foot; and	Information required
	С	the surfaces around feeders and water troughs are evenly graded and compacted to form a hard, durable surface that readily sheds surface water.	Information required
S3.5		The registered premises must be either constructed or located in such a manner as to provide animals with protection from extreme climatic conditions by means of:	
	А	shade;	No, but not required
	В	windbreaks;	No, but not required
	С	shelter; or	No, but not required
	D	other means approved by the registration authority.	No, but not required
S3.6		Fencing at registered premises must:	
	А	be appropriate to hold livestock and to prevent the entry of livestock;	Compliant
	В	be maintained in a good state of repair;	Operational
	С	be inspected before the entry of each consignment and twice a week while livestock are in the registered premises; and	Operational
	D	be consistent with the importing country requirements.	Operational
S3.7		To ensure adequate supply of feed and water:	
	A	where feeders, self-feeders and water troughs are used, they must be of a design that allows for complete cleaning of all surfaces, prevents spoilage of feed during inclement weather, and minimises faecal contamination and injuries	Information required



Section		Criteria	
	В	all livestock feed for use at the registered premises must be stored in a manner that maintains the integrity and nutritional value of the feed, and protects it from weather, pests and external contaminants (including chemical spray drift) and from direct access by animals	
	Е	the quantity of feed available should meet at least minimum feed requirements, which are:	
	E(i)	cattle/buffalo — 2.5% of their bodyweight, of a quality feed able to meet daily maintenance requirements;	Compliant
	F	all livestock in the registered premises must have access to drinking water at all times (unless under curfew)	Compliant
	G	water troughs must be:	
	G(i)	positioned apart from hay and feed sources to prevent fouling; and	Operational
	G(ii)	kept clean.	Operational
	н	the water quality must be suitable for the livestock and there must be sufficient backup storage or a contingency	Information
		plan to ensure continuity of supply at peak demand for 2 days.	required
S3.8A		The minimum length of time that livestock must remain in a registered premises prior to departure is as follows:	
	А	for cattle or buffalo:	
	A(i)	a long haul voyage — 2 clear days;	Operational
	A(ii)	for a short haul voyage in a vessel with multiple port loadings or multiple port discharges — 1 clear day;	Operational
	A(iii)	for a short haul voyage in a vessel with 1 port of loading or 1 port of discharge — 24 hours;	Operational
S3.10		The operator of the registered premises must have arrangements in place at the premises to prevent unauthorised entry and access to the feed when livestock are being prepared for export. Access to the premises must be controlled at all times, with:	
	А	all entry points to premises being clearly signed;	Compliant
	В	only those persons necessary for the day-to-day operation of the premises and state and territory government officials having direct access to the area of the premises; and	Operational
	С	all non-employees reporting to reception for appropriate biosecurity checks relevant to the requirements of the facility.	Operational
\$3.11		Stocking density at registered premises must provide at least the following minimum space per head (cattle with horns must be provided with additional space), unless a variation is required and approved by the relevant Australian Government agency:	



Section		Criteria	Outcome
	А	for cattle or camels held for 30 days or more, a minimum of 9 m2, based on an individual liveweight of 500 kg (this allowance can be varied by 0.09 m2 for each 5 kg change in individual liveweight)	Operational
	В	for cattle or camels held for less than 30 days, a minimum of 4 m2, based on an individual liveweight of 500 kg (this allowance can be varied by 0.04 m2 for each 5 kg change in individual liveweight)	Operational
S3.12		When receiving and identifying livestock, the operator must obtain a copy of the vendor declarations regarding the property of source and health and welfare status of the livestock before accepting the livestock for the purpose of preparation for export.	Operational
S3.13		Unloading and inspection:	
	А	Livestock must be unloaded as soon as possible after arrival at the registered premises. Facilities must enable safe and efficient unloading of livestock.	Operational
	В	Livestock must be individually inspected at unloading to determine whether they are suitable for preparation for export.	Operational
	С	Livestock for export must be held and assembled at the registered premises in accordance with the relevant approved NOI and CRMP.	Operational
S3.14		All livestock accepted into the registered premises must be offered water and feed as soon as possible and no more then 12 hours after arrival.	Operational
S3.15		Livestock must be penned in accordance with the criteria in S2.10 (a) to (e).	Operational
S3.16		Daily monitoring of health, welfare and mortality must include the following:	Operational
	А	All livestock must be inspected daily by a competent stock person	Operational
	В	All sick or injured livestock must be given immediate treatment, and veterinary advice must be sought if the cause of a sickness or injury is not obvious, or if action taken to prevent or treat the problem is ineffective	Operational
	С	Investigation by a registered veterinarian must be conducted if mortalities in any one paddock or shed exceed 0.1% or 3 deaths, whichever is the greater, on any one day for cattle and buffalo, or 0.25% or 3 deaths, whichever is the greater, on any one day for cattle and buffalo, or 0.25% or 3 deaths, whichever is the greater, on any one day for any other species of livestock. Dead livestock must be collected and disposed of on a daily basis. Animals must not be able to access the area for disposal of carcasses.	Operational
	D	Records of each consignment must be kept for at least 2 years after the date of export.	Operational



Section	Criteria	Outcome
\$3.17	Any livestock identified at unloading as being distressed, injured or otherwise unsuitable for export must be marked by a permanent method and isolated from the rest of the consignment. A record must be kept that details identity, the method of treatment or euthanasia and disposal of all rejected animals. Criteria for rejection are outlined in Appendix 3.1.	Operational



## 5.2.3. Current access and use

The existing Paterson's Yards are located to the west of the Great Northern Highway and are currently accessed from an unnamed road that joins onto the Great Northern Highway. The existing facility is currently non-operational due to compliance issues with AQIS and DAF.

While the yards are not able to be considered as a potential site in this assessment, they are ideally located and, because they are pre-existing, present an economically advantageous option for holding yard development.

If the facility can obtain AQIS and DAF compliance and is operational in the future it is recommended that a turning lane be added to the Great Northern Highway for both northern and southern access.

#### 5.2.4. Operational structure

While a complete site audit could not be undertaken, a desktop review indicated that the existing infrastructure surrounding the pens would likely satisfy the majority of the requirements as outlined in ASEL (2011). Without knowing the current non-compliance and reason for closure, it is difficult to ascertain the steps in moving forward to again reach operational compliance.

The high-level review did indicate that the existing effluent management and drainage across the site may be insufficient and may need some attention to reach compliance.

#### 5.2.5. Capacity

The existing Paterson's yards have a maximum capacity of 6,000 head. This capacity is maintained in the main pens and the paddocks that surround the facility. The Paterson facility is located on a 140 ha lot and therefore has adequate land to allow for a potential future expansion to the required 10,000 head.

# 5.3. Site 3 – Yindjibarndi Aboriginal Corporation Lease – Lot 150 DP 240249

#### 5.3.1. Location and site description

The Yindjibarndi Aboriginal Corporation Lease (Lot 150 DP 240249) is located south of Port Hedland and outside of the 200 km target zone for this assessment. However, it could represent a potential investment in an agricultural based backgrounding facility or pelletisation plant. The size of the property is approximately 54,833 ha.

#### 5.3.2. Planning approval issues

The site itself includes Lot 190, which is part of Reserve 38991 for water supply. It is under a management order to Water Corporation. A lease has been granted to Yalleen Pastoral Co Pty Ltd over a portion of Lot 190 for grazing purposes. There are two native title claims that cross the Lot: the Ngarluma/Yindjibarndi claim WCD2005/001 (determined) and the Kuruma Marthudunera claim WC2016/002 (registered) (PDC Pers. Comm., 2017).

The adjoining land to the west includes Lot 313 on DP 63520, which is a pastoral lease to Yalleen Pastoral Co Pty Ltd. The adjoining land to the north is unallocated crown land (UCL) and the adjoining land to the east is Class A Reserve 30071, the Millstream-Chichester National Park borders (Lot 190) (PDC Pers. Comm., 2017).

Reserve 40617 for use and benefit of Aboriginal peoples is also located within Lot 190 with no obvious access. Reserve 40617 is vested in the Aboriginal Lands Trust under a management order to the Ngurawaana Group Aboriginal Corporation who also have the power to lease for any term subject to consent of the Minister for Lands. This consent has been granted, and a lease is currently registered to the Ngurawaana Group Aboriginal Corporation due to expire on 31 December 2087.



## 5.3.3. Environmental approval issues

Development on the property would need to consider the following environmental matters:

• Creeks, rivers and fixed infrastructure including several unmarked tracks that run through the property, the Portland River, Fortescue River, Coondinnar Creek and Withnell creek run through the lot, a Special Agreement lease for the purpose of railway which benefits Robe River JV bisects a portion of the lot, a Special Agreement lease for the purpose of power transmission line and access track which benefits Hamersley Iron Pty Ltd bisects a portion of the lot, several registered Aboriginal heritage sites, Gregory Gorge (a popular tourist camping site listed on Karratha tourist website is also located within the lot), and any other relevant information that could support beef or agricultural activities.

A small portion of the Lot is under an exploration licence, otherwise the lot is free of mining tenure

#### 5.3.4. Land tenure matters

Land tenure matters for Yindjibarndi are discussed in Section 5.3.2.

#### 5.3.5. Design and operation constraints

Due to the distance of the site from Port Hedland, consideration would have to be given to costs and logistics associated with transport.

#### 5.3.6. Potential backgrounding facilities

Anecdotal evidence suggests that under trade agreements with China, backgrounding facilities need to be within 200 km of the export Port, in which case the site would not be applicable as a backgrounding facility to supporting exports from Port Hedland. However, there would still be potential for co-location opportunities such as fodder production, at this site. Consideration would need to be given to costs associated with transporting cattle to the Port or other holding yards if this opportunity were to be pursued.

## 5.4. Site 4 – Waste Water Treatment Plant – Port Hedland

#### 5.4.1. Location and site description

The Town of Port Hedland owned and Water Corporation operated WWTP is a potential site for the yards, truck wash, or backgrounding facility. The Western Australian Department of Water has 50 ha of land south of the WWTP that could potentially be used and supplied with A class treated water from the WWTP.

#### 5.4.2. Site inspection

A site inspection was conducted in March 2017 after a significant rainfall event and the site was observed to be flooded. Based on this, the site is considered is not viable for use as a cattle holding yards due to potential for flooding.

#### 5.4.3. Planning approval issues and land tenure matters

The southern portion of the site is currently zoned "other public purposes: waste disposal and treatment". Therefore, for a backgrounding or holding facility to be developed there, planning approval would need to be sought. Considerations by Council would include the ultimate purpose intended and the intentions of agencies with responsibility for managing and developing the operation. Further considerations may include whether recycled water can be used throughout the supply chain of live cattle exports including as drinking water or if it is only able to be used for non-potable uses such as cattle washing. Whether there are restrictions on the use of recycled water for backgrounding facilities and holding yards needs to be confirmed as does the use of waste water to irrigate pasture and/or fodder crops.



An alternative to the development of holding yards or backgrounding facilities on the WWTP site may be to develop the truck wash facility on, or adjacent to, this site. It is less likely that use of recycled water on the truck wash would have restrictions (though this must be confirmed), and therefore, treated wastewater from the WWTP could potentially be used to supply the truck wash. Depending on treatment requirements and the quality of resulting wastewater from the truck wash, treatment to remove bulk sediments from the truck wash wastewater could be undertaken on the truck wash site and then pre-treated water returned for full treatment to the WWTP. Planning approval would need to be sought regarding developing the truck wash on an adjacent site because the surrounding land is zoned rural.

# 5.4.4. Environmental approval issues

There may be potential odour issues for use of the WWTP as holding yards based on the proximity to the Golf Course and other adjacent land holders, including a pony club. However, these are not a formal compliance requirement under ASEL (2011).

## 5.4.5. Design and operation constraints

There may be restrictions on the use of recycled water in various parts of the live export supply chain. This needs to be confirmed.

# 5.4.6. Potential backgrounding facilities

There is 50 ha available at the south of the site that could be a potential irrigation area for grain or fodder production.

# 5.5. Site 5 – Pippingarra Station

# 5.5.1. Location and site description

Pippingarra Station surrounds Port Hedland (Figure 5-3) and is ideally located in terms of proximity to the port for development of the holding yards and truck wash, as well as backgrounding facilities to support the Pilbara live cattle export industry.

## 5.5.2. Site inspection

A site inspection was conducted in March 2017. Four sites within Pippingarra Station were investigated and the findings are presented in Table 5-3. Pippingarra – Road Access 'B' on the corner of Pippingarra Road and the Great Northern Highway was selected as the preferred site for the location of the truck wash and holding yards.

Location	Description
Pippingarra – Road Access 'A' (Yarrie Road)	<ul> <li>Best access to power available by locating the facility at the northern end of the road, closer to South Hedland. This may cause concern over odour and increased truck movements through and around South Hedland &amp; Boodarie.</li> <li>Access to the site via Boodarie, would be along Quartz Quarry Road, which at the time of the inspection was closed to traffic due to flood water.</li> <li>The site is generally flat with what appeared like a slight fall from eastwest.</li> <li>The soils were red and sandy, likely to have high drainage, some ponding suggested there may be some clay content.</li> </ul>

Table 5-3. Pippingarra Station sites investigated during site selection


Location	Description
	<ul> <li>Presumably, the town water supply must run by the site to provide water from South Hedland to Boodarie.</li> <li>There are concerns over the proximity of the proposed site to South Hedland.</li> </ul>
Pippingarra – Road Access 'B' (Pippingarra Road)	<ul> <li>The site is ideally located to capture traffic travelling along the Great Northern Highway.</li> <li>Power runs parallel to the Great Northern Highway, so if the site was located in the northern section of Pippingarra Station, this would be ideal.</li> <li>Pippingarra Road itself is a gravel road that provides good wet weather access.</li> <li>Topography is very flat.</li> <li>Soils are red sand, with some possible clay materials, which resulted in water ponding.</li> <li>There are no concerns surrounding sensitive receptors.</li> <li>The Pippingarra Road and Great Northern Highway intersection is approximately 20 km from the Port.</li> <li>Directly east of the site is the Turner River. Need to investigate possible flood risk this would present to a possible development.</li> </ul>
Pippingarra – Road Access 'C' (-20.3886; 118.8081)	<ul> <li>The site is ideally located to capture traffic travelling along the Great Northern Highway.</li> <li>Power runs parallel to the Great Northern Highway, so if the site was located in the northern section of Pippingarra Station this would be ideal.</li> <li>The access road is gravel</li> <li>Topography is very flat.</li> <li>Soils are red sand, with some possible clay materials, which resulted in water ponding.</li> <li>There are no concerns surrounding sensitive receptors.</li> <li>The intersection with Great Northern Highway intersection is approximately 30 km from the Port.</li> <li>Directly east of the site is the King Edward River. Need to investigate possible flood risk this would present to a possible development.</li> </ul>
Pippingarra – Road Access 'D' (-20.4065; 118.7234)	<ul> <li>The site is ideally located on the Great Northern Highway, 25 km from the port.</li> <li>Power runs along the north of the site.</li> <li>The access is good and line of sight in both directions is good.</li> <li>Topography is flat,</li> <li>Earth is red and sandy.</li> <li>The road is shared by a quarry and therefore access is limited. This makes the site less than ideal due to traffic volumes.</li> </ul>



### 5.5.3. Design and operation constraints

The site is ideally located for development of the holding yards and truck wash. The property is adjacent to the WWTP and there may be potential to access water from the WWTP, in accordance with recycled water restrictions as discussed in Section 5.4. There could also be the potential to treat waste water from the Pippingarra Station facility at the WWTP.

### 5.5.4. Potential backgrounding facilities

The site is ideally located for development of backgrounding facilities. The property is adjacent to the WWTP and there may be potential to access water from the WWTP, in accordance with recycled water restrictions as discussed in Section 5.4.



Figure 5-3. Excerpt from Western Australia Pastoral Land Tenure – Pilbara Region showing Pippingarra Station mapped as pastoral lease owned by Indigenous Interest and Mundabullangana Station to the east of Port Hedland. Source: DAFWA (2016b)

### 5.6. Site 6 – Mundabullangana Station

### 5.6.1. Location and site description

Mundabullangana (Munda) Station is located approximately 88.5 km south west of Port Hedland on the Great Northern Highway (refer to Figure 5-3) and is considered too far from the Port for development of the holding yards and truck wash.

### 5.6.2. Design and operation constraints

The site is located too far from Port Hedland for development of the holding yards and truck wash.



### 5.6.3. Potential backgrounding facilities

The site is ideally located for development of backgrounding facilities. Further investigation is required to determine the land capability.

### 5.7. Site 7 – Pardoo Station

### 5.7.1. Location and site description

Pardoo Station is located approximately 119 km east of Port Hedland on the Great Northern Highway and is considered too far from the port for development of the holding yards and truck wash. The stakeholder consultation process identified that it takes two days using 7 dual level cattle trucks to load a 3,000 head capacity boat of cattle from Pardoo. The owners of Pardoo Station are currently developing their own export operations, which may include holding yards and backgrounding facilities.

### 5.7.2. Design and operation constraints

The site is located too far from Port Hedland for development of the holding yards and truck wash.

### 5.7.3. Potential backgrounding facilities

The site is ideally located for development of backgrounding facilities. Further investigation is required to determine the land capability.

### 5.8. Other sites

Other sites identified as potential locations for backgrounding facilities include Namagoorie Yard, De Grey Station Yard, Mallina Station Yards, and Sherlock Yard. These were considered in the shortlisting process for this assessment.



# 6. Selection of priority sites

### 6.1. Criteria for site selection

Priority sites were selected from the sites listed in Section 5 based on the following site selection criteria:

- Distance to port;
- Distance to highway;
- Capacity;
- Size;
- Access to water and power;
- Distance to receptors;
- Ability to co-locate agricultural opportunities such as irrigated agriculture; and
- Land/environmental constraints.

Based on the criteria outlined above, each site was found to be either suitable for the location of the holding yards (of at least 5,000 head), suitable for location of the truck wash, or both (Table 6-1). The only locations that were identified as within a 50 km distance of the port were the South Hedland Yards, Paterson's Yards, the WWTP, and Pippingarra Station. Paterson's Yards are not able to be used in this analysis because of the unresolved tenure and lease agreement issues and the WWTP was found to be unsuitable due to the potential risk of frequent flooding and inundation. Furthermore, because of the perceived advantages of colocating the truck wash with the holding yards, only those sites that were suitable for both facilities were pursued as potential sites for further analysis. The only sites that were found to satisfy these criteria were the South Hedland Yards and Pippingarra Station.

Table 6-1. Suitability of sites identified in	Stakeholder consultation as locations f	for holding vards and truck wash facilities.

Site	Suitable for holding yards	Suitable for truck wash	Potential site
South Hedland yards	Yes	Yes	Yes
Paterson yards	No	No	No
Yindjibarndi	No	No	No
WWTP	No	No	No
Pippingarra Station	Yes	Yes	Yes
Mundabullangana	No	No	No
Pardoo	No	No	No

### 6.2. Environmental constraints analysis

FSA Consulting developed a site constraints map to identify potential environmental and planning constraints to the priority sites. Findings of this analysis are presented in the site selection matrix in Table 6-2. Excerpts from the site constraints map for individual constraints are provided in Appendix A.



### Table 6-2. Site selection matrix

Site constraints matrix	South Hedland	Pippingarra Station
Location	Lat/Long -20.424733°, 118.555864°	Lat/Long -20.40786°, 118.6912°
Cost and potential for investment	\$10,000 for re-establishment and >\$1.5 million for expansion	>\$7 million
Distance to Port (< 50 km = acceptable, > 50 km = of concern	< 50 km	< 50 km
Distance to Highway (access off highway exists / minor road improvements = acceptable, major road improvements = of concern)	Acceptable	Acceptable
Capacity (Size (<5000 = of concern), (5000-10000 = acceptable))	5000/8000	5000-10000
Access to water and power (no = of concern, yes = acceptable, don't know = information required)	Yes, but the available water yield is unknown and further information required.	Yes, but the available water yield is unknown and further information required
Distance to receptors (see below)	Acceptable but need to consider flood/bushfire	Acceptable but need to consider flood/bushfire
Ability to co-locate agricultural opportunities such as irrigated agriculture (yes = acceptable, no = of concern, don't know = information required)	Of concern	Yes
Land/environmental constraints (see below)	See below	See below
Constraints - other	See below	See below
Defined use (Council Zoning)	Rural	Rural
Council specific buffers/ requirements for intensive animal industries - Planning schemes can have specific buffer distance and separation distance requirements for intensive animal industries. Most of the surrounds of Port Hedland are zoned rural according the Town of Port Hedland Planning Scheme No. 5. Stockyards are permissible under the Rural zone. The only other land where stockyards can exist is on Industry and Industrial Development zoned land (subject to Council approval and, in certain cases) public advertising. Other relevant buffers are given in the National Feedlot Guidelines.	Reserve 33593 – Crown Land Title 3133/413. Lot 364 on DP 74712. Current yards are rural and the lot is surrounded by strategic industry. Use is assumed to be acceptable – but only up to 8000 head. Further clarification recommended.	Pastoral Lease N49843 – Crown Land Title 3061/44. Lot 202 on DP 220387. Will need to address tenure issues related to Native Title prior to proceeding with development.
Regional Plan, Catchment Management plans, Development Control Plans	None known	None known
State Environmental Policies	No State Environmental Policies apply to the area	No State Environmental Policies apply to the area



Site constraints matrix	South Hedland	Pippingarra Station
RAMSAR Wetland	None in the area	None in the area
Environmentally Sensitive Areas	None in the area (Appendix A)	None in the area (Appendix A)
Protected Areas	None in the area	None in the area
Nationally Important Wetlands including Port Hedland Wild Rivers	None in the area	None in the area
National Ecological Significance	None in the area (Appendix A)	None in the area (Appendix A)
Mining leases	None identified	None identified
Other lease/tenure issues - native title etc.	Lot is in the rural zone and surrounded by strategic industry	Under Native Title - WC1999/003
Sufficient Land - Consider the size of the entire complex (pens, cattle handling, feed mill and commodity storage, effluent ponds and manure storage). For the area of the entire complex a good estimate should be at least three times the pen area.	Acceptable – but only up to 8,000 head	Acceptable
Manure and effluent utilisation area - Consider the suitability of surrounding land for manure and effluent utilisation.	Not included. Effluent will need to be transported offsite for disposal or composting	Acceptable
Local topography Avoid sites in confined valleys with sensitive receptors below.	Acceptable if avoided	Acceptable if avoided
Site topography - Site area required to have a gradient of less than 1 in 5	Acceptable (Appendix A)	Acceptable (Appendix A)
Flooding - Avoid sites below the 1 in 100 year average recurrence	The entire Port Hedland area and surrounds is mapped as floodplain under the Port Hedland FPM100 Year ARI Floodplain map (Appendix A). This site is less susceptible to flooding than many sites in the area, including the WWTP, that was found to be inundated during a site inspection. Site will be designed in consideration of specific flood impacts. Site is not likely to be in used during periods of high rainfall.	The entire Port Hedland area and surrounds is mapped as floodplain under the Port Hedland FPM100 Year ARI Floodplain map (Appendix A). This site is less susceptible to flooding than other sites in the area, including the WWTP, that was found to be inundated during a site inspection. Site will be designed in consideration of specific flood impacts. Site is not likely to be in used during periods of high rainfall.



Site constraints matrix	South Hedland	Pippingarra Station
Bushfire Risk	Bushfire Prone Area - additional planning and building requirements may apply to development at this site (Appendix A)	Bushfire Prone Area - additional planning and building requirements may apply to development at this site (Appendix A)
Geotechnical qualities	Mapped as Carlinidi Granitoid complex group of the Pilbara Craton tectonic plate (Appendix A).	Mapped as Pippingarra Granitoid complex group of the Pilbara Craton tectonic plate (Appendix A).
Soils Australian Soil Classification (ASC) Soil Type Overlay Map	Mapped as tenosols, with fast permeability, low/no plant water holding capacity, uniform coarse texture, and low nutrient status (Appendix A). Should confirm whether suitable through on site soil testing	Mapped as tenosols, with fast permeability, low/no plant water holding capacity, uniform coarse texture, and low nutrient status (Appendix A). should confirm whether suitable through onsite testing.
Native vegetation	No impacts foreseen	Information required
Threatened and endangered species	Information required	Information required
Protection of water resources	Information required - drainage line down highway proximal to site (Appendix A)	Acceptable if located outside drainage lines
Community amenity – Air Quality - Consider the impact of the feedlot on the neighbouring community Can it meet the required s-factor separation distance? · Is odour modelling required?	No impacts foreseen	Acceptable if located correctly
Noise - Consider the distance, terrain and vegetation between the feedlot and the surrounding sensitive receptors (dwellings).	No impacts foreseen	Acceptable



Site constraints matrix	South Hedland	Pippingarra Station
Visual amenity - Avoid highly visible sites. – Is a visual screen required? (vegetative screen)	No impacts foreseen	Information required
Archaeological and heritage issues	Acceptable (Appendix A)	Some of Pippingarra Station mapped as Port Hedland Aboriginal Heritage - 12 Mile, Ceremonial, Skeletal Material, Burial. Avoid this area if possible
Roads and traffic - Check State and National lists	Road improvement required	Road improvement required
Economic and resource availability		
Water supply	Water available	Groundwater available
Electricity availability -	Available	Information required
Access to feedstuffs - Reliable supply of feed commodities such as grain and roughages	Acceptable	Assumed to be acceptable
Labour availability	Available	Available
Access to building materials - Consider the on-site or nearby off-site availability of: Suitable clay for lining of feedlot pens, drains, effluent holding ponds, manure storage and composting pads. Suitable gravel for construction and maintenance of feedlot pens, drains, composting pads, roads, cattle lanes and hard stand areas. Suitable materials for road base and sub-grade. Concrete aggregate (if mixing on-site) or ready-mixed concrete.	Acceptable	Acceptable
Animal Welfare		
Climate - Consider the following: Is the annual rainfall less than 750 mm; Rainfall concentrated to the summer season; and Is the proposed feedlot located in areas where excessive heat load events are a regular occurrence? Rainfall in Port Hedland is mainly in summer (very dry winters) and does not exceed 350 mm mean annual rainfall.	Heat impacts to be monitored and managed	Heat impacts to be monitored and managed



# 7. Site Specifications and Preliminary Costing

### 7.1. South Hedland Yards

Two options were identified as viable for the potential holding yards at the existing South Hedland Site. The first option involves re-establishing the existing yards at their current capacity of 5,000 head at a cost of \$10,000 (yard re-establishment). The second option requires expanding the current capacity to the maximum capacity of 8,000 head. The costs associated with the expanded capacity is described in detail in this section.

This study assumes the yards will be operational 8 months of the year with one full consignment of 5,000 head through the yards each month. Holding yard design plans.

High level layout plans have been prepared for the holding yard facilities at the South Hedland Yards (Figure 7-1). These indicate the existing and proposed locations within the site for holding yard infrastructure and the truck wash facilities. Specific effluent management has not been included in the existing facility or the expansion design of the proposed holding yards. The primary reason for this is that the facilities are only to be operated during the dry season and potential runoff is not expected to be transported offsite, nor is it expected to have significant impacts downstream. It is proposed that if a truck wash facility is co-located on the site, considerations would be made to direct runoff into the truck wash evaporation pond.

Appendix B contains plans showing the typical layout of the holding yard pens in more detail and a typical cross section of the holding yard facility.



### NOTES:

- 1. EXISTING FACILITY FEATURES MAY HAVE BEEN DIGITISED FROM PLANS OR AERIAL PHOTOGRAPHS AND ACCURACY IS LIMITED.
- 2. IMAGE SOURCED FROM GOOGLE EARTH PRO<sup>TH</sup>.

ITEM	DIMENSION
EXISTING CAPACITY	7625 HEAD
PROPOSED CAPACITY	8000 HEAD
WEIGHT PER HEAD	400KG
STOCKING DENSITY	3.2m <sup>2</sup>
TRUCK WASH POND	169x87x190m; 1.1m WATER DEPTH; 7ML

	JOB CODE:
ARDS AND TRUCK WASH	1084 & 1085
	SHEET NUMBER: REV:
KISTING FACILITY	FIG 7.1
	Copyright FORM E027 10 AUG 2006



### 7.1.1. Holding yard expansion infrastructure requirements and costing

A detailed list of anticipated infrastructure and indicative costs required for the holding yard expansion at the South Hedland yards is provided in Appendix C and summarised in Table 7-1. These costs are based on a similar facility in the Northern Territory and have been adjusted for anticipated expansion from 5,000 to 8,000 head. Operating costs for all three scenarios are also presented in Appendix C and summarised in Table 7-1.

SUMMARY OF COSTS	BUDGET COST (EX GST)	BEST PRACTICE COST (EX GST )
SECTION 1 - SITE PREPARATION	\$1,200.00	\$1,200.00
SECTION 2 - BULK EARTHWORK	\$20,000.00	\$20,000.00
SECTION 3 - ROAD INFRASTRUCTURE	\$0.00	\$0.00
SECTION 4 - YARD COMPONENT - WORKING CENTRE	\$20,090.00	\$20,090.00
SECTION 5 - YARD COMPONENT - FEED YARDS	\$313,040.00	\$354,789.00
SECTION 6 - WATER SUPPLY	\$66,000.00	\$66,000.00
SECTION 7 - EFFLUENT MANAGEMENT	\$0.00	\$0.00
SECTION 8 - ASSOCIATED INFRASTRUCTURE	\$125,000.00	\$125,000.00
SECTION 9 - ONSITE EQUIPMENT	\$0.00	\$0.00
SECTION 10 - FACILITY LICENCING	\$15,500.00	\$16,500.00
SECTION 11 - DETAILED DESIGN	\$9,618.00	\$10,036.00
SECTION 12 - CONTINGENCY	\$57,145.00	\$61.362.00
TOTAL	\$627,593.00	\$674,977.00

Table 7-1. Indicative costs of holding yard expansion infrastructure.

Table 7-2. Summary of operating costs for holding yard re-establishment, holding yard expansion, and new development at Pippingarra Station.

Component	Value	Comment
Maximum standing capacity (head)	Variable	<ul> <li>5,000 for holding yard re-establishment</li> <li>8,000 for holding yard expansion</li> <li>10,000 for Pippingarra Station</li> </ul>
Estimated facility throughput (head/year)	Variable	<ul> <li>40,000 for holding yard re-establishment</li> <li>64,000 for holding yard expansion</li> <li>80,000 for Pippingarra Station</li> </ul>
Estimated construction costs FIXED FACILITY OPERATING COSTS	Variable	Refer to text



Component	Value	Comment
Annual maintenance costs (\$/year)	Variable	2% of construction costs + (for South Hedland yards only) maintenance fee for existing
Labour costs (\$/year)	\$100,000	Including 2 F/T staff for 8 months of the year (at \$1000/week), plus accommodation, food, fuel (at \$187.50/week), plus additional part time staff. Based on existing yards in WA
Ongoing AQIS accreditation costs (\$/year)	\$5,000	Based on existing yards in WA
Rent (\$/year)	\$5,000	Based on existing yards in WA
Insurance (\$/year)	\$100,000	Nominal based on existing yards in WA
VARIABLE FACILITY OPERATING COSTS		
Electricity usage (\$/head)	\$1.00	Estimate only
Pellets fully supplied and fed out (\$/head)	\$18	Assume cattle to consume an average total of 0.056 tonne pellets during stay in facility (based on average of 14 day stay in facility). Based on existing vards in WA.
Hay fully supplied and fed out (\$/head)	\$17	Assume cattle to consume an average total of 0.056 tonne hay during stay in facility (based on average of 14 day stay in facility). Based on existing vards in WA.
Silage fully supplied and fed out (\$/head)	\$7	Assume cattle to consume an average total of 0.028 tonne silage during stay in facility (based on average of 14 day stay in facility). Based on existing yards in WA.
VARIABLE FACILITY YARD FEES		
yard fee including watering (\$/head)	\$1.15	Based on existing yards in WA
Weighing fee - assumes one per animal (\$/head/weigh)	\$1	Based on existing yards in WA. Assumes one weigh per animal
Drafting fee - excluding entry induction (\$/head/draft)	\$1	Based on existing yards in WA. Assumes one draft per animal
NLIS and documentation fee (\$/head)	\$2	Based on existing yards in WA
Load out fee (\$/head)	\$1	Based on existing yards in WA
Yard holding charge (\$/head)	\$29	Based on existing yards in WA

### 7.1.2. South Hedland Yard Water management

Specific effluent management has not been included in the existing facility or the expansion design of the proposed holding yards. The primary reason for this is that the facilities are only to be operated during the dry season and potential runoff is not expected to be transported offsite, nor is it expected to have significant impacts downstream. However, an effluent pond has been included in the plans for the holding yard



expansion to treat effluent output from the holding yards and truck wash-down facility. This is discussed further in the Truck Wash-Down Feasibility Assessment Report prepared by FSA Consulting. Economic context

The holding yards will have both public and private costs and benefits, which both need to be considered. Public costs and benefits have been considered based only on the transport cost savings discussed in the NBIR (ACIL Allen Consulting 2016). There may also be other public benefits such as avoided losses associated with not having adequate market access. Data around these parameters is extremely difficult to obtain and has not been considered in this assessment.

### 7.1.2.1. Public perspective

The NBIR modelling indicated that optimal cattle exports at the Port of Port Hedland would be associated with transport cost savings of \$8 per head. The re-establishment of operational holding yards is a requirement for achieving optimal cattle exports at Port Hedland, however, a working truck-wash facility, adequate Port infrastructure, and renewed confidence in the industry by pastoralists and exporters is also required. Therefore, only a portion of the transport cost savings can be reasonable attributable to the presence of operational holding yards.

A preliminary cost benefit analysis (CBA) was conducted to investigate whether investment in a holding yard expansion would be beneficial assuming that the re-establishment and expansion of the holding yards would be associated with the \$8 per head transport cost savings. The CBA considered initial capital expenditure and industry benefits only and did not consider the operational costs and benefits that would be incurred by the owner or operator of the facility.

Using a nominal capital expenditure of \$10,000 for weed removal and other minor measures to re-establish the existing yards, the industry would benefit from a positive return on this investment within 5 years (NPV of \$1.20 million; Table 7-3). This was based on a throughput of 40,000 head per annum. However, yard re-establishment was also shown to be beneficial to the industry for throughputs of 5,000 (NPV of \$0.14 million) and 1,000 per annum NPV of \$0.29 million) within 5 years from initial investment.

Investment Criteria	Years after last year of investment						
Years	0	5	10	15	20	25	30
Present Value of Benefits (\$m)	0.00	1.21	1.97	2.43	2.72	2.90	3.02
Present Value of Costs (\$m)	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Net Present Value (\$m)	-0.01	1.20	1.96	2.42	2.71	2.89	3.01
Benefit-Cost Ratio	0.00	121.31	196.63	243.39	272.43	290.47	301.66

Table 7-3. Results of cost benefit analysis for the re-establishment of the existing yards.

Using the best practice total capital expenditure from Table 7-1 for the yard expansion to an 8,000 head facility of \$674,977, the industry would benefit from a positive return on investment within 5 years of investment (NPV of \$1.27 million; Table 7-4). This was based on a throughput of 64,000 head. The CBA showed that, for a throughput of 40,000 head, the expansion would also achieve a positive return within 5 years (NPV of \$0.54 million).

Table 7-4. Results of cost benefit analysis for the best practice expansion to the South Hedland Yards.

Investment Criteria		Years	s after la	st year of	<sup>i</sup> investm	ent	
Years	0	5	10	15	20	25	30
Present Value of Benefits (\$m)	0.00	1.94	3.15	3.89	4.36	4.65	4.83
Present Value of Costs (\$m)	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Net Present Value (\$m)	-0.67	1.27	2.47	3.22	3.68	3.97	4.15



1		1			1	1	1
Benefit-Cost Ratio	0.00	2.88	4.66	5.77	6.46	6.89	7.15

Using the budget total capital expenditure from Table 7-1 for the yard expansion to an 8,000 head facility of \$627,593, the industry would benefit from a positive return on investment within 5 years of investment (NPV of \$1.31 million; Table 7-4). This was based on a throughput of 64,000 head. The CBA showed that, for a throughput of 40,000 head, the expansion would also achieve a positive return within 5 years (NPV of \$0.59 million).

Investment Criteria	Years after last year of investment						
Years	0	5	10	15	20	25	30
Present Value of Benefits (\$m)	0.00	1.94	3.15	3.89	4.36	4.65	4.83
Present Value of Costs (\$m)	0.63	0.63	0.63	0.63	0.63	0.63	0.63
Net Present Value (\$m)	-0.63	1.31	2.52	3.27	3.73	4.02	4.20
Benefit-Cost Ratio	0.00	3.09	5.01	6.21	6.95	7.41	7.69

Table 7-5. Results of cost benefit analysis for the budget expansion to the South Hedland Yards.

### 7.1.2.2. Private perspective

The private perspective considers the costs and benefits of the investment to a potential investor, including capital expenditure and fixed and variable operational costs. Fixed costs are based on best practice costs described above. Operational costs and benefits are included in Appendix C and the yard expansion operational costs and benefits are summarised in Table 7-2.

The key variables that influence costs and benefits are yard holding fees and throughput. It is difficult to access data on yard holding fees in Western Australian due to privacy issues within the industry. However, based on data that has been made available for an existing facility in Western Australia, average yard fees that are paid to holding yard operators are estimated to be between \$30 and \$40 per head. This cost includes:

- Feed;
- Feed out;
- Watering;
- Weighing fees;
- Draft fees;
- NLIS documentation fee; and
- Load out fee.

The analysis shown in Table 7-6 considers the initial investment of \$10,000 in the re-establishment of the South Hedland yards, a throughput of 40,000 head, a holding yard fee of \$35, and is based on the assumptions listed in Table 7-2**Error! Reference source not found.**, a discount rate of 10%, and an investment period of 0-30 years. It shows that the NPV for the investment is \$-5.07 million at the end of the 30 year period. Sensitivity analysis showed that the 20 year NPVs for the same period were \$-4.91 million and \$-4.25 million based on 2% reductions and increases respectively on operating costs. Table 7-7 shows the changes in 20 year NPV for a range of yard fees and throughputs. It shows that a private investor would need to charge a yard holding fee of \$50 per head for the investment to be viable.

# Table 7-6. CBA for private investor in the holding yards re-establishment based on 10% discount rate and first year of operation in 2019.

Investment Criteria	Years after last year of investment						
Years	0	5	10	15	20	25	30
Present Value of Benefits (\$m)	0.00	-2.03	-3.30	-4.08	-4.57	-4.87	-5.06



Present Value of Costs (\$m)	0.01	0.01	0.01	0.01	0.01	0.01	0.01
Net Present Value (\$m)	-0.01	-2.04	-3.31	-4.09	-4.58	-4.88	-5.07
Benefit-Cost Ratio	0.00	-203.41	-329.72	-408.14	-456.84	-487.07	-505.85

Table 7-7. 20 year NPV (\$ million) for a range of throughputs and holding yard fees for the re-established facility

Annual throughput	Hold	ling yard fees (\$/hea	ad)
	40	50	60
40000	-2.88	0.53	3.94
64000	-3.4	2.05	7.5

The analysis shown in Table 7-8 considers the initial investment of \$674,977 in the expansion of the South Hedland yards, a throughput of 64,000 head, a holding yard fee of \$35, and is based on the assumptions listed in Table 7-2, a discount rate of 10%, and an investment period of 0-30 years. It shows that the NPV for the investment is \$-8.13 million at the end of the 30 year period. Sensitivity analysis showed that the 20 year NPVs for the same period were \$-7.93 million and \$-6.90 million based on 2% reductions and increases respectively on operating costs. Table 7-9 shows the changes in 20 year NPV for a range of yard fees and throughputs. Similarly to the yards re-establishment scenario, it shows that a private investor would need to charge a yard holding fee of \$50 per head for the investment to be viable.

Table 7-8. CBA for private investor in the holding yards expansion based on 10% discount rate and first year of operation in 2019.

Investment Criteria	Years after last year of investment						
Years	0	5	10	15	20	25	30
Present Value of Benefits (\$m)	0.00	-3.00	-4.86	-6.02	-6.74	-7.18	-7.46
Present Value of Costs (\$m)	0.67	0.67	0.67	0.67	0.67	0.67	0.67
Net Present Value (\$m)	-0.67	-3.67	-5.54	-6.69	-7.41	-7.86	-8.13
Benefit-Cost Ratio	0.00	-4.44	-7.20	-8.92	-9.98	-10.64	-11.05

Table 7-9. 20 year NPV (\$ million) for a range of throughputs and holding yard fees for the expanded facility

Annual throughput	Holding yard fees (\$/head)					
	40	50	60			
64000	-4.69	0.76	6.21			
100000	-5.78	2.73	11.25			

### 7.2. Pippingarra Station

### 7.2.1. Location

An appropriate location for the holding yards on Pippingarra Station has been identified on the corner of the Great Northern Highway and Pippingarra Road (Figure 7-2).





Figure 7-2. Proposed location for the holding yards at Pippingarra Station. Source: ArcGiS <sup>®</sup> software by Esri.

### 7.2.2. Holding yard design plans

High level layout plans have been prepared for the holding yard facilities at Pippingarra Station (Figure 7-3). These indicate the proposed locations within each of the potential sites for holding yard infrastructure and the truck wash facilities.

		NOTES PENS - STOCKNO DENSITY - STOCKNO DENSITY	= 400kg/HEAD = 3.2m <sup>2</sup> /HEAD = 140mm/HEAD = 690m <sup>2</sup> /PEN = 215 HEAD = 24 = 5,0000 HEAD = 4.5m = 4.5m = 4.5m = 2.0m CONSTRUCTED LANE FENCES OSTS ARE TO TS. TT UP TO THE S THROUGH THE 1.0 - 4 CABLE) 3.0m CTRS YS Sim WIDE) DN
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A ONGRAM USUE SCALE 1:1500 (A1)		TILE OPTION 2 - PROPOSED GREENFIELD FACILITY	Copyright FORM E027 10 AUG 2006

_ // // //	PEN FENCE - 1.6m HIGH (2 RAIL - 4 CABLE) 70 NB POSTS @ 3.0m CTRS
//	LANE FENCE - 1.6m HIGH (2 RAIL - 4 CABLE) 70 NB POSTS @ 3.0m CTRS
<u></u>	INDICATIVE SHADE POLE STAYS
····	PROPOSED ROAD
	PROPOSED DRAIN
	INDICATIVE SHADE CLOTH (7.5m WIDE)



### 7.2.3. Holding yard infrastructure requirements and costing

A detailed list of anticipated infrastructure and indicative costs required for the new holding yard development at Pippingarra Station is provided in Appendix C and summarised in Table 7-10. These costs are based on a similar facility in the Northern Territory and have been adjusted for anticipated development of a 10,000 head capacity holding yard based on the requirement to be able to service all sizes of livestock vessels.

SUMMARY OF COSTS	BUDGET COST (EX GST)	BEST PRACTICE COST (EX GST)
SECTION 1 - SITE PREPARATION	\$94,070.00	\$94,070.00
SECTION 2 - BULK EARTHWORK	\$73,100.00	\$73,100.00
SECTION 3 - ROAD INFRASTRUCTURE	\$257,409.00	\$257,409.00
SECTION 4 - YARD COMPONENT - WORKING CENTRE	\$987,853.00	\$1,268,545.00
SECTION 5 - YARD COMPONENT - FEED YARDS	\$1,048,686.00	\$1,187,851.00
SECTION 6 - WATER SUPPLY	\$225,440.00	\$225,440.00
SECTION 7 - EFFLUENT MANAGEMENT	\$0.00	\$0.00
SECTION 8 - ASSOCIATED INFRASTRUCTURE	\$232,800.00	\$232,800.00
SECTION 9 - ONSITE EQUIPMENT	\$670,000.00	\$670,000.00
SECTION 10 - FACILITY LICENCING	\$21,700.00	\$21,700.00
SECTION 11 - DETAILED DESIGN	\$42,111.00	\$46,309.00
SECTION 12 - CONTINGENCY	\$365,317.00	\$407,722.00
TOTAL	\$4,018,486.00	\$4,484,947.00

### 7.2.4. Economic context

### 7.2.4.1. Public perspective

Using the best practice total capital expenditure from Table 7-10 for the development of a new 10,000 head facility at Pippingarra Station (\$4,484,947), the industry would benefit from a positive return on investment within 15 years of investment (NPV of \$0.38 million; Table 7-11). This was based on a throughput of 80,000 head. If the throughput were to reduce to 64,000 head, a positive return on investment would be achieved within 25 years (NPV of -\$0.13 million).

Table 7-11. Results of cost benefit analysis for the new yards at Pippin	garra Station
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Investment Criteria	Years after last year of investment							
Years	0	5	10	15	20	25	30	
Present Value of Benefits (\$m)	0.00	2.43	3.93	4.87	5.45	5.81	6.03	
Present Value of Costs (\$m)	4.48	4.48	4.48	4.48	4.48	4.48	4.48	
Net Present Value (\$m)	-4.48	-2.06	-0.55	0.38	0.96	1.32	1.55	
Benefit-Cost Ratio	0.00	0.54	0.88	1.09	1.21	1.30	1.35	



Using the budget total capital expenditure from Table 7-10 for the development of a new 10,000 head facility at Pippingarra Station (\$7,023,750), the industry would benefit from a positive return on investment within 15 years of investment (NPV of \$0.85 million; Table 7-11). This was based on a throughput of 80,000 head. If the throughput were to reduce to 64,000 head, a positive return on investment would be achieved within 20 years (NPV of -\$0.34 million).

Investment Criteria	Years after last year of investment							
Years	0	5	10	15	20	25	30	
Present Value of Benefits (\$m)	0.00	2.43	3.93	4.87	5.45	5.81	6.03	
Present Value of Costs (\$m)	4.02	4.02	4.02	4.02	4.02	4.02	4.02	
Net Present Value (\$m)	-4.02	-1.59	-0.09	0.85	1.43	1.79	2.01	
Benefit-Cost Ratio	0.00	0.60	0.98	1.21	1.36	1.45	1.50	

Table 7-12. Results of cost benefit analysis for the new yards at Pippingarra Station

### 7.2.4.2. Private perspective

The analysis shown in Table 7-13 considers the initial investment of \$4,484,947 in the development of new yards at Pippingarra Station, a throughput of 80,000 head, a holding yard fee of \$35, and is based on the assumptions listed in Table 7-2, a discount rate of 10%, and an investment period of 0-30 years. It shows that the NPV for the investment is \$-12.87 million at the end of the 30 year period. Sensitivity analysis showed that the 20 year NPVs for the same period were \$-13.51 million and \$-12.22 million based on 2% reductions and increases respectively on operating costs. Table 7-14 shows the changes in 20 year NPV for a range of yard fees and throughputs. Similarly to the yards re-establishment scenario, it shows that a private investor would need to charge a yard holding fee of \$50 per head for the investment to be viable.

 Table 7-13. CBA for private investor in new yards at Pippingarra Station based on 10% discount rate and first year of operation in 2019.

Investment Criteria	Years after last year of investment								
Years	0	5	10	15	20	25	30		
Present Value of Benefits (\$m)	0.00	-3.73	-6.05	-7.49	-8.38	-8.94	-9.28		
Present Value of Costs (\$m)	4.48	4.48	4.48	4.48	4.48	4.48	4.48		
Net Present Value (\$m)	-4.48	-8.22	-10.53	-11.97	-12.87	-13.42	-13.77		
Benefit-Cost Ratio	0.00	-0.83	-1.35	-1.67	-1.87	-1.99	-2.07		

Table 7-14. 20 year NPV (\$ million) for a range of throughputs and holding yard fees at Pippingarra Station facility

Annual throughput	Holding yard fees (\$/head)								
	40	50	60						
80000	-8.82	-2.01	4.8						
100000	-10.07	-1.55	6.96						



## 8. Conclusions and recommendations

This study has investigated, through a review of existing information, stakeholder engagement, site investigations, and engineering design and costing, the feasibility of expanding existing, or developing new, holding yards to service live cattle exports from the Port of Port Hedland.

A site selection process identified two sites that would be optimal locations for holding yards in Port Hedland. These are the existing South Hedland holding yards and Pippingarra Station. The existing holding yards require minimal investment in order to re-establish operations and the operator of these yards is currently in consultation with exporters regarding potential exports to be shipped in the near future.

A number of scenarios were analysed to assess the potential public and private returns on investment in:

- Re-establishment of existing yards at South Hedland;
- Expansion of existing yards at South Hedland; and
- Development of new yards at a greenfield site on Pippingarra Station.

The analysis identified that, from a public perspective, investment in re-establishing the existing South Hedland yards would have substantial benefits to the Western Australian pastoral industry. Furthermore, investing in an expansion to the existing yards would achieve a positive economic return within 5 years of investment, assuming a guaranteed throughput of at least 40,000 per annum in both cases. In contrast, investment in developing a greenfield site would not achieve a positive return until between 15 and 25 years after the initial investment and would rely on a guaranteed throughput of at least 64,000 head.

From a private perspective, it was found that, in order for an investment in any of the scenarios to be viable, operators would need to charge a yard holding fee of \$50 per head to cover costs (including the current assumed cost of feed) and would require a throughput of 40,000 head for the yard re-establishment, 64,000 head for the yard expansion, and 80,000 head for the greenfield development.

While it is evident that there is a strong potential industry benefit associated with re-establishing or increasing exports from Port Hedland, this report indicates the industry itself needs to be re-established through increasing confidence in users of the port prior to committing to substantial investment in holding yard infrastructure.

If growth in the live export sector eventuates, warranting increased investment in live export infrastructure, opportunities to co-locate related operations and develop backgrounding facilities should be investigated. Many of the sites identified in this study would likely be suitable for such opportunities, depending on export market restrictions around distances to the Port of the various supply chain sectors.

From the perspective of environmental and planning constraints, there is opportunity for a range of vertically integrated and complimentary agricultural development to occur in the Pilbara and, specifically, around Port Hedland. However, this study has indicated that a significant amount of confidence and relationship building of people involved in the industry is a vital prerequisite to growth ensuring that future investment has a benefit to the overall region.



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# Appendix A Environmental constraints layers



Figure B-9-1. Drainage lines (streams) in pink. Source: Google Earth ©.



Figure B-9-2. Environmentally Sensitive Areas (red) to the east of Port Hedland but not in proximity to potential sites. Source: Google Earth ©.





Figure B-3. Slopes < 5% (brown) and slopes > 5% (blue). Source: Google Earth C.



Figure B-9-3. Nationally Important Wetlands (blue) to the east of Port Hedland but not in proximity to potential sites. Source: Google Earth ©.





Figure B-9-4. Port Hedland Aboriginal Heritage sites. There is a large area of Aboriginal Heritage mapped on Pippingarra Station that should be avoided for the development. Source: Google Earth ©.



Figure B-9-5. Port Hedland area and surrounds mapped as 100 Year Flood Prone Area. Source: Google Earth ©.





Figure B-9-6. Pippingarra Station mapped as Pippingarra Granitoid complex group of the Pilbara Craton tectonic plate (blue) and the South Hedland Holding Yards mapped as Carlinidi Granitoid complex group of the Pilbara Craton tectonic plate (brown). Source: Google Earth ©.



Figure B-9-7. Port Hedland Area and surrounds mapped as Bushfire Prone Area. Source: Google Earth ©.





Figure B-9-8. Pippingarra Station and the South Hedland Holding Yards mapped as Mapped as tenosols, with fast permeability, low/no plant water holding capacity, uniform coarse texture, and low nutrient status. Source: Google Earth ©.



# Appendix B Typical pen layout and cross section



### <u>NOTES:</u>

PEN FOUNDATIONS SHOULD BE CONSTRUCTED IN ACCORDANCE WITH THE NATIONAL GUIDELINES FOR BEEF CATTLE FEEDLOTS IN AUSTRALIA (2012). THESE STANDARDS STAGE THAT:

1) THE FINAL SURFACE OF THE PAD MUST HAVE A CBR (CALIFORNIA BEARING RATION) OF  $\geq$  AT LEAST 20, AND BE OF SUFFICIENT DEPTH TO ENSURE THE INTEGRITY OF THE STRUCTURE IS MAINTAINED THROUGHOUT THE GENERAL WORKING OF THE FEEDLOT.

2) IRRESPECTIVE OF THE FINISHED PEN SURFACE, THE UNDERLYING SOILS MUST HAVE A MAXIMUM PERMEABILITY OF 1 x 10° m/s (0.1mm/day) FOR DISTILLED WATER WITH 1.0m OF PRESSURE HEAD.

3) IF A CLAY LINER IS USED, THE MATERIAL SHOULD BE PLAYED IN LAYERS OF 150mm (±50 mm). EACH LAYER SHOULD BE TINED, WETTED TO ±2% OF OPTIMUM MOISTURE CONTENT (AS 1289 5.1.1) AND COMPACTED TO REACH THE REQUIRED COMPACTION (RELATIVE TO THE MAXIMUM DRY DENSITY, AS 1289 5.4.2) THAT IS NEEDED TO ACHIEVE THE REQUIRED PERMEABILITY OF 0.1mm/day.

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### NOTES:

### PENS

- 1. CATTLE WEIGHT
- STOCKING DENSITY 2
- З. BUNK SPACE
- 4. PENS 30m (WIDE)x 23m (DEPTH)
- INDIVIDUAL PEN CAPACITY 5.
- 6. TOTAL PENS
- 7. TOTAL CAPACITY

### FACILITY

Ι.	CATTLE LANE WIDTH	= 4.5m
2.	BUNK WIDTH	= 1.0 m
3.	FEED ROAD WIDTH	= 4.5m
<b>.</b>	DRAIN WIDTH	= 4.5m

= 400kg/HEAD

= 3.2m<sup>2</sup>/HEAD

= 140mm/HEAD = 690m<sup>2</sup>/PEN

= 5,0000 HEAD

= 215 HEAD

= 24

= 2.0m

5. JUMP UP ALLOWANCE

### SHADE POSTS

- 1. NETPRO SHADE POSES ARE TO CONSTRUCTED INLINE WITH THE PEN & CATTLE LANE FENCES WHERE REQUIRED. THE SHADE POSTS ARE TO REPLACE STANDARD FENCE POSTS.
- 2. FENCE RAIL AND CABLE IS TO BUTT UP TO THE POST AND CABLES ARE TO PASS THROUGH THE SHADE POSTS.

### <u>LEGEND</u>



LANE FENCE – 1.5m HIGH (2 RAIL – 4 CABLE) 70 NB POSTS @ 3.0m CTRS FEED BUNK FENCE

- 4.5m x 1.5m RAIL GATE 3.6m x 1.5m RAIL GATE
- PROPOSED ROAD
- PROPOSED DRAIN

INDICATIVE SHADE CLOTH (7.5m WIDE)

EFFLUENT DRAINAGE DIRECTION



1084 & 1085

FIGB2 A

SHEET NUMBER:

Copyright



# Appendix C Cost estimate

### **Pippingarra Station Yards Capital Costs**

	•			R	ate Per Unit	Fixed Total Price						
Item No	Description	Unit	Quantity	(	Inc. Fuel)	(Inc. Fuel)						
		•	Quantity	(GST Inc)			(GST Inc)					
SECTION <sup>•</sup>	1 - SITE PREPARATION		_									
1.1	Land clearing	ha	15	\$	600	\$	9.000					
1.2	Facility fencing (fence)	lin.km	1.8	\$	6.650	\$	11.970					
1.3	Facility fencing (end assembly and gates)	Item	15	\$	220	\$	3.300					
1.4	High voltage power connection (3 phase)	lin.m	200	\$	90	\$	18.000					
1.5	25kva three phase transformer	ltem	1	\$	30.000	\$	30.000					
1.6	Diesel Backup Generator (50 kva)	ltem	1	\$	21.800	\$	21.800					
				Ŧ	,	+	_ ,					
			SUB	тот	AL	\$	94,070					
							- ,					
			•									
SECTION 2	2 - BULK EARTHWORK	Unit	Quantity		Rate		Fixed Price					
2.1	Site survey	Item	1	\$	5.000	\$	5,000					
2.2	Topsoil stripping	m2	85000	\$	1	\$	42,500					
2.3	Ground compaction of insitu material	m2	51200	\$	1	\$	25,600					
2.4	Bulk earthwork	m3	0	\$	8	\$	-					
			SUB	тот	AL	\$	73,100					
SECTION 3	3 - ROAD INFRASTRUCTURE	Unit	Quantity		Rate		Fixed Price					
3.1	Main access road	m2	3200	\$	38	\$	121,600					
3.2	Internal roads (inc. turning circles)	m2	9296	\$	9	\$	106,439					
3.3	Staff parking area	m2	40	\$	8	\$	320					
3.4	Hardstand truck parking area (40m x 80m)	m2	3200	\$	4	\$	12,800					
3.5	Entrance grid (8m wide 18t/axel)	Item	1	\$	16,250	\$	16,250					
3.6	B-double weighbridge	Item	0	\$	160,000	\$	-					
			SUB TOTAL		UB TOTAL		3 TOTAL		SUB TOTAL		\$ 257,409.20	
SECTION 4	4 - YARD COMPONENT - WORKING CENTRE	Unit	Quantity		Rate		Fixed Price					
4.1	Crushes (Including auto drafting pneumatic controls)	Item	1	\$	47,841	\$	47,841					
4.2	Equipment	Item	1	\$	409,585	\$	409,585					
4.3	Yard Components (gates, fences) Supply	Item	1	\$	253,594	\$	253,594					
4.4	Civil components (post hole digging and concrete)	Item	1	\$	170,579	\$	170,579					
4.5	Water troughs	Item	8	\$	992	\$	7,936					
4.6	Installation costs	Item	1	\$	235,032	\$	235,032					
4.7	Site costs (Hire, Job Fixed Costs Employee Costs (Accom, Travel, Food)	Item	0	\$	82,168	\$	-					
4.8	Freight.	Item	1	\$	7,842	\$	7,842					
4.9	Administration	Item	1	\$	32,136	\$	32,136					
4.10	Shed over processing area	Item	0	\$	85,000	\$	-					
4.11	Shed over cattle exit area	Item	0	\$	85,000	\$	-					
4.12	Lighting tower poles	Item	10	\$	2,000	\$	20,000					
4.13	Electrical supply connection, and materials	Item	1	\$	84,000	\$	84,000					
			SUB	тот	AL	\$	1,268,545					

SECTION	5 - YARD COMPONENT - FEED YARDS	Unit	Quantity		Rate	Fixed Price
5.1	Yard Components (gates, fences) Supply	Item	1	\$	465,444	\$ 465,444
5.2	Civil components (feed apron 100mm thick)	Item	0	\$	398,124	\$ -
5.3	Civil components (post hole digging and concrete)	Item	1	\$	87,778	\$ 87,778
5.4	Netpro Shade (7.5m wide)	Item	0	\$	640,000	\$ -
5.5	Feed bunks (poly belt)	Item	1	\$	133,508	\$ 133,508
5.6	Water troughs	Item	32	\$	992	\$ 31,744
5.7	Installation costs	Item	1	\$	414,278	\$ 414,278
5.8	Site costs (Hire, Job Fixed Costs Employee Costs (Accom, Travel, Food)	Item	0	\$	147,954	\$ -
5.9	Freight	Item	1	\$	29,929	\$ 29,929
5.10	Administration	Item	1	\$	25,171	\$ 25,171
			SUB	SUB TOTAL		\$ 1,187,851

SECTION		Unit	Quantity	1	Data	1	Fixed Drice
SECTION	0 - WATER SUPPLY	Unit	Quantity	¢	Rate	¢	Fixed Price
0.1	Drill groundwater bore - Main supply	lin. m	20	ф Ф	200	ф Ф	4,000
6.2	Pero nump x 2	ltom	20	ф Ф	200	ф Ф	4,000
6.4	1 x Tank for gravity food to water troughs	ltem	1	φ ¢	20,000	ф Ф	20,000
0.4	2 x Packup storage tapks	ltom	2	ф Ф	20,000	ф Ф	20,000
0.5		nem	2	φ	20,000	φ	40,000
6.6	2 x Pressure pump to pump water to sprinklers and bore if required	Item	2	\$	3,000	\$	6,000
6.7	Water reticulation to facilities, troughs and dust sprinklers	lin.m	3586	\$	40	\$	143,440
			SUB		TAL	\$	225,440
SECTION	7 - EFFLUENT MANAGEMENT	Unit	Quantity		Rate		Fixed Price
7 1	Sever line from troughs (100 mm uPVC)	lin m	N/A	\$	80	\$	-
7.1	Sedimentation basin		N/A	\$	10	\$	-
7.3	Sedimentation basin concrete entry	ltem	N/A	\$	10 000	\$	-
7.4	Sedimentation weir	Item	N/A	\$	20,000	\$	-
7.5	Evaporation holding pond		N/A	\$	10	\$	-
7.6	Sedimentation basin and evaporation pond fence	lin.km	N/A	\$	6,650	\$	-
77	Eacility fencing (End assembly and gates)	Item	N/A	\$	220	\$	-
				Ť		+	
			SUB	тот	AL	\$	-
						Ť	
SECTION	8 - ASSOCIATED INFRASTRUCUTRE	Unit	Quantity		Rate		Fixed Price
8.1	Commodity storage shed + mixing area (40m x 20m x 6.0m)	ltem	1	\$	75,000	\$	75,000
8.2	Commodity Storage Concrete Pad * removed - assume no	m3	0	\$	300	\$	-
83	Hav storage shed (20m x 20m x 6.0m)	Itom	1	¢	50,000	¢	50.000
0.3 8.4	Hay Storage Concrete Pad	m3	0	φ ¢	300	9 6	50,000
8.5	Workshop shed with roller door (6m x 8m)	ltem	1	φ \$	25 500	ф ¢	25 500
8.6	Workshop shed concrete pad	m3	0	Ψ \$	20,000	¢ ¢	
0.0	Office & administration dongs with fover administration area	110	0	Ψ	000	Ψ	
8.7	manager's office, kitchenette & ablution	Item	1	\$	82,300	\$	82,300
8.8	Staff accommodation, kitchen area, dining room area & ablution	Item	N/A	\$	208,300	\$	-
			SUB		TAL	\$	232,800
OFOTION				1			
SECTION		Unit	Quantity	<b>^</b>	Rate	<b>^</b>	Fixed Price
9.1	Mixer tractor	Item	1	\$	80,000	\$	80,000
9.2	Mixer wagon	Item	1	⇒	150,000	\$ ¢	150,000
9.3	l elenandier	Item	1	⇒	170,000	\$ ¢	170,000
9.4	Second tractor & food wages	Item	1	¢	100,000	¢	70,000
9.5	Second tractor & reed wagon	Item	1	ф Ф	60,000	\$ ¢	100,000
9.6	Oued bikes	Item	1	\$ ¢	60,000	¢	60,000
9.7		Item	1	\$	10,000	¢	10,000
9.8	Front end loader	Item	1	\$	30,000	\$	30,000
						¢	070.000
			508		AL	\$	670,000

SECTION	SECTION 10 - FACILITY LICENCING		Quantity	Rate		Fixed Price	
10.1	Preparation of Development Application	Item	1	\$	15,000	\$	15,000
10.2	Development Application advertising cost	Item	1	\$	500	\$	500
10.3	Preparation of the Vegetation Clearing Application	Item	1	\$	5,000	\$	5,000
10.4	Native Vegetation Clearing Permit	Item	1	\$	200	\$	200
10.5	Environmental Protection Licence	Item	1	\$	1,000	\$	1,000
10.6	Department of Agriculture Licence Fee	Item	1	\$	-	\$	-
			SUB	SUB TOTAL		\$	21,700

SECTION	TT - DETAILED DESIGN	Unit	Quantity	Rate		Fixed Price
11.1	Detailed engineering design	Item	1	\$	40,309	\$ 40,309
11.2	Bill of Quantities	Item	1	\$	6,000	\$ 6,000
			SUB TOTAL		\$ 46,309.15	

SECTION	12 - CONTINGENCY	Unit	Quantity		Rate	Fixed Price
12.1	Contingency (10%)	Item	1	\$	407,722	\$ 407,722
			SUB TOTAL		\$ 407,722	

SUMMARY OF COSTS	COS	T (GST INC.)
SECTION 1 - SITE PREPARATION	\$	94,070
SECTION 2 - BULK EARTHWORK	\$	73,100
SECTION 3 - ROAD INFRASTRUCTURE	\$	257,409
SECTION 4 - YARD COMPONENT - WORKING CENTRE	\$	1,268,545
SECTION 5 - YARD COMPONENT - FEED YARDS	\$	1,187,851
SECTION 6 - WATER SUPPLY	\$	225,440
SECTION 7 - EFFLUENT MANAGEMENT	\$	-
SECTION 8 - ASSOCIATED INFRASTRUCUTRE	\$	232,800
SECTION 9 - ONSITE EQUIPMENT	\$	670,000
SECTION 10 - FACILITY LICENCING	\$	21,700
SECTION 11 - DETAILED DESIGN	\$	46,309
SECTION 12 - CONTINGENCY	\$	407,722
TOTAL	\$	4,484,947

### **Sounth Hedland Yards - Capital Costs**

				Rate Per Unit	F	ixed Total Price
Item No	Description	Unit	Quantity	(Inc. Fuel)		(Inc. Fuel)
				(GST Inc)		(GST Inc)
SECTION	1 - SITE PREPARATION					
1.1	Land clearing	ha	2	\$ 600	\$	1,200
1.2	Facility fencing (fence)	lin.km	N/A	\$-	\$	-
1.3	Facility fencing (end assembly and gates)	Item	N/A	\$-	\$	-
1.4	High voltage power connection (3 phase)	lin.m	N/A	\$-	\$	-
1.5	25kva three phase transformer	ltem	N/A	\$-	\$	-
1.6	Diesel Backup Generator (50 kva)	Item	N/A	\$-	\$	-
			_			
			SUB	TOTAL	\$	1.200
					Ť	.,
SECTION	2 - BULK EARTHWORK	Unit	Quantity	Rate		Fixed Price
2.1	Site survey	ltem	N/A	\$-	\$	-
2.2	Topsoil stripping	m2	20000	\$ 1	\$	10,000
2.3	Ground compaction of insitu material	m2	20000	\$ 1	\$	10,000
2.4	Bulk earthwork	m3	0	\$8	\$	-
			SUB	TOTAL	\$	20,000
SECTION	3 - ROAD INFRASTRUCTURE	Unit	Quantity	Rate		Fixed Price
3.1	Main access road	m2	N/A	\$-	\$	-
3.2	Internal roads (inc. turning circles)	m2	N/A	\$-	\$	-
3.3	Staff parking area	m2	N/A	\$-	\$	-
3.4	Hardstand truck parking area (40m x 80m)	m2	N/A	\$-	\$	-
3.5	Entrance grid (8m wide 18t/axel)	Item	N/A	\$-	\$	-
3.6	B-double weighbridge	Item	N/A	\$-	\$	-
					•	
			SUB		\$	-
	1					
SECTION	4 - YARD COMPONENT - WORKING CENTRE	Unit	Quantity	Rate		Fixed Price

SECTION	4 - YARD COMPONENT - WORKING CENTRE	Unit	Quantity		Rate	Fixed Price
4.1	Crushes (Including auto drafting pneumatic controls)	Item	1	\$	9,090	\$ 9,090
4.2	Equipment (NLIS panel tag reader)	Item	2	\$	4,500	\$ 9,000
4.3	Yard Components (gates, fences) Supply	Item	N/A	\$	-	\$ -
4.4	Civil components (post hole digging and concrete)	Item	N/A	\$	-	\$ -
4.5	Water troughs	Item	N/A	\$	-	\$ -
4.6	Installation costs	Item	N/A	\$	-	\$ -
4.7	Site costs (Hire, Job Fixed Costs Employee Costs (Accom, Travel, Food)	Item	N/A	\$	-	\$ -
4.8	Freight	Item	N/A	\$	-	\$ -
4.9	Administration	Item	N/A	\$	-	\$ -
4.10	Shed over processing area	Item	1	\$	2,000	\$ 2,000
4.11	Shed over cattle exit area	Item	N/A	\$	-	\$ -
4.12	Lighting tower poles	Item	N/A	\$	-	\$ -
4.13	Electrical supply connection, and materials	Item	N/A	\$	-	\$ -
			SUB TOTAL			\$ 20,090

SECTION 5 - YARD COMPONENT - FEED YARDS		Unit	Quantity		Rate	Fixed Price
5.1	Yard Components (gates, fences) Supply	Item	1	\$	139,650	\$ 139,650
5.2	Civil components (feed apron 100mm thick)	Item	0	\$	119,400	\$ -
5.3	Civil components (post hole digging and concrete)	Item	1	\$	26,340	\$ 26,340
5.4	Netpro Shade (7.5m wide)	Item	0	\$	270,000	\$ -
5.5	Feed bunks (poly belt)	Item	1	\$	40,050	\$ 40,050
5.6	Water troughs	Item	8	\$	992	\$ 7,936
5.7	Installation costs	Item	1	\$	124,283	\$ 124,283
5.8	Site costs (Hire, Job Fixed Costs Employee Costs (Accom, Travel, Food)	ltem	0	\$	44,386	\$ -
5.9	Freight	Item	1	\$	8,979	\$ 8,979
5.10	Administration	Item	1	\$	7,551	\$ 7,551
			SUB TOTAL		\$ 354,789	

SECTION	6 - WATER SUPPLY	Unit	Quantity		Rate		Fixed Price
61	Drill groundwater hore - Main supply		N/A	\$	-	\$	-
6.2	Drill groundwater bore - Contingency measures	lin m	N/A	\$	-	\$	
6.3	Bore pump x 2	Item	N/A	\$	-	\$	-
6.4	1 x Tank for gravity feed to water troughs	Item	N/A	\$	-	\$	-
6.5	2 x Backup storage tanks	Item	2	\$	20.000	\$	40.000
6.6	2 x Pressure pump to pump water to sprinklers and bore if required	Item	2	\$	3,000	\$	6,000
6.7	Water reticulation to facilities, troughs and dust sprinklers	lin.m	500	\$	40	\$	20.000
				Ŧ		<b>•</b>	
			SUB	тот	AL	\$	66,000
					_	r	
SECTION		Unit	Quantity	<b>•</b>	Rate	<b>•</b>	Fixed Price
7.1	Sewer line from troughs (100 mm uPVC)	lin.m	N/A	\$	-	\$	-
7.2	Sedimentation basin	m3	N/A	\$	-	\$	-
7.3	Sedimentation basin concrete entry	Item	N/A	\$	-	\$	-
7.4	Sedimentation weir	Item	N/A	\$	-	\$	-
7.5	Evaporation holding pond	lin km	N/A	Ф Ф		Э Ф	-
7.0	Sedimentation basin and evaporation poind tence		N/A	Ф Ф	-	Ф Ф	-
1.1	Tacinty rending (Lind assembly and gates)	nem		N/A 5 -		Ψ	
			SUB	тот	AL	\$	-
SECTION	8 - ASSOCIATED INFRASTRUCUTRE	Unit	Quantity		Rate		Fixed Price
8.1	Commodity storage shed + mixing area (40m x 20m x 6.0m)	Item	1	\$	75,000	\$	75,000
8.2	Commodity Storage Concrete Pad	m3	0	\$	300	\$	-
8.3	Hay storage shed (20m x 20m x 6.0m)	Item	1	\$	50,000	\$	50,000
8.4	Hay Storage Concrete Pad	m3	0	\$	300	\$	-
8.5	Workshop shed with roller door (6m x 8m)	ltem	N/A	\$	-	\$	-
8.6	Workshop shed concrete pad	m3	N/A	\$	-	\$	-
8.7	Office & administration donga with foyer, administration area, manager's office, kitchenette & ablution	Item	N/A	\$	-	\$	-
8.8	Staff accommodation, kitchen area, dining room area & ablution	Item	N/A	\$	-	\$	-
			SUB		ΔΙ	¢	125 000
						Ψ	125,000
SECTION	9 - ONSITE EQUIPMENT	Unit	Quantity		Rate		Fixed Price
9.1	Mixer tractor	Item	N/A	\$	-	\$	-
9.2	Mixer Wagon	Item	N/A	\$	-	\$	-
9.3	Telehandler	Item	N/A	\$	-	\$	-
9.4	Second Loader	Item	N/A	\$	-	\$	-
9.5	Second tractor & feed wagon	Item	N/A	\$	-	\$	-
9.6	Utes	Item	N/A	\$	-	\$	-
9.7	Quad bikes	ltem	N/A	\$	-	\$	-
9.8	Front end loader	Item	N/A	\$	-	\$	-
			SUB	тот	AL	\$	-
SECTION	10 - FACILITY LICENCING	Unit	Quantity		Rate		Fixed Price
10 1	Preparation of Development Application	ltem	1	\$	15 000	\$	15 000
10.1	Development Application advertising cost	ltem	1	\$	500	\$	500
10.2	Preparation of the Vegetation Clearing Application	Item	N/A	\$	-	\$	-
10.4	Native Vegetation Clearing Permit	Item	N/A	\$	-	\$	-
	Environmental Drotection License	ltom	1	¢	1 000	¢	1 000
10.5	Environmental Protection Licence	nem		φ	1,000	Ф	1,000

 10.5
 Environmental Protection Licence
 Item
 1
 \$ 1,000
 \$ 1,000

 10.6
 Department of Agriculture Licence Fee
 Item
 N/A
 \$ \$ 

 Image: Substrain Control Contrectica

SECTION	11 - DETAILED DESIGN	Unit	Quantity	Rate		Rate		Rate		Rate		Rate		Rate		Rate		Rate		Rate		Rate		Rate		Fixed Price	
11.1	Detailed engineering design	Item	1	\$ 0	\$	6,036																					
11.2	Bill of Quantities	Item	1	\$ 4,000	\$	4,000																					
			SUB TOTAL			10,035.79																					

SECTION	12 - CONTINGENCY	Unit	Quantity		Rate	Fixed Price
12.1	Contingency (10%)	Item	1	\$	61,362	\$ 61,362
			SUB TOTAL			\$ 61,362

SUMMARY OF COSTS	COST	(GST INC.)		
SECTION 1 - SITE PREPARATION	\$	1,200		
SECTION 2 - BULK EARTHWORK	\$	20,000		
SECTION 3 - ROAD INFRASTRUCTURE	\$	-		
SECTION 4 - YARD COMPONENT - WORKING CENTRE	\$	20,090		
SECTION 5 - YARD COMPONENT - FEED YARDS	\$	354,789		
SECTION 6 - WATER SUPPLY	\$	66,000		
SECTION 7 - EFFLUENT MANAGEMENT	\$	-		
SECTION 8 - ASSOCIATED INFRASTRUCUTRE	\$	125,000		
SECTION 9 - ONSITE EQUIPMENT	\$	-		
SECTION 10 - FACILITY LICENCING	\$	16,500		
SECTION 11 - DETAILED DESIGN	\$	10,036		
SECTION 12 - CONTINGENCY	\$	61,362		
TOTAL	\$	674,977		
Operating Costs				
---	---------------------------------	--	---	--
	<b>Options Assessment</b>			
OVERVIEW	Do nothing	Expand existing South Hedland yards	Develop new yards at Pippingarra Station	Comment
Maixum standing capacity (head)	5,000	8,000	10,000	
Estimated facility throughput (head/year)	40,000	64,000	80,000	Variable range for investigation
Estimated construction costs	\$10,000	\$674,977	\$4,484,947	Assumed to occur in the first year
FIXED FACILITY OPERATING COSTS				
				2% of construction costs + maintenance fee for existing
Annual maintenance costs (\$/year)	\$20,200.00	\$33 <i>,</i> 499.54	\$89,698.94	infrastructure (2% of 200,000)
				Including 2 F/T staff for 8 months of the year (at \$1000/week),
Labour costs				plus accommodation, food, fuel (at \$187.50/week), plus
(\$/year)	\$100,000	\$100,000	\$100,000	additional part time staff. Based on existing yards in WA
Ongoing AQIS accredictation costs (\$/year)	\$5,000	\$5,000	\$5,000	Based on existing yards in WA
Rent				
(\$/year)	\$5,000	\$5,000	\$5,000	Based on existing yards in WA
Insurance				
(\$/year)	\$100,000	\$100,000	\$100,000	Nominal based on existing yards in WA
VARIABLE FACILITY OPERATING COSTS				
Electricity usage				
(\$/head)	\$1.00	\$1.00	\$1.00	Estimate only
				Assume cattle to consume an average total of 0.056 tonne
Pellets fully supplied and fed out				pellets during stay in facility (based on average of 14 day stay in
(\$/head)	\$18	\$18	\$18	facility). Based on existing yards in WA.
,	7	<b>7</b>	+	Assume cattle to consume an average total of 0.056 tonne hav
Hay fully supplied and fed out				during stay in facility (based on average of 14 day stay in facility).
(\$/tonne)	\$17	\$17	\$17	Based on existing vards in WA.
	<i><i><i>q</i>=<i>r</i></i></i>	<i>~_</i> /	φ <b>-</b> ,	Assume cattle to consume an average total of 0.028 tonne silage
Silage fully supplied and fed out				during stay in facility (based on average of 14 day stay in facility).
(\$/tonne)	\$7	\$7	\$7	Based on existing vards in WA.
VARIABLE FACILITY YARD FEES	φ <b>γ</b>	<i>,</i> ,,	γ,	
vard fee including watering				
(\$/head)	\$1.15	\$1.15	\$1.15	Based on existing vards in WA
Weighing fee - assumes one per animal	<i>+</i> = · = •	<i>+</i>	<i>+</i>	
(\$/head/weigh)	\$1	\$1	\$1	Based on existing yards in WA. Assumes one weigh per animal
Drafting fee - excluding entry induction				
(\$/head/draft)	\$1	\$1	\$1	Based on existing yards in WA. Assumes one draft per animal
NLIS and documentation fee				
(\$/head)	\$2	\$2	\$2	Based on existing yards in WA
Load out fee				
(\$/head) Xard halding shares	\$1	\$1	\$1	Based on existing yards in WA
(\$/bead)	¢20	¢20	¢ 20	
(onlead)	\$29	\$29	\$29	
l otal yard charge	¢2E	¢25	¢2E	Variable range for investigation
	20000 200	\$55 64000	00000 CCÇ	Variable range for investigation
	40000	64000	80000	
	¢220.200	¢242 E00	¢200.600	
Total Variable Costs	\$230,200 \$1,742,400	\$243,500 \$2,797,940	2299,099 ۵۵ ۸۹۸ ۵۵	
	\$1,742,400	\$2,787,840	\$3,484,800	
	\$1,972,600	\$3,031,340	\$3,784,499	
opper total costs (+ 2%)	\$2,012,052.00	\$3,091,966.33	\$3,860,188.92	
Lower total costs (-2%)	\$1,933,148.00	\$2,970,712.75	\$3,708,808.96	
Total Benefit	\$1,400,000.00	\$2,240,000	\$2,800,000.00	