



Proposed Pinkenba Ethanol Bio-Refinery

Initial Advice Statement



OCTOBER 2006

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1.0 INTRODUCTION

1.1 PROJECT OVERVIEW

Primary Energy Pty Limited proposes to establish a dry milling ethanol bio-refinery on an existing industrial site at Pinkenba in Brisbane, Queensland. The site is currently operated by Graincorp. The location of the site and current site layout are shown on **Figures 1.1** and **1.2** respectively. The site has frontage to Brisbane River (**Figure 1.2**), and has road access via Tingira Street off Eagle Farm Road and Farrer Street. The site has a rail loop that connects to the Pinkenba Line.

The proposed Bio-Refinery will combine ethanol plant technology with anaerobic digester technology, green electricity generation and fertiliser production. At full production the Bio-Refinery will process up to approximately 400,000 tonnes of grain feedstock per year to produce approximately 160 ML of fuel grade ethanol, fertiliser, aqueous ammonia and green electricity.

An anaerobic digester will be used to process by-products from the ethanol production to produce bio-gas which will be used to produce green electricity that can be exported back into the power grid. Raw materials and product will be transported to and from the site by a combination of road, rail, ship, conveyor and pipelines.

It is estimated that the project will require approximately \$150 million in capital expenditure to establish and will generate up to 300 construction jobs. During the operational phase of the development approximately 50 direct full-time jobs will be created and it is estimated that approximately 350 indirect jobs will be generated in the local region.

The Primary Energy Ethanol Bio-Refinery proposed to be constructed at Pinkenba consists of a series of processes that convert and harness the solar energy that has been captured through agricultural production of wheat, into:

- transport fuel, namely Fuel Grade Ethanol;
- bio-gas, which fuels generators to produce green electricity;
- aqueous ammonia; and
- fertiliser, which is used to return nutrients to agricultural soils.

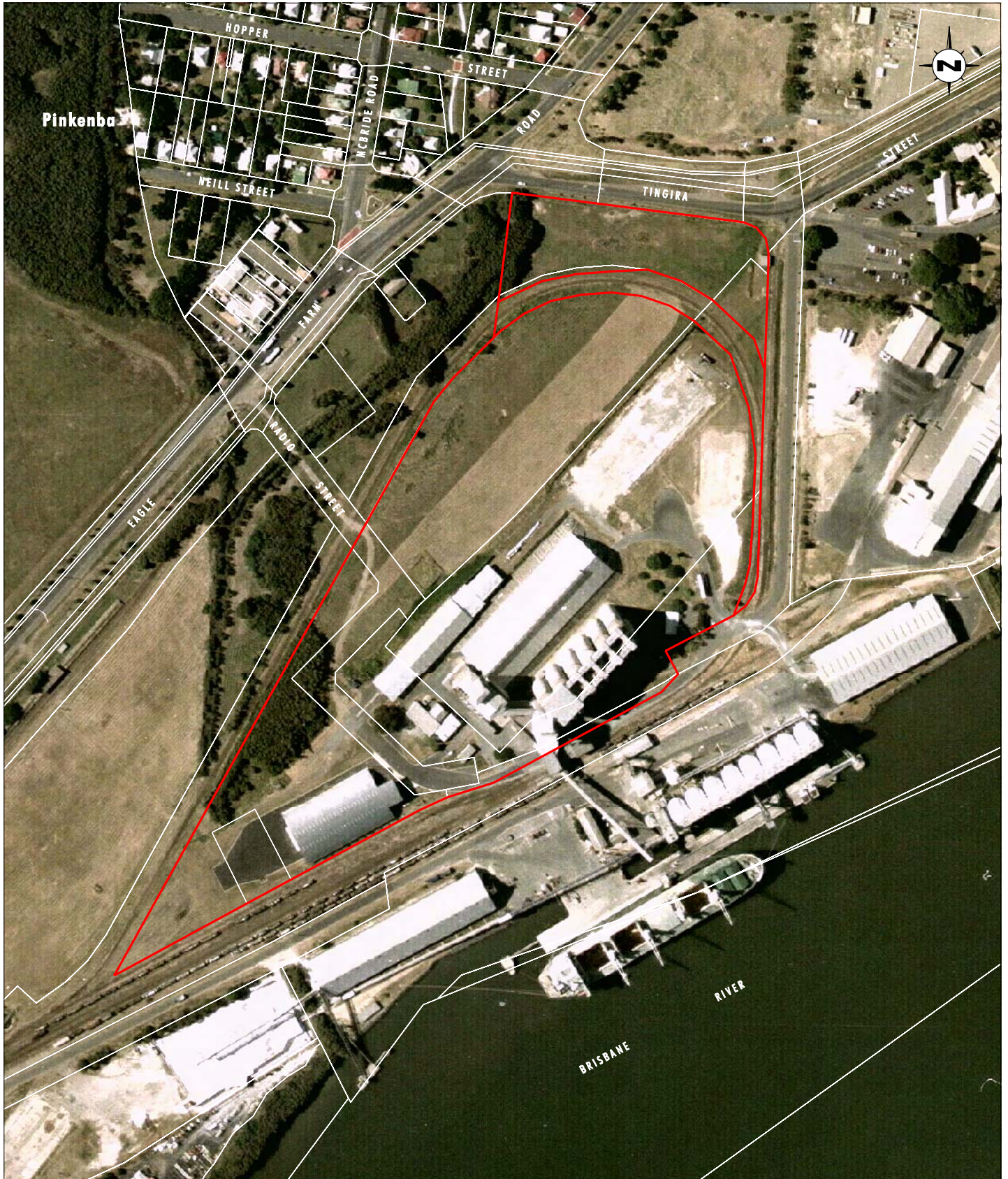
The Bio-Refinery has been designed to produce up to 160 Million Litres per annum (MLpa) of fuel grade ethanol. The Bio-Refinery will operate 24 hours per day and will produce ethanol approximately 350 days per annum.

The proposed Bio-Refinery utilises renewable raw materials in the form of wheat, sorghum, and other forms of starch to produce renewable sources of energy that recycle existing carbon within our environment, rather than adding to it. Fertiliser produced from the proposed plant will assist in replacing nutrients and trace elements in the soil that are required to grow the grain feedstock that is required for the Bio-Refinery.

The process will also recycle water within the system and utilise grey water where possible as a source of top up water for cooling towers and other areas requiring process water. The plant will also collect rainwater from the roofs of the buildings on site to use in the process. There will be no discharge of water from the process other than runoff from roads and parking areas within the site. This runoff will be directed to suitable water treatment devices



FIGURE 1.1
Locality Map



Source: Aerial Photo and Cadastral: © The State of Queensland
(Department of Natural Resources and Water) [2006]

0 50 100 200m
1:4 000

Legend

Proposed Development Site

FIGURE 1.2
Existing Site Layout

for treatment prior to discharge. The site is already extensively developed and serviced and existing service infrastructure will be utilised where feasible.

The Bio-Refinery will also provide significant greenhouse gas abatement, which has been quantified and reported by CSIRO for this particular plant process. Compared to the production and use of premium unleaded petrol, there will be greenhouse gas reduction within the range 8% to 12.5%. Production of 160 MLpa of fuel grade ethanol from the proposed Bio-Refinery will result in greenhouse gas savings of approximately 400,000 tonnes/year or the equivalent of that produced by approximately 95,000 cars per year.

The Bio-Refinery has been designed to have low noise, odour and air quality emissions and to have a low risk profile.

1.2 QUEENSLAND GOVERNMENT POLICIES AND INITIATIVES

High and volatile oil prices, coupled with a growing worldwide demand for alternative energy, has been an important catalyst in the Queensland Government's strategy to establish ethanol as a marketable renewable fuel alternative in Queensland. An independent report, commissioned by the Queensland Government into the potential of the ethanol industry in Queensland (*The Economics of a Queensland Ethanol Industry*, LEGC, 2005), stated that the Queensland ethanol industry had the potential to create thousands of jobs and generate up to \$1.5 billion for the Queensland economy. The report, released in May 2005, highlighted that between 2038 and 6886 jobs could be created by 2010 and the industry could make a significant contribution of between \$441 million and \$1.5 billion to the economy annually. (The 2038 jobs and \$441 million figures were based on the projection that E10 could achieve a 30 per cent share of the Queensland market by 2010).

In May 2005 the Queensland Government hosted the first national ethanol conference 'Ethanol – The Smart Way Forward', and it was followed up by Australia Ethanol '06 in May of 2006, to which the government contributed \$70,000. The conferences are aimed at bringing key industry figures and decision makers to Queensland.

In May 2005 the Queensland Government also launched its Ethanol Industry Action Plan 2005-2007, which commits \$7.3 million to promoting the ethanol industry in Queensland. Approximately \$2.28 million of this funding is designated to a marketing campaign to educate the Queensland public about the benefits of ethanol use and to dispel some of the myths surrounding the impacts of its use in motor vehicles. As part of this Action Plan the Government has, among other things:

- directed its fleet vehicles to use E10 fuel;
- provided a \$236,000 grant to BP for the construction and operation of an ethanol blending plant at Mackay;
- provided a \$250,000 grant to CSR for a dehydrating plant at Sarina; and
- promoted Suncorp's directive to their fleet to use E10.

The AgForce State Conference in 2005 promoted the role of ethanol production to farmers as a means of diversifying their industry. Queensland's sugar and wheat production is seen as a key resource for ethanol production.

The rural sector is of major significance to the establishment and growth of the ethanol industry, being the supplier of either wheat or sugar to the ethanol production facilities. In

June 2006, the Queensland Government launched the 'Blueprint for the Bush' strategy, designed to support growth and development in rural and regional Queensland. The strategy, developed in association with AgForce Queensland and the Local Government Association, provides for a \$36 billion investment from private and public sectors for sustaining and growing Queensland's rural communities. The intent of the strategy is to retain young people in the bush by providing ongoing skill development, as well as attracting families to live and work in rural Queensland.

With drought ravaging many areas of Queensland, water has become a precious and limited resource. State and Local Governments are working together to implement sustainable water management initiatives which balance the need to maintain the health of the river ecosystems and the need of businesses reliant on water. Australia TradeCoast (a partnership between the Queensland Government, Brisbane City Council, Brisbane Airport Corporation and Port of Brisbane Corporation) has undertaken a study in regard to the potential to supply recycled water to industry in Brisbane. As a result of this study, a recycled water system is currently being constructed by Brisbane Water (which is a part of Brisbane City Council). The Luggage Point sewerage treatment plant which forms part of this strategy is located north of the proposed Pinkenba Bio-Refinery. Make up water will be required for cooling towers in the proposed Bio-Refinery. The potential to utilise recycled water from Luggage Point as make up water for the Bio-Refinery will be explored as part of the environmental impact assessment that will be undertaken for the project.

It is considered that the proposed Pinkenba Ethanol Bio-Refinery is therefore in keeping with the policies and initiatives of the Queensland Government, in its push to be the leader in ethanol production in Australia. The proposed production of 160 ML of fuel grade ethanol annually represents approximately 5.3 % of Queensland's usage of 3000 ML of unleaded fuel and will make a significant contribution to fuel available to supply the growing E10 market. The project will create significant employment in the local area and rural areas and will further assist in making Queensland a leader in the Australian ethanol industry.

1.3 THE PROPONENT

Primary Energy is a privately-owned company that was established by Matthew Kelley specifically to develop ethanol plants in Australia. Matthew is the Chief Executive Officer of Primary Energy, has a degree in civil engineering and operates a sorghum and grazing property in Gunnedah NSW. Primary Energy is currently developing plans for similar ethanol bio-refineries in NSW and in Western Australia.

Clean Up Australia last year announced its Clean Fuels Campaign to which Primary Energy is a partner. BP is a Founding Partner in the Clean Fuels Campaign and has established an off take agreement with Primary Energy for ethanol produced at the proposed Pinkenba Bio-Refinery.

Graincorp, which currently has tenure over the proposed Pinkenba site, has indicated in writing that Primary Energy has the Executive and Board of Directors' full support to establish the proposed Bio-Refinery at Graincorp's terminal at Pinkenba. Graincorp's tenure of the terminal is subject to a series of leases from Queensland Rail and the Department of Natural Resources and Water (DNRW). Graincorp has written to Queensland Rail seeking approval to provide Primary Energy with a sub-lease of Queensland Rail lands and will assist Primary Energy by providing a sub-lease of the land it currently leases from DNRW.

1.4 PURPOSE AND SCOPE OF THIS INITIAL ADVICE STATEMENT

This Initial Advice Statement (IAS) has been prepared by Umwelt (Australia) Pty Limited (Umwelt) on behalf of Primary Energy to provide information on the proposed Bio-Refinery at Pinkenba in Brisbane. The IAS is intended to provide information for the purpose of:

- assisting the Coordinator-General in considering a ‘significant project’ declaration;
- enabling stakeholders to determine the nature and level of their interest in the proposal; and
- to enable the preparation of Terms of Reference (ToR) for an Environmental Impact Statement (EIS) for the proposed Bio-Refinery.

This IAS scopes the proposed project and potential impacts as understood at this time. An EIS and Environmental Management Plan (EMP) will be prepared in accordance with the ToR provided by the Coordinator-General in response to this IAS.

2.0 THE PROPOSAL

2.1 LOCATION

The proposed Bio-Refinery site is located adjacent to an existing Graincorp import/export wharf (Pinkenba Bulk Wharf) on the banks of the Brisbane River at Pinkenba. The site is approximately 7 kilometres from the mouth of Brisbane River and 10 kilometres from Brisbane Central Business District (CBD). Pinkenba Bulk Wharf as shown on **Figure 1.2** can accommodate ships up to 65,000 tonnes capacity.

The site is located wholly within Brisbane City Local Government Area (LGA) as shown on **Figure 2.1**. The site is located within an established industrial area which adjoins the site to the northeast, east and south.

To the west of the site is the Pinkenba Hotel and Pinkenba residential area which, at its closest point, is approximately 100 metres from the northern edge of the rail loop that forms the perimeter of the proposed Bio-Refinery site. The rail loop, which connects to the Pinkenba Line, provides access to the Queensland Rail network and will be used to transport grain feedstock to the site.

The site is also accessible by road with direct access to Farrer Street and access via Soutter Street and Tingira Street to Eagle Farm Road.

The site is approximately 3 kilometres by road (Tingira Street) from the BP Bulwer Island Oil Refinery (see **Figure 2.2**). Heavy industrial companies close by include Shell Oil Terminal and Incitec Fertilisers. Other users in the area include Graincorp fertiliser/grain/sand storing and handling facility, Pinkenba Waste Transfer, concrete recyclers, commercial warehousing and Brisbane Airport.

2.2 JUSTIFICATION AND ALTERNATIVES

The Queensland Government has made ethanol production and development of an ethanol industry, in particular for fuel purposes, a priority. The proposed development of a Bio-Refinery at Pinkenba in Brisbane will make a significant contribution to the Queensland Government's push toward more renewable fuel sources. It will also contribute to the 'Blueprint for the Bush' strategy, which was recently launched by the Queensland Premier to 'provide the building blocks for continued prosperity for current and future generations of rural Queenslanders.'

Alternatives to the proposal include the continued reliance on fossil fuels which will make significantly less contribution to Queensland's rural economy in particular, while continuing to add to the greenhouse gas burden that current and future generations are and will continue to face. Production and usage of 160 ML of fuel grade ethanol, when compared to the use of Premium unleaded fuel, results in a net reduction in greenhouse gas emissions of approximately 400,000 tonnes of CO₂ equivalent per year. In terms of greenhouse gas emissions this is equivalent to removing approximately 95,000 cars from Queensland roads per year.

Analysis also indicates that production of ethanol, green electricity, aqueous ammonia and fertiliser at the proposed Pinkenba Bio-Refinery will generate the equivalent of approximately 11 times the amount of energy consumed by the Bio-Refinery process. The process has been designed to utilise all by-products that would normally be discharged in the waste stream. As a result, there will be no waste products from the process that would require further treatment or disposal.



Source: TFA Project Group

0 200 400 800m
1:16 000

Legend

- Proposed Development Site
- Existing Boundary
- Easement

FIGURE 2.2

Proximity of Site to BP Bulwer Island Oil Refinery

A range of alternative sites have been considered as part of the pre-feasibility work for the proposed Bio-Refinery. However, Graincorp's Terminal at Pinkenba has been selected due to its existing grain handling and storage infrastructure which includes rail receival facilities and shipping receival and export facilities. The site also has good access to the main road system. The advantages provided by the existing infrastructure on site are substantial and make this site the site of preference for the proposed Bio-Refinery. The existing transport infrastructure that services the site affords substantial flexibility in the movement of raw material and products to and from the site. This includes the transport of raw grain feedstock from rural Queensland to the site, imports of raw materials for fertiliser production via the existing wharf facilities, transport of fuel grade ethanol, fertiliser and aqueous ammonia to markets throughout Queensland and overseas. The existing transport infrastructure at the site also provides the opportunity for the amount of material that can be transported by rail and ship to be maximised.

Views of the existing site and facilities are shown on **Plates 1 and 2**.

2.3 ELEMENTS AND OPERATIONAL PROCESSES

2.3.1 Bio-Refinery Processes

The proposed Pinkenba Ethanol Bio-Refinery will consist of four main interlinked processing units, which will be integrated to maximise the energy and products created per tonne of grain. A process overview showing the interaction of the four main processing units is shown on **Figure 2.3** and includes:

- ethanol refinery, which will be a grain to fuel grade Ethanol Plant using technology similar to that developed by Delta-T Corporation of Virginia, USA;
- anaerobic digestion of whole stillage, (which will be a by-product of ethanol production) using technology similar to that developed by Bio Scan of Denmark;
- Fertiliser Plant involving sludge drying and fertiliser manufacture using technology similar to that developed by Flo-Dry of New Zealand; and
- Combined Heat and Power Plant (CHPP) technology which will include gas engine generators based on technology provided by Mayfield Construction, a Queensland based subsidiary of Leighton's or similar providers.

Grain feedstock will be input into the Ethanol Plant together with enzymes and yeast to produce fuel grade ethanol and whole stillage. The whole stillage will become the feed to the Anaerobic Digestion Plant, which will produce bio-gas (mainly methane), recycled water and sludge. The sludge output from the Anaerobic Digestion Plant will become the feedstock for the Fertiliser Plant. The bio-gas produced in the Anaerobic Digestion Plant will provide fuel for gas generators in the CHPP. The exhaust emissions from the CHPP will provide the heat to dry the fertiliser production operation.

Further utilities will be required to support the plant operation and are expected to include plant steam, plant cooling water and plant air.

Whilst there are many existing plants representing each separate technology, this will be one of the first plants that combines all technologies.



PLATE 1
Existing Graincorp Site Viewed From Tingira Street



PLATE 2
Existing Storage Shed and Grain Silos From Radio Road

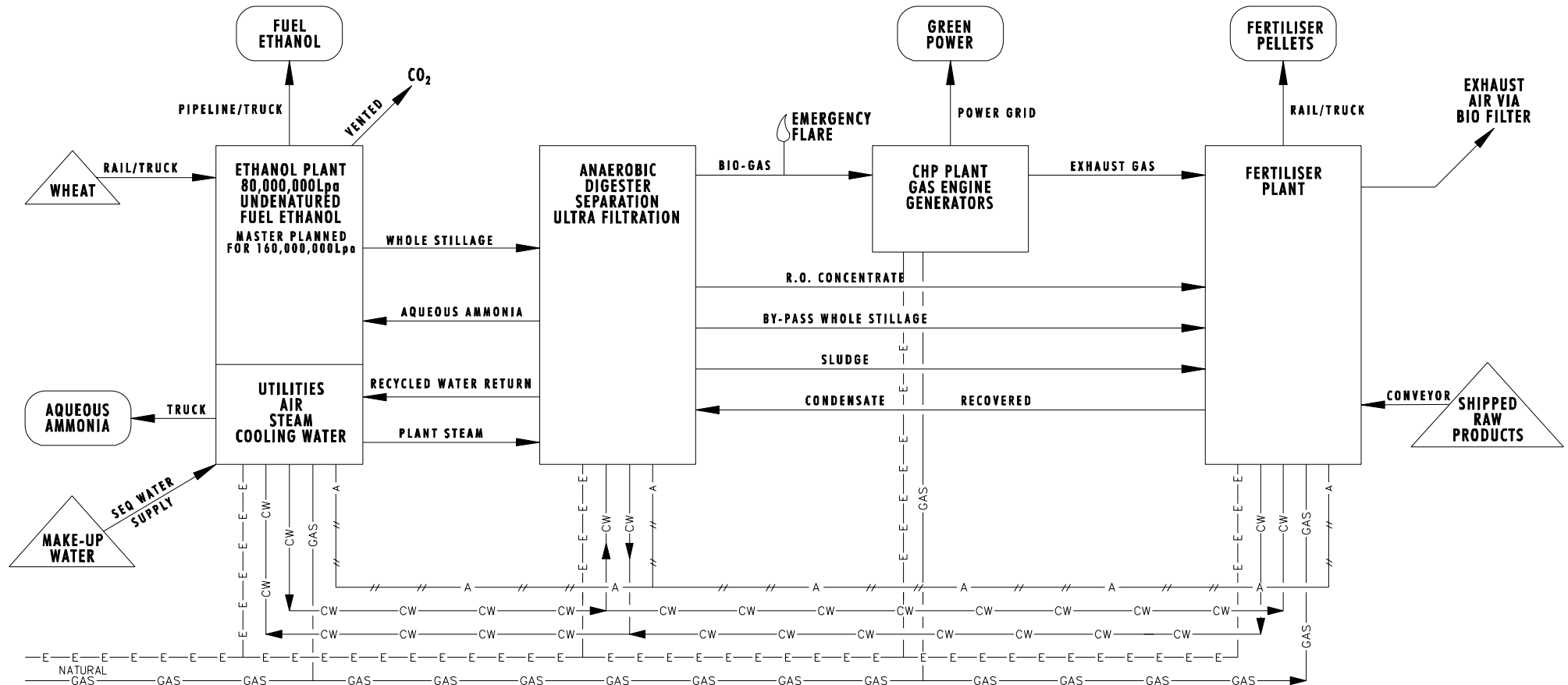


FIGURE 2.3

Process Overview

2.3.2 Raw Materials and Products

The Bio-Refinery will be designed to produce 160 ML per annum of fuel grade ethanol.

Major inputs to the proposed Bio-Refinery at an ethanol production rate of 160 million litres per annum are set out in **Table 2.1**. Major Outputs are listed in **Table 2.2**.

Table 2.1 – Major Inputs at 160 ML/Year Production Level

Process Inputs	Tonnes per year	Method of Delivery
Grain Feedstock	400,000	By rail and occasionally by road
Fertiliser Raw Materials	180,000	Ship and conveyed to plant

The process will use up to approximately 5 to 6 MW of electricity annually and small amounts of natural gas, particularly in the initial stages while the anaerobic digesters are being fully commissioned.

Table 2.2 - Major Outputs at 160 ML/Year Production Level

Outputs	Output per year	Method of Delivery
Fuel Grade Ethanol	160 ML	Road tanker and possible pipeline
Fertiliser	240,000 tonnes	Trucks and Train
Aqueous Ammonia (25%)	16,000 tonnes	Trucks
Green Electricity	Up to 28 MW	Electricity Grid

2.3.3 Buildings and Structures

A number of site layouts are currently being considered. A conceptual layout for the Bio-Refinery is shown on **Figure 2.4**. Buildings and structures will include:

- grain conveyor connection to wharf;
- grain silos and hammermills;
- ethanol process building with associated laboratories, control rooms and maintenance areas;
- transformers;
- distillation building;
- ethanol Storage tanks;
- anaerobic digester tanks;
- methane gas storage tank;
- flare stack;
- reverse osmosis and ultrafiltration facility;

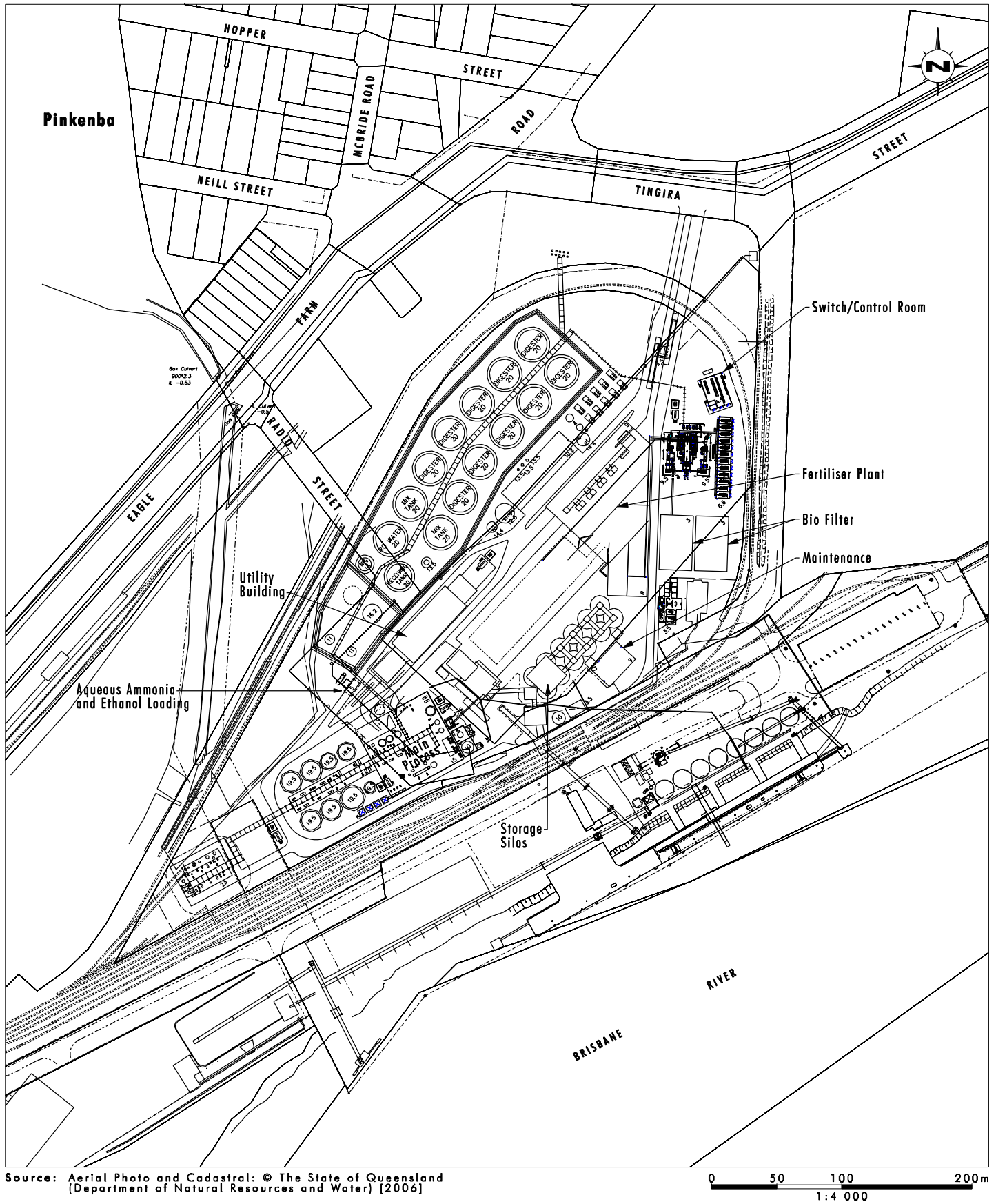


FIGURE 2.4
Conceptual Site Layout

- aqueous ammonia storage facility;
- engine buildings;
- fertiliser drying facility;
- bio-filter building;
- fertiliser plant;
- weighbridge and gatehouse;
- administration building; and
- car parks and access roads.

Options to use a smaller number of larger diameter digester tanks are also being considered.

New buildings and structures will have a maximum height of approximately 30 metres with the highest structure on the site being the existing silos which are approximately 40 metres high.

All new buildings will be clad with Colorbond or similar steel sheeting and all hardstand areas will be paved concrete. Non-trafficked or hardstand areas other than landscaped areas will be covered with crushed aggregate to minimise weed growth and promote infiltration of clean runoff.

2.4 CONSTRUCTION PROCESSES

It is envisaged that, subject to relevant approvals being obtained, construction of the Bio-Refinery would commence at the start of 2008, and would have a duration of approximately 48 weeks. The plant could therefore be commissioned at the end of 2008.

Construction activities will involve:

- demolition and/or modification of some existing buildings and structures on site;
- earthworks and civil works;
- construction of site utilities to feed the various processes with water, air and steam;
- construction of major plant including:
 - Ethanol Plant;
 - Fertiliser Plant;
 - Anaerobic Digester Plant; and
 - CHPP; and
- site wide electrical works.

The construction phase of the project will involve use of equipment such as earth moving equipment, cranes and small plant such as welding machines, boom lifts and generators.

The environmental controls in place during construction will address:

- noise management;
- dust management;
- erosion and sediment control;
- traffic management, and
- waste management.

2.5 WASTE MANAGEMENT

Once operational, the proposed Bio-Refinery process will utilise all by-products from each component of the process and as a result the only waste produced will be effluent from showers and toilets and normal office waste. Effluent will be directed to the existing sewer that services the site.

Some waste will be generated through demolition of some infrastructure on site during the construction phase. Where possible this material will be recycled or will be otherwise disposed of at an approved waste facility.

2.6 HAZARD AND RISK

A detailed Preliminary Risk Assessment (PRA) has been undertaken by Risk Management International Pty Ltd for Primary Energy's proposed Kwinana Bio-Refinery which is similar to that proposed at Pinkenba. The key findings of the PRA are:

- small quantities of the following materials that have a potential risk profile will be stored onsite:
 - Ethanol;
 - Methane;
 - Sulfuric Acid; and
 - Caustic;
- storage volumes will be **less than 10%** of the storage threshold for classification as a Major Hazardous Facility; and
- the Bio-Refinery **is not** a notifiable facility.

A summary of the risk profile of the proposed Bio-Refinery is provided in **Table 2.3**.

Table 2.3 – Risk Profile Summary

Material	Quantity Stored (tonnes)	Major Hazard Facility Storage Threshold (tonnes)	Individual Risk From Fire
Ethanol	2,800	50,000	Negligible
Methane	6.6	200	Negligible
Sulfuric Acid	15	-	-
Caustic	15	-	-

In accordance with the relevant safety guidelines the facility will achieve fatality frequency risk levels well below the level of 1×10^{-6} per annum. Note that a fatality frequency of 1×10^{-6} per annum means that one fatality will result in one million years of facility life.

In order to minimise the risk to the nearby residential area, the following measures will be employed at the Pinkenba Bio-Refinery:

- The Bio-Refinery will be designed, constructed, operated and maintained in accordance with *AS 1940 – 2004: The storage and handling of flammable and combustible liquids*, and with good industry practices.
- A Hazard and Operability (Hazop) study of the Bio-Refinery will be undertaken prior to construction.
- Operators of the facility will be trained in operational and emergency procedures.
- Emergency response equipment, including fire fighting equipment, will be designed, installed and maintained in accordance with relevant Standards. Corresponding emergency procedures will be developed.
- There will be an ongoing program of communication of relevant risk information to employees to ensure that they are able to manage flammability risks.
- There will be an ongoing program of audit and review to confirm that key risk controls remain in place.

2.7 EXTERNAL SERVICE INFRASTRUCTURE REQUIREMENTS

An electricity transmission line currently supplies the site. It is anticipated that this network will not need to be upgraded to meet plant requirements. It is proposed that electricity will be accessed from this line. This connection will also be used to export green electricity generated at the site to the electricity grid.

Potable water will be drawn from the reticulated water mains that traverse the site. It is anticipated that this supply will have adequate capacity to service the proposed Bio-Refinery.

Natural gas will be sourced from the existing gas pipeline that is also located along the boundary of the site. It is estimated that approximately 0.2 PJ of natural gas will be required each year to produce steam for cleaning of the fermentation tanks.

Consultation with the relevant service providers will occur as a part of the EIS process.

Access to grey water/recycled water system from Luggage Point sewerage treatment works will be sought to supply top water for the cooling towers on the site. This recycled water will be treated at the site prior to reuse. Primary Energy will have discussions with Brisbane Water regarding recycled water use.

Access arrangements to the existing rail system and time slots and schedules to transport grain to the site, and fertiliser and potentially ethanol from the site, will be determined during preparation of the EIS.

2.8 ECONOMIC INDICATORS AND COST BENEFIT SUMMARY

As discussed in **Section 1.2**, the proposed Bio-Refinery will contribute to the Queensland Government's commitment to major renewable fuels projects and making Queensland a leader in renewable energy. The project is expected to require approximately \$150 million in capital investment at Pinkenba and will generate approximately \$200 million in annual revenue with a significant component of this contributing to the local and State economies.

At full operation the project will require approximately 400,000 tonnes of locally grown Queensland grain worth approximately \$70 million. The Bio-Refinery requires grain with high starch content and low protein and as a result will provide Queensland farmers with an alternative market for low grade traditionally non-export grade grain. The use of Queensland grain feedstock in the Bio-Refinery will contribute to sustaining the rural sector of the State. The benefits of using the Queensland grain will be directed to the Queensland farmers, and will have flow-on effects for employment in local commercial centres in rural Queensland.

Analysis of the proposed Bio-Refinery undertaken by CSIRO indicates that the equivalent energy value of the ethanol, green electricity, aqueous ammonia and fertiliser produced is up to 11 times greater than the fossil fuel derived energy is required for the process.

2.9 EMPLOYMENT OPPORTUNITIES

The project is likely to provide approximately 300 jobs during the construction phase and approximately 50 permanent jobs once the plant is commissioned. In addition to this, the project will provide a significant number of jobs for truck drivers and a range of service industry contractors for maintenance and shut down periods. It is expected that the flow on effect of the project will provide indirect employment for approximately 350 additional people.

During the construction phase local contractors and fabricators will be used where possible.

Primary Energy will provide employment opportunities for locals where possible with a range of skills including labours, equipment operators, tradesman, technicians, chemists, administration staff and managers being required. As this will be one of the first grain to ethanol plants in Queensland and a unique plant in its own right, it is unlikely that a labour force with all relevant skills will exist. To address this, Primary Energy will provide a comprehensive programme of training for all staff leading up to commissioning of the new facility.

2.10 TIMING

2.10.1 Bio-Refinery Commissioning Schedule

2.10.1.1 Detailed Design Phase

It is anticipated that once the Coordinator-General's assessment has been completed and when development approval is obtained from Brisbane City Council, it will take three to five months to complete detailed design before construction commences.

2.10.1.2 Construction Phase

The majority of the construction work will be completed within approximately 12 months of commencement.

2.10.1.3 Commissioning and Life of the Facility

It is envisaged that once construction is complete it will take one to two months to commission the plant and to get the anaerobic digesters to full functionality. At this time it is proposed to have the Bio-Refinery fully operational by the end of 2008.

Once operational, the plant will have an indefinite life span as it principally utilises renewable materials in the form of wheat/grain products and recycled water to produce fuel grade ethanol, green power, ammonia and fertiliser.

2.10.2 Hours of Operation

During the construction phase, it is envisaged that construction activities will be undertaken between 6.00 am and 6.00 pm Monday to Saturday however no noise generating activities will be undertaken before 6.30 am.

Once constructed, the Bio-Refinery will operate 24 hours per day, 7 days a week with ethanol typically being produced approximately 350 days per year.

Fuel Grade ethanol will be transported by road from the site Monday to Saturday.

Aqueous ammonia will be transported by road from the site Monday to Friday.

The fertiliser plant will operate six and a half days per week with fertiliser being transported from the site Monday to Friday.

3.0 GOVERNMENT AND PLANNING LEGISLATIVE AND POLICY REQUIREMENTS

3.1 QUEENSLAND GOVERNMENT

3.1.1 Significant Project Declaration

The Coordinator-General may declare a proposal to be a ‘significant project’ for which an EIS is required, under section 26(1)(a) of the *State Development and Public Works Organisation Act 1971* (SDPWOA). The benefit of a significant project declaration is that Government input to the assessment process is centralised through a single agency, namely The Coordinator-General. Such a declaration does not imply government approval of a proposal.

Part 4 of the SDPWOA provides a statutory process for assessing the potential environmental impacts (both adverse and beneficial) of a development proposal. It provides an opportunity to identify stakeholders and key issues so that potentially adverse impacts can be addressed before approval is considered by the Assessment Manager.

This Initial Advice Statement has been prepared in the first instance to provide The Coordinator-General with information to determine whether the Pinkenba Bio-Refinery project should be declared a ‘significant project’ for which an EIS is required. It can then be used to develop Terms of Reference for the EIS.

3.1.2 Integrated Development Assessment System

The Integrated Development Assessment System (IDAS) under the *Integrated Planning Act 1997* (IPA) provides a single system for development assessment, incorporating environmental impact assessment and all approvals required for a proposed development to proceed.

Many permits and licences are provided for under the provisions of this *Integrated Planning Act*. This includes the assessment of *Environmentally Relevant Activities* (ERAs) listed in Schedule 1 of the *Environmental Protection Regulation 1998* (EP Regulation). ERAs that are likely to be relevant to the Pinkenba Bio-Refinery include the following:

- ERA 5 (Alcohol Distilling);
- ERA 7 (Chemical Storage); and
- ERA 17 (Fuel Burning).

The development application for a Material Change of Use for the proposed Bio-Refinery will be submitted once The Coordinator-General finalises the Report under the SDPWO Act and indicates whether the project can proceed. The information and referral stage and the notification stage of IDAS do not apply to the application and the Coordinator-General’s Report is taken to be a concurrence agency’s response for the application under IDAS.

3.2 COMMONWEALTH GOVERNMENT

The proposal is required to be considered in relation to the provisions of the *Environmental Protection and Biodiversity Conservation (EPBC) Act 1999* (Cwlth) and whether it impacts on matters of national environmental significance. Matters relevant to this proposal could include:

- Wetlands of International Significance (RAMSAR);
- Threatened Species; and
- Migratory Species.

Preliminary assessment by the proponent and its consultants indicates that the proposed development will not be a 'controlled action' and will not need to be referred to the Commonwealth Minister for the Environment under the EPBC Act.

3.3 LOCAL GOVERNMENT (BRISBANE CITY COUNCIL)

The Pinkenba Bio-Refinery site is located adjacent to the Brisbane River and is entirely within the Brisbane City Council LGA. The proposed development will need to ensure that all relevant measures within the relevant environmental planning instruments of Brisbane City Council are addressed in any EIS that is required to be prepared for the site. Of relevance are the Brisbane City Plan 2000 and other Brisbane City Council strategies.

3.3.1 Brisbane City Plan 2000

Brisbane City Plan (2000) is a planning scheme prepared under the *Integrated Planning Act*. The Plan applies to the Brisbane City Council LGA and deals with land use and development, infrastructure and valuable land features within the LGA.

Brisbane City Plan sets out a number of Desired Environmental Objectives (DEOs) for the city. These DEOs provide the basis of the policies and strategies set out in the Plan. There are two levels of DEOs, namely city wide DEOs and specific area DEOs. There are 22 citywide DEOs set out in the Brisbane City Plan.

Brisbane City Plan sets out zoning within Brisbane City. Under the Plan the proposed Bio-Refinery site is zoned as 'Heavy Industry', and is surrounded by 'Community Use' and 'Heavy Industry' land.

The specific DEOs for Heavy Industry land are that:

- Heavy Industry Areas accommodate higher impact industrial activities only;
- the necessary infrastructure is available to facilitate the efficient operation of major industry; and
- land is planned and developed to ensure its continued suitability for industrial activities with higher levels of risk from technological hazards or emissions of contaminants.

The use of the site for the Pinkenba Ethanol Bio-Refinery is in keeping with the Heavy Industry zoning of the site under the Brisbane City Plan. The Bio-Refinery will require access to rail and port infrastructure and will have significant synergies with existing industries in the area such as Graincorp's existing storage and handling facilities, the BP Oil Refinery and Incitec Fertilisers. While the specific DEOs for Heavy Industry Areas state that the area should accommodate higher impact industrial activities only it is considered that development of the low-impact Bio-Refinery at the site is appropriate, particularly given its proximity to community use land and the existing Pinkenba residential area, located approximately 100 metres from the site. The proposed Bio-Refinery is likely to achieve acceptable noise and air emission levels at the nearest residential area and has a sufficiently

low risk profile so as to be appropriate for development on a land area zoned for Heavy Industry located approximately 100 metres from a residential area.

3.3.2 Australia TradeCoast Local Plan

The Australia TradeCoast Local Plan contains specific planning requirements for the areas of Brisbane City Council to which it applies. The specific local provisions of the plan prevail where there are any inconsistencies between the Local Plan and the Brisbane City Plan.

The area covered by the Australia TradeCoast Plan is comprised of 8000 hectares with approximately 2000 hectares available for industrial development, and includes the Port of Brisbane and Brisbane International Airport.

The subject site is located within the Pinkenba Precinct which is immediately adjacent to the Pinkenba residential area and includes land under the control of Brisbane Airport Corporation and private industrial lands to the west of the Pinkenba residential area. The Local Plan provides that the Precinct is suitable for general industry, though only light industry is considered suitable for areas near the Entrance Creek Wetland. It also states that any development must be consistent with the Drainage Strategy for Pinkenba and Boggy Creek.

The plan lists nine (9) development principles that any development occurring within the Australia TradeCoast Area must comply with. The EIS will consider these nine principles to ensure compliance of the proposed development with the Australia TradeCoast Local Plan.

3.4 CONSULTATION REQUIREMENTS

3.4.1 Advisory Authority Consultation

Advisory Authority consultation will be conducted throughout the EIS process for the proposed Bio-Refinery, to ensure that relevant issues are identified and addressed and that agencies are kept informed as to the outcomes of specialist studies and community consultation. Consultation will include briefings, presentations and continued contact via email and telephone. Key government agencies identified during the preliminary stakeholder identification process include:

- Environmental Protection Authority;
- Department of Primary Industry and Fisheries;
- Department of Natural Resources and Water;
- Queensland Transport;
- Queensland Rail;
- Queensland Health; and
- Brisbane City Council.

3.4.2 Community Consultation

A comprehensive community consultation program is being designed by Umwelt as a part of the EIS process for the proposed Bio-Refinery. This program will include the identification of stakeholders and mechanisms to involve the key groups.

The initial stakeholder identification process has involved discussions with Brisbane City Council and has identified the following key groups:

- Pinkenba Community Association and Neighbourhood Watch, and
- Pinkenba State Primary School Parents and Friends Association.

It is envisaged that consultation with these groups will be organised through a single point of contact, at the Pinkenba Community Association.

Based on the stakeholder analysis undertaken by Umwelt, a number of communication mechanisms will be used to provide information regarding the proposed Bio-Refinery to the community, as well as opportunities for the community to provide feedback and/or ask questions about the proposed Bio-Refinery. The key mechanisms which may be employed during the community consultation program are outlined in **Table 3.1** below.

Table 3.1 - Community Consultation Methods

Method	Description
Website	The Pinkenba Ethanol Bio-Refinery website will be designed to provide an overview of the proposed Bio-Refinery, the results of specialist studies regarding the potential impacts of the proposal, and ways to receive further information and to provide feedback
Telephone Information	Information regarding the proposed Bio-Refinery will be initially provided by telephone to representatives of the community groups identified in the stakeholder analysis. This information will include an overview of the proposal, ways to receive further information and to provide feedback regarding the proposed Bio-Refinery.
Newspaper Articles	Newspaper articles providing an overview of the proposed Bio-Refinery and the details of ways to receive more information or provide feedback will be run in local newspapers.
Community Information Brochure	A community information brochure will be designed to provide an overview of the proposed Bio-Refinery and inform the community of ways to receive more information or provide feedback. The brochure will be distributed to local residents in Pinkenba, users of local recreation reserves, local environment groups and attendees of community information days.
Personal Discussion	Members of the project team will visit houses in Pinkenba in order to inform residents of the proposed Bio-Refinery and provide opportunities for questions and feedback from members of the community. Meetings with individual interest groups may also be organised.
Community Information Day	A community information day may be held to present an overview of the proposal, the findings of specialist studies relating to the potential impacts of the proposed Bio-Refinery, and to provide opportunities for questions to be asked of the project team.

4.0 NATURAL, SOCIAL AND BUILT ENVIRONMENT

The proposed Bio-Refinery site is located in the suburb of Pinkenba, adjacent to the Brisbane River in the Brisbane City LGA. The site is immediately adjacent to the Pinkenba Bulk Wharf, an existing Graincorp import/export wharf. The site is within an established industrial area, and is zoned for Heavy Industry under Brisbane City Plan. As discussed in **Section 2.1**, the industrial area extends to the northeast, east and south, and includes industries such as Graincorp's fertiliser, grain and sand storing and handling facility, Shell Oil Terminal, Incitec Fertilisers, BP Bulwer Island Refinery, Pinkenba Waste Transfer Station, concrete recyclers, commercial warehousing and Brisbane Airport.

The proposed Bio-Refinery site has frontage on to Tingira Street and Soutter Street and is located approximately 100 metres from the nearest residence, which is located in the Pinkenba residential area (refer to **Figure 1.2**). The site is also in proximity to the Pinkenba Hotel. Rail access from the site to the Queensland Rail network is via an existing rail loop surrounding the site (**Figure 2.4**) which connects to the Pinkenba line.

The proposed Bio-Refinery site has been used for industrial purposes for many years and has been heavily disturbed and modified as a result of this use. The eastern part of the site is currently used as a part of Graincorp's fertiliser, grain and sand storing and handling facility (refer to **Figure 1.2**), and includes a number of existing structures including conveyers from Pinkenba Bulk Wharf, existing storage sheds and grain silos, as shown on **Plates 1 and 2**. The north western portion of the site contains no structures. The site is subject to a series of leases and is owned by Queensland Rail and Department of Natural Resources and Water.

Vegetation within the site is modified grassland, with a mangrove dominated drainage line located to the west of the site (refer to **Figure 1.2**). The topography of the site is generally flat, and the site is located within the Brisbane River catchment. The heavily disturbed and modified nature of the site indicates that it is unlikely to provide habitat for significant populations of vulnerable or endangered species or ecological communities. Similarly, it is considered unlikely that any in-situ or intact aboriginal artefacts will be located on the site.

5.0 POTENTIAL IMPACTS

5.1 AIR QUALITY AND ODOUR

The nearest residences to the proposed Pinkenba site are approximately 100 metres from the site. A detailed air quality assessment will be undertaken for the Pinkenba site to investigate the potential impacts on the surrounding area and regional airshed.

As an indication of potential air quality impacts, an assessment of an identical Bio-Refinery in terms of scale of operation and products produced has been undertaken by Heggies Australia for Primary Energy's proposed Kwinana Bio-Refinery. The Kwinana Bio-Refinery is located approximately 240 metres from the nearest public reserve area.

The predicted air quality performance of the proposed Bio-Refinery was assessed against National Environmental Protection Measures (NEPM) standards for ambient air quality. Predicted incremental increase air emissions at nearest residences with the Bio-Refinery operating at 160 ML per year production level are summarised in **Table 5.1**.

Table 5.1 – Predicted Worst Case Bio-Refinery Air Emissions

Pollutant	Averaging Time	Maximum Permissible NEMP Concentration	Estimated Maximum Worst Case Incremental Increase with Bio-Refinery	Percentage of NEPM Air Quality Goal
Particulate Matter (PM ₁₀)	24 hour	50 µg/m ³	5 µg/m ³	10%
Sulphur Dioxide (SO ₂)	1 hour	520 µg/m ³	40 µg/m ³	7.7%
Nitrogen Dioxide (NO ₂)	1 hour	226 µg/m ³	12.3 µg/m ³	5.4%

As shown in **Table 5.1**, all predicted incremental increases for the above air quality parameters are significantly below the relevant NEPM guidelines.

Potential odour emissions from the site will be negligible with emissions from the ethanol fermentation process being directed through a wet scrubber before being vented to the atmosphere. In addition, bio-gas from the anaerobic digesters will be utilised in electricity generation with the exhaust gases from the generators being utilised in the fertiliser drying process. Exhaust gas from the dryers will be passed through bio-filters before being vented to the atmosphere.

The bio-filters to be used will achieve an approximately 99% reduction in odour emissions indicating that the relevant guideline levels for odour can be achieved at Pinkenba residential area.

5.2 SURFACE WATER AND GROUNDWATER

The surface water management system for the proposed Pinkenba Bio-Refinery will be designed based on Water Sensitive Urban Design principles and will be consistent with the

requirements of the Drainage Strategy for Pinkenba and Boggy Creek. Key water management objectives will include:

1. maintain or improve surface and groundwater quality;
2. maintain existing water cycle balance in terms of water quantity;
3. conserve water by maximising reuse;
4. preserve ecosystem health by maintaining natural drainage lines;
5. ensure that the system has long term economic viability;
6. ensure the proposed waste management system is designed to not increase public risk or risk of injury;
7. ensure buildings and structures are not in areas prone to flooding or water logging;
8. recognise social values in developing water management systems; and
9. ensure that the development includes best practice stormwater management.

The proposed Bio-Refinery will include the following water management measures that are consistent with the above key objectives.

- In terms of process, the plant will operate a closed water management system to conserve water; with all waste water from the various sections of the Bio-Refinery process treated on-site using reverse osmosis and ultrafiltration treatment facilities. Treated water will then be reused in the process. Salts separated out by the treatment process will be used as input to the fertiliser manufacture process. In this way the process has negligible potential to adversely impact on surface or groundwater quality.
- Some make up water will be required to replace that lost from the cooling towers. This make up water will be sourced from recycled water and roof runoff where possible.
- Potable water from the reticulated water supply will be used for potable purposes such as in administration building and laboratories.
- Runoff from hard stand areas will be managed via Gross Pollution Traps (GPTs) and detention systems where appropriate. This will ensure that the proposed development does not result in increases in peak discharge from the site.
- The development will be designed to have no impact on the existing mangrove lined drainage line that is located at the southern edge of the proposed development area.
- Non-hardstand areas that do not form part of site landscaping will have gravel or similar placed on the surface to minimise weed growth and to minimise the amount of water required to maintain grassed or vegetated areas.
- The stormwater management system will be designed to require low ongoing maintenance and as a result will be readily sustainable in an economically viable manner into the future.
- The proposed stormwater management system will be designed to not increase public risk or risk of injury.

5.3 NOISE AND VIBRATION

A detailed assessment of potential noise emissions from the proposed development during construction and operation phases will be undertaken for the site in accordance with the *Environmental Protection (Noise) Policy 1997*. Where necessary either the design of the Bio-Refinery will be modified or additional noise control measures will be incorporated into the development to ensure that relevant noise standards are met.

A detailed noise model of a similar plant has already been prepared and will be updated to reflect conditions at the proposed Pinkenba site. This model is based on Environmental Noise Model (ENM) software and includes approximately 190 separate noise sources which will enable appropriate noise management measures to be explored and incorporated.

5.4 SOLID WASTE

The proposed Bio-Refinery has been designed to utilise all materials used or generated in the process in the four product streams (i.e. ethanol, aqueous ammonia, green electricity and fertiliser). As a result the Bio-Refinery will generate no process waste.

5.5 GREENHOUSE GAS EMISSIONS

A detailed life cycle analysis of greenhouse gas emissions for an ethanol Bio-Refinery similar to that proposed for Pinkenba has been undertaken by the CSIRO. The CSIRO life cycle analysis included an assessment of all processes associated with the production and use of ethanol from the proposed Bio-Refinery. These processes included:

- grain production and transport;
- tractor combustion emissions;
- ethanol production;
- fuel blending and distribution; and
- production of by-products (i.e. renewable energy, phosphate fertiliser, potassium fertiliser, aqueous ammonia) in comparison to equivalent production systems.

Analysis undertaken by CSIRO indicates that the proposed Bio-Refinery at full production will produce approximately 14,000 tonnes per year of CO₂. By comparison the full life cycle analysis indicates that the use of unleaded fuel with 10% ethanol compared to the use of 100% unleaded fuel will result in a reduction in greenhouse gas emissions of approximately 400,000 tonnes per year. In terms of greenhouse gas emissions this is the equivalent of removing approximately 95,000 cars from Queensland roads per year.

5.6 LAND CONTAMINATION

There is no known contamination on the proposed Pinkenba Bio-Refinery site. A detailed review of the potential for contamination to exist on the site will be undertaken as part of the environmental impact assessment work, and appropriate remediation of any contaminants will be carried out prior to commencement of construction.

5.7 ABORIGINAL ETHNOGRAPHY/ARCHAEOLOGY

The site has been used for industrial purposes for many years and has been heavily disturbed and modified as a result of this use. On this basis it is considered unlikely that any in-situ or intact Aboriginal artefacts will be located on the site.

As part of the environmental impact assessment process, the local aboriginal community will be consulted to determine the level of assessment required to be undertaken and matters to be addressed in the preparation of a Cultural Heritage Management Plan (CHMP) for the site in accordance with the *Aboriginal Cultural Heritage Act 2003*.

5.8 VISUAL IMPACT

A visual assessment of the proposed development and potential lighting impacts will be undertaken as part of the environmental impact assessment process. This will include development of a computer generated 3-dimensional model of the site and preparation of photomontages to provide an indication of how the proposed Bio-Refinery will look.

5.9 TRAFFIC AND TRANSPORT

It is envisaged that raw material will be brought to and taken from the site using a combination of transport methods including road, rail and ship.

Table 5.2 summarises likely truck movements assuming that all raw materials are brought to the site by rail or ship and that all product fertiliser is railed or shipped from the site.

Table 5.2 - Daily Truck Movements

Product	In/Out	Vehicle	Trucks Per Day
Ethanol	OUT	50T B-Double	10
Aqueous Ammonia (25%)	OUT	50T B-Double	3

A detailed traffic impact assessment and review of rail access timing and scheduling will be undertaken as part of the environmental impact assessment process.

5.10 AMENITY CONSIDERATIONS

Design of similar plants has demonstrated that, in terms of impacts on the amenity of the surrounding area, the proposed Bio-Refinery plant will have a similar impact to a light industry.

Impacts on the amenity of adjoining residences and commercial premises (i.e. Pinkenba Hotel/Motel) will be explored as part of the environmental impact assessment process.

6.0 ADDITIONAL STUDIES REQUIRED

A number of additional specialist studies will be undertaken in the preparation of the EIS for the proposed Bio-Refinery. These will include:

- Ecological Assessment;
- Air Quality Assessment;
- Noise and Vibration Assessment;
- Logistics and Traffic Assessment;
- Aboriginal and European Heritage Assessment including a CHMP;
- Visual Amenity Assessment;
- Site Contamination Assessment;
- Soil and Water Management including an acid sulphate soils investigation; and
- Preliminary Risk Assessment.

The findings of these studies will be incorporated into the EIS.

7.0 ENVIRONMENTAL MANAGEMENT

7.1 CONSTRUCTION/COMMISSIONING PHASE

Environmental Considerations/Measures:

Whilst the plant will be designed to operate within set parameters, it is recognised that construction activities will present a number of different circumstances that are not contemplated by the operational conditions set out for the plant. With this in mind, construction activities have been reviewed from an environmental impact perspective. This process has identified the issues below, along with corrective measures to minimise the impact of these issues.

1. **Early Installation of Noise Reduction Screens** – Noise coming from the construction site will be an issue from commencement of works on the site. With this in mind one of the first construction activities will be to erect noise barriers where required. This will help minimise the impact that noise from construction activities will have on the adjacent residential areas and Pinkenba Hotel.
2. **Designated Working Hours** – It is envisaged the designated construction working hours for the site will be 06.00 – 18.00 Monday – Friday and 08.00 – 16.00 Saturday and Sunday. Whilst work during Saturday and Sunday will be minimised, it will be necessary to work a proportion of these days in order to resolve logistical issues such as tie-ins to shut down plant and equipment and optimise the overall site construction duration. Night shift work is not currently envisaged.
3. **Traffic Management:**
 - a) **Defined On Site Routes** – The definition of an effective traffic routing system on site will assist in minimising congestion both on the site and also on the roads adjacent to the site.
 - b) **Defined On Site Parking** – The definition of on site parking areas will minimise the amount of congestion experienced at the entry to the site.
 - c) **Route in to & out of Site** – It is envisaged that a peak of approximately 300 personnel will be employed on the project; which could present problems regarding access to and from the site at the start and finish of the day, if not properly managed. It is proposed to minimise the effects of this by designating entry to the site via the roads away from residential areas where possible. This will minimise the impact on traffic in the residential areas around Pinkenba. Start/finish times may be staggered to further mitigate congestion.
 - d) **Designated Delivery Times** – Given the location of the construction site there may be periods of peak traffic congestion. To minimise the Project adding to this issue a system of designated delivery times outside peak periods can be implemented.
4. **Construction Program** – The construction program will be designed to progress on as many work fronts as practical, thus achieving minimum time on site and limiting periods of local disruption.
5. **Modularisation/Minimisation of On Site Fabrication** – The on site fabrication and assembly activities for the tanks, pipe work and steelwork will be minimised as far as practicable. This will be achieved by developing a constructability review program and ensuring a close link between the design function and the fabricators during all stages of the design and fabrication.

Key considerations will include:

- a) Ensuring tanks are (where practicable) designed so as to allow full off-site fabrication within the limits of the approved transport corridor; thereby reducing site.
- b) Modularisation of process units and pipe work assemblies wherever possible. This again will involve construction review with the designers to adopt an appropriate mind set when designing the process system.
- c) Engage local sub-contractors to facilitate use of local facilities and support the prefabrication and modularisation concepts outline above.

6. On Site Equipment:

- a) **Cranes** – The mobilisation of cranes to site will be reduced through a system of crane pooling through major contractors. All cranes will undergo rigorous pre-start checks to ensure they comply with OH&S requirements and are operating in accordance with manufactures recommendations.
- b) **Welding Machines, Generators & Compressors** – The use of this type of diesel powered site equipment is not likely to cause problems though steps will be minimised by utilising power from the existing power grid as soon as practicable.

7. Dust Suppression – A water truck will be engaged to wet the site and minimise and eliminate any dust that may be generated.

8. Waste Management – A waste management plan will be developed to ensure controls and measures are put in place to reduce the impact to the environment during the demolition phase. Measures to manage this include – provision of recycle waste skips and bins across the site for steel, wood, cardboard and other recyclables, routine and daily clean up of work areas to ensure no loose waste and on going monitoring of the plan by project staff to ensure compliance.

9. Hazardous Materials Storage & Spillage Containment – Hazardous materials containers will be employed for the storage of all hazardous materials on an area by area basis – these containers will have limited access and will be monitored by a storeman who will be fully trained and aware of the risks, preventative measures and emergency measures appropriate to the goods contained. Trained spillage containment personnel will be employed across the site, materials safety data sheet (MSDS) information will be held on file and issued, and appropriate procedures will be in place for materials that are to be used on site.

10. Materials Storage - The storage of all materials on site will be in designated lay down areas only. Wherever possible deliveries to site will be lifted straight from transport and into their as constructed position.

11. Erection Activities – General construction activities consisting of: excavation, concrete pouring, steel work erection, equipment installation through to paint touch-up will be undertaken on the site and the site contractors will manage these phases of construction to minimise any impact they may have on the surrounding area and local community. This will be achieved by developing and implementing a detailed construction management plan and schedule to ensure all contractors engaged on site are aware of local conditions prior to commencing work.

Whilst all of the above items are designed to help minimise the impact the project will have on the local community, the key is to develop a community relations strategy that will establish lines of communication with the local community, keep the community informed and to provide feedback on any issues that may need to be addressed as quickly as possible.

7.2 OPERATIONAL PHASE

Detailed environmental management and monitoring procedures for the proposed Bio-Refinery will be developed once site specific specialist studies are completed and the specific environmental management needs of the site are identified. These will be incorporated into the EIS.

7.3 CESSATION ACTIVITIES AND FINAL REHABILITATION

The site has been used for industrial purposes for many years and is located within an existing industrial area. A site decommissioning plan will be prepared as part of the EIS.

8.0 CONCLUSIONS

The proposed Bio-Refinery will combine ethanol plant technology with anaerobic digester technology, green electricity generation and fertiliser production. At full production the Bio-Refinery will process up to approximately 400,000 tonnes of grain feedstock per year to produce approximately 160 ML of fuel grade ethanol, fertiliser, aqueous ammonia and green electricity.

It is estimated that the project will require approximately \$150 million in capital expenditure to establish and will generate up to 300 construction jobs. During the operational phase of the development approximately 50 direct full-time jobs will be created and it is estimated that approximately 350 indirect jobs will be generated in the local region.

The proposed Bio-Refinery utilises renewable raw materials in the form of wheat, sorghum, and other forms of starch to produce renewable sources of energy that recycle existing carbon within our environment, rather than adding to it. Fertiliser produced from the proposed plant will assist in replacing nutrients and trace elements in the soil that are required to grow the grain feedstock utilised by the Bio-Refinery.

The process will also recycle water within the system and utilise grey water where possible as a source of top up water for cooling towers etc.

The Bio-Refinery will provide significant greenhouse gas abatement, which has been quantified and reported by CSIRO for this particular plant process. Compared to the production of premium unleaded petrol, there will be greenhouse gas reduction within the range 8% to 12.5%. Production of 160 MLpa of fuel grade ethanol from the proposed Bio-Refinery will result in greenhouse gas savings of approximately 400,000 tonnes/year or the equivalent of that produced by approximately 95,000 cars per year.

The Bio-Refinery has been designed to have low noise, odour and air quality emissions and to have a low risk profile.

It is considered that the project supports the policies of the Queensland Government, in its push to be the leader in ethanol production in Australia. The proposed 160 ML annual production of fuel grade ethanol represents approximately 5.3% of Queensland's usage of 3000 ML unleaded fuel and will greatly contribute to fuel available to supply the growing E10 market. The project will create significant employment in the local area and rural areas and will further assist making Queensland the leader in the ethanol industry.

9.0 REFERENCES AND SUPPLEMENTARY REPORTS

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