Government of Western Australia
Department of Environment Regulation

Works Approval

Environmental Protection Act 1986, Part V

Works Approval Holder: TEC Hedland Pty Ltd

Works Approval Number: W5729/2014/1

Registered office: Level 14, Parmelia House
191 St Georges Terrance
PERTH WA 6000

ACN: 169 777 404

Premises address: South Hedland Power Station
Lot 601 on Depositied Plan 70566
BOODARIE WA 6722
as depicted in Schedule 1.

Issue date: Thursday, 18 December 2014

Commencement date: Monday, 22 December 2014

Expiry date: Saturday 31 March 2018

The following category/s from the *Environmental Protection Regulations 1987* cause this Premises to be a prescribed premises for the purposes of the *Environmental Protection Act 1986*:

Category number	Category description	Category production or design capacity	Approved premises production or design capacity
52	Electric power generation: premises (other than premises within category 53 or an emergency or standby power generation plant) on which electrical power is generated using a fuel	20 megawatts or more in aggregate (using natural gas)	149 megawatts in aggregate

Conditions
This Works Approval is subject to the conditions set out in the attached pages.

Date signed: 18 December 2014
.....
Officer delegated under section 20
of the *Environmental Protection Act 1986*

Works Approval Conditions

1 General

1.1 Interpretation

1.1.1 In the Works Approval, definitions from the *Environmental Protection Act 1986* apply unless the contrary intention appears.

1.1.2 In the Works Approval, unless the contrary intention appears:

'Act' means the *Environmental Protection Act 1986;*

'annual period' means the inclusive period from 1 April until 31 March in the following year;

'AS 4323.1' means the Australian Standard AS4323.1 *Stationary Source Emissions Method 1: Selection of sampling positions;*

'averaging period' means the time over which a limit or target is measured or a monitoring result is obtained;

'CEMS' means continuous emissions monitoring system;

'CEMS Code' means the current version of the Continuous Emission Monitoring System (CEMS) Code for Stationary Source Air Emissions, Department of Environment & Conservation, Government of Western Australia;

'CEO' means Chief Executive Officer of the Department of Environment Regulation;

'CEO' for the purpose of correspondence means:
Manager Licensing (North West)
Department of Environment Regulation
PO Box 942
KUNUNURRA WA 6743
Telephone: (08) 9168 4200
Facsimile: (08) 9168 2179
Email: northwest@der.wa.gov.au;

'code of practice for the storage and handling of dangerous goods' means document titled "Storage and handling of dangerous goods: Code of Practice" published by the Department of Mines and Petroleum, as amended from time to time;

'Commissioning' means the process of operation and testing that verifies the works and all relevant systems, plant, machinery and equipment have been installed and are performing in accordance with the design specification set out in the works approval application;

'dangerous goods' has the meaning defined in the *Dangerous Goods Safety (Storage and Handling of Non-explosives) Regulations 2007*;

'environmentally hazardous material' means material (either solid or liquid raw materials, materials in the process of manufacture, manufactured products, products used in the manufacturing process, by-products and waste) which if discharged into the environment from or within the premises may cause pollution or environmental harm. Note: Environmentally hazardous materials include dangerous goods where they are stored in quantities below placard quantities. The storage of dangerous goods above placard quantities is regulated by the Department of Mines and Petroleum;

'Full load' means the operation of the plant at the design capacity, including but not limited to, all augmentation equipment, such as water injection;

'MWe' means power output (electricity generated) in megawatts;

'MWth' means power input (thermal) in megawatts;

'NATA' means the National Association of Testing Authorities, Australia;

'NATA accredited' means in relation to the analysis of a sample that the laboratory is NATA accredited for the specified analysis at the time of the analysis;

'normal operating conditions' means any operation of a particular process (including abatement equipment) excluding start-up, shut-down and upset conditions, in relation to stack sampling or monitoring;

'NOx' means oxides of nitrogen, calculated as the sum of nitric oxide and nitrogen dioxide and expressed as nitrogen dioxide;

'Part load' means the operation of the plant at 50% design capacity, including but not limited to, all augmentation equipment, such as water injection;

'Premises' means the area defined in the Premises Map in Schedule 1 and listed as the Premises address on page 1 of the Works Approval;

'Schedule 1' means Schedule 1 of this Works Approval unless otherwise stated;

'shut-down' means the period when plant or equipment is brought from normal operating conditions to inactivity;

'spot sample' means a discrete sample representative at the time and place at which the sample is taken;

'stack test' means a discrete set of samples taken over a representative period at normal operating conditions;

'**Stage 1'** means one open cycle gas turbine (OCGT) unit;

'**Stage 2**' means combined cycle gas turbine (CCGT) block configuration;

'start-up' means the period when plant or equipment is brought from inactivity to normal operating conditions;

'STP dry' means standard temperature and pressure (0^{o}Celsius and 101.325 kilopascals respectively), dry;

'USEPA' means United States (of America) Environmental Protection Agency;

'USEPA Method 7E' means the promulgated Test Method 7E – Determination of Nitrogen Oxides Emissions from Stationary Sources (Instrumental Analyser Procedure);

'Works Approval' means this Works Approval numbered W5729/2014 /1 and issued under the Act; and

'Works Approval Holder' means the person or organisation named as the Works Approval Holder on page 1 of the Works Approval.

1.1.3 Any reference to an Australian or other standard in the Works Approval means the relevant parts of the standard in force from time to time during the term of this Works Approval.

1.1.4 Any reference to a guideline or code of practice in the Works Approval means the current version of the guideline or code of practice in force from time to time, and shall include any amendments or replacements to that guidelines or code of practice made during the term of this Works Approval.

1.2 General conditions

1.2.1 The Works Approval Holder shall construct the works in accordance with the documentation detailed in Table 1.2.1:

Table 1.2.1: Construction Requirements[1]

Document	Parts	Date of Document
Works Approval Application Form	All	11 August 2014
South Hedland Power Station Works Approval Application, Strategen Environmental Consultants.	All, including Drawings and Appendices	July 2014

Note 1: Where the details and commitments of the documents listed in condition 1.2.1 are inconsistent with any other condition of this works approval, the conditions of this works approval shall prevail.

1.2.2 The Works Approval Holder, except where storage is prescribed in section 1.3, shall ensure that environmentally hazardous materials are stored in accordance with the Code of Practice for the Storage and handling of dangerous goods.

1.2.3 The Works Approval Holder shall undertake commissioning in accordance with the commissioning plan required by Works Approval condition 4.1.1.

1.3 Premises operation

There are no specified conditions relating to Premises operation in this section.

2 Emissions

2.1 General

2.1.1 The Works Approval Holder shall record and investigate the exceedance of any descriptive or numerical limit or target specified in any part of section 2 of this Works Approval.

2.2 Point source emissions to air

2.2.1 The Works Approval Holder shall ensure that where waste is emitted to air from the emission points in Table 2.2.1 it is done so in accordance with the conditions of this Works Approval.

Table 2.2.1: Emission points to air

Emission point reference	Emission point reference on Map of emission points	Emission Point [and source]	Emission point height (m)	Source, including any abatement
A1	1	Closed Cycle Gas Turbine 1	35	Closed Cycle Gas Turbine 1
A2	2	Closed Cycle Gas Turbine 2	35	Closed Cycle Gas Turbine 2
A3	3	Open Cycle Gas Turbine 1	25	Open Cycle Gas Turbine 1

2.2.2 The Licensee shall not cause or allow point source emissions to air greater than the limits listed in Table 2.2.2.

Table 2.2.2: Point source emission limits to air

Emission point Reference	Parameter	Operating Conditions	Fuel	Limit (including units)[1,2]	Averaging period
A1-A3	NOx	Full Load	Natural Gas	52 mg/m^3	Stack Test (minimum 30 minute average)
		Part Load		412 mg/m^3	
		Full Load	Low Sulphur Diesel	175 mg/m^3	
		Part Load		618 mg/m^3	

Note 1: All units are referenced to STP dry
Note 2: Concentration units for A1-A3 are referenced to 15% O_2.

3 Monitoring

3.1 General monitoring

3.1.1 The Works Approval Holder shall ensure that:
(a) all laboratory samples are submitted to and tested by a laboratory with current NATA accreditation for the parameters being measured.

3.1.2 The Works Approval Holder shall record production or throughput data and any other process parameters relevant to any non-continuous or CEMS monitoring undertaken.

3.1.3 The Works Approval Holder shall ensure that all monitoring equipment used on the Premises to comply with the conditions of this Licence is calibrated in accordance with the manufacturer's specifications , the requirements of the Licence or insert any relevant Australian standard.

3.1.4 The Works Approval Holder shall, where the requirements for calibration cannot be practicably met, or a discrepancy exists in the interpretation of the requirements, bring these issues to the attention of the CEO accompanied with a report comprising details of any modifications to the methods.

3.2 Monitoring of point source emissions to air

3.2.1 The Works Approval Holder shall undertake the monitoring in Table 3.2.1 according to the specifications in that table.

Table 3.2.1: Monitoring of point source emissions to air					
Emission point reference	**Parameter**	**Units**[1, 3]	**Averaging period**	**Frequency**[2, 4]	**Method**
A3	NOx	mg/m^3 g/s	Stack Test (minimum 30 minute average)	Once during commissioning of Stage 1, conducted at 50%, 75% and 100% load on each fuel type.	USEPA Method 7E
A1-A3				Once during commissioning of Stage 2, conducted at 50%, 75% and 100% load on each fuel type.	

Note 1: All units are referenced to STP dry
Note 2: Monitoring shall be undertaken to reflect normal operating conditions and any limits or conditions on inputs or production.
Note 3: Concentration units for A1-A3 are referenced to 15% O_2 .
Note 4: Monitoring to be undertaken under the operating conditions and using fuel covered in Table 2.2.2.

3.2.2 The Works Approval Holder shall ensure that sampling required under Condition 3.2.1 of the Works Approval is undertaken at sampling locations in compliance with the AS 4323.1 or relevant part of the CEMS Code.

3.2.3 The Works Approval Holder shall ensure that all non-continuous sampling and analysis undertaken pursuant to condition 3.2.1 is undertaken by a holder of NATA accreditation for the relevant methods of sampling and analysis.

4 Improvements

4.1.1 The Works Approval Holder shall complete the improvements in Table 4.1.1 by the date of completion in Table 4.1.1.

Table 4.1.1: Improvement program

Improvement reference	Improvement	Date of completion
IR1	The Works Approval Holder shall, prior to commencing commissioning Stage 1 and Stage 2 of the Power Station, submit a commissioning plan to the CEO. The commissioning plan shall include details relating to: (a) the commissioning stages and expected timescales for commissioning; (b) expected emissions and discharges during commissioning and the environmental implications of the emissions; (c) how emissions and discharges will be managed during commissioning; (d) how accidents or malfunctions will be managed; (e) start up and shut down procedures; and reporting proposals including accidents, malfunctions and reporting against the commissioning plan.	Six months prior to commissioning
IR2	The Works Approval Holder shall undertake a noise assessment of the Premises during commissioning of Stage 1 and Stage 2. A report on the noise assessment shall be prepared in accordance with Part 3 of the *Environmental Protection (Noise) Regulations 1997 (Noise Regulations).* The report shall be submitted to the CEO and shall include: (a) methods used for monitoring and modelling of noise; (b) an assessment of whether noise emissions from the Premises comply with the assigned noise level in the Noise Regulations; and (c) where they are not met, proposed measures to reduce noise emissions to assigned levels together with timescales for implementing the proposed measures.	One month after commissioning is completed in conjunction with W5.1.3.
IR3	The Works Approval Holder shall validate and update the monitoring results against the design specifications set out in the application and update the Air Quality Assessment of the Premises following commissioning of Stage 1 and 2.	One month after commissioning is completed in conjunction with W5.1.3.

5 Information

5.1 Reporting

5.1.1 The Works Approval Holder shall submit a compliance document to the CEO, following the construction of each of Stage 1 and Stage 2 of the works and prior to commissioning of the same.

5.1.2 The compliance document shall:
(a) certify that the works were constructed in accordance with the conditions of the Works Approval; and
(b) be signed by a person authorised to represent the Works Approval Holder and contain the printed name and position of that person within the company.

5.1.3 The Works Approval Holder shall submit a commissioning report for the Power Station, to the CEO within 1 month of the completion of commissioning.

5.1.4 The Works Approval Holder shall ensure the report includes:
(a) a list of any original monitoring reports submitted to the Works Approval Holder from third parties for the commissioning period;
(b) a summary of the environmental performance of the Power Station as installed, against the design specification set out in the Works Approval application;
(c) a review of performance against the Works Approval conditions; and
(d) where they have not been met, measures proposed to meet the design specification and/or works approval conditions, together with timescales for implementing the proposed measures.

5.2 Notification

5.2.1 The Works Approval Holder shall ensure that the parameters listed in Table 5.2.1 are notified to the CEO and are in accordance with the notification requirements of the table.

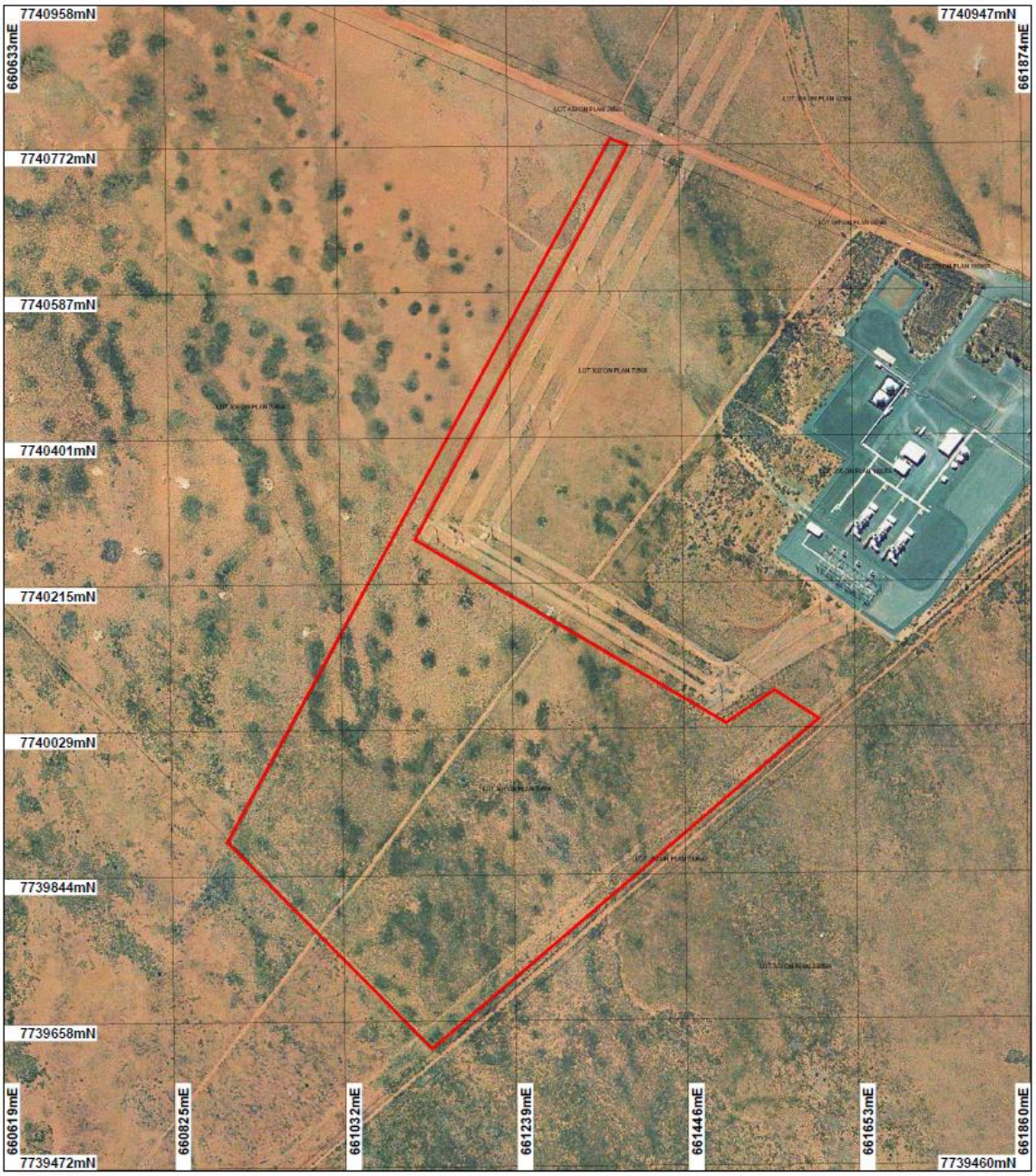
Table 5.2.1: Notification requirements

Condition or table (if relevant)	Parameter	Notification requirement	Format or form
1.2.3	Commencement of commissioning of Stage 1	7 days prior to start	None specified
	Completion of commissioning of Stage 1	7 days after completion	
	Commencement of commissioning of Stage 2	7 days prior to start	None specified
	Completion of commissioning of Stage 2	7 days after completion	

Schedule 1: Maps

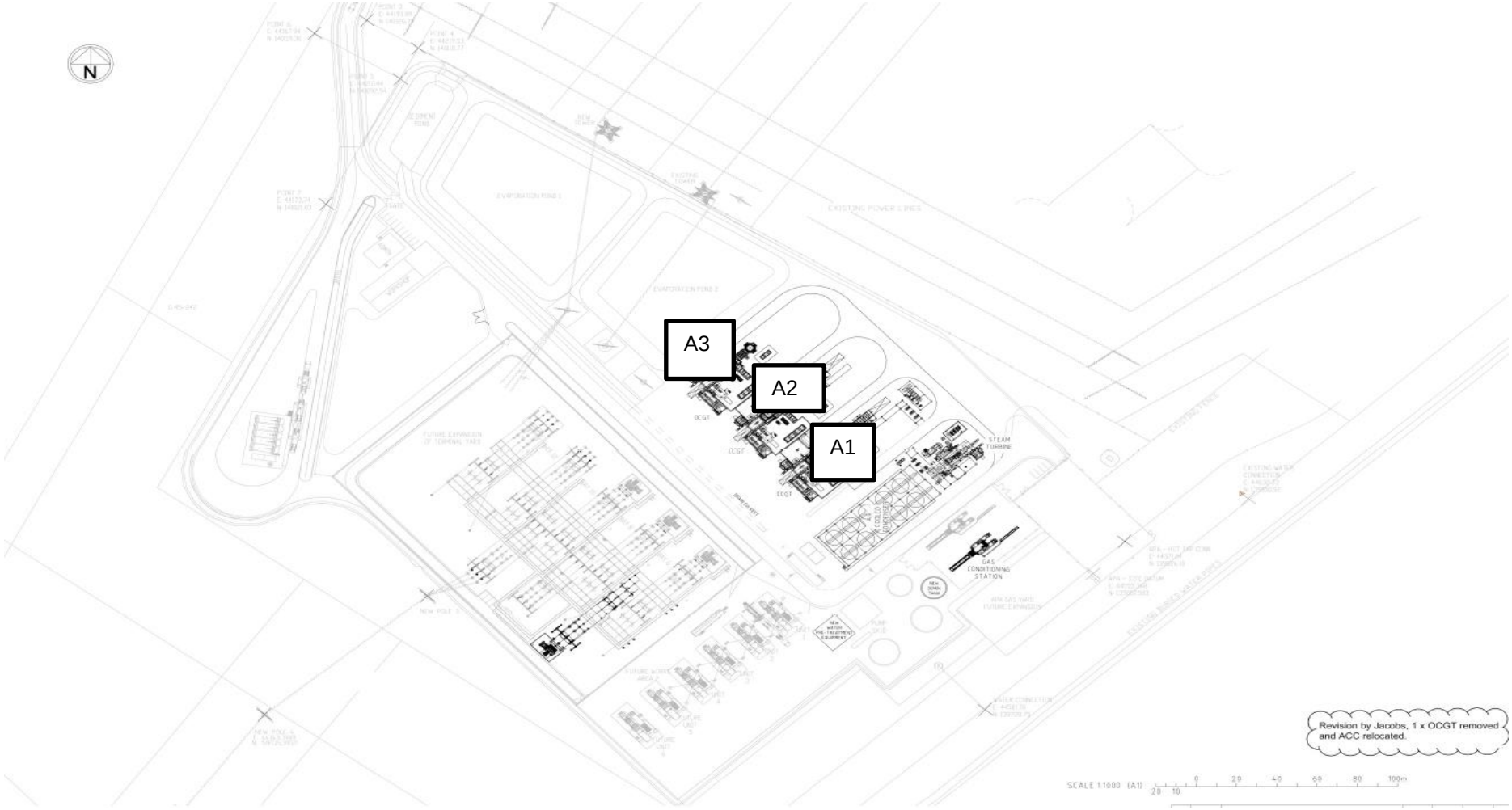
Premises map

The Premises is shown in the map below. The red line depicts the Premises boundary.



Map of emission points

The locations of the emission points defined in Table 2.2.1 shown below.



Government of Western Australia
Department of Environment Regulation

Decision Document

Environmental Protection Act 1986, Part V

Proponent: TEC Hedland Pty Ltd

Works Approval: W5729/2014/1

Registered office: Level 14, Parmelia House
191 St Georges Terrance
PERTH WA 6000

ACN: 169 777 404

Premises address: South Hedland Power Station
Lot 601 on Deposited Plan 70566
BOODARIE WA 6722

Issue date: Thursday, 18 December 2014

Commencement date: Monday, 22 December 2014

Expiry date: Saturday 31 March 2018

Decision

Based on the assessment detailed in this document the Department of Environment Regulation (DER), has decided to issue a works approval. DER considers that in reaching this decision, it has taken into account all relevant considerations and legal requirements and that the Works Approval and its conditions will ensure that an appropriate level of environmental protection is provided.

Decision Document prepared by: Damian Thomas
Licensing Officer

Decision Document authorised by: Alana Kidd
Manager Licensing

Contents

1 Purpose of this Document

This decision document explains how DER has assessed and determined the application for a works approval or licence, and provides a record of DER's decision-making process and how relevant factors have been taken into account. Stakeholders should note that this document is limited to DER's assessment and decision making under Part V of the *Environmental Protection Act 1986.* Other approvals may be required for the proposal, and it is the proponent's responsibility to ensure they have all relevant approvals for their Premises.

Works approval and licence conditions
DER has three types of conditions that may be imposed on works approvals and licences. They are as follows;

Standard conditions (SC)

DER has standard conditions that are imposed on all works approvals and licences regardless of the activities undertaken on the Premises and the information provided in the application. These are included as the following conditions on works approvals and licences:

Works approval conditions: 1.1.1-1.1.4, 1.2.1, 1.2.2, 5.1.1 and 5.1.2.

Licence conditions: 1.1.1-1.1.4, 1.2.1-1.2.4, 5.1.1-5.1.4 and 5.2.1.

For such conditions, justification within the Decision Document is not provided.

Optional standard conditions (OSC)

In the interests of regulatory consistency DER has a set of optional standard conditions that can be imposed on works approvals and licences. DER will include optional standard conditions as necessary, and are likely to constitute the majority of conditions in any licence. The inclusion of any optional standard conditions is justified in Section 4 of this document.

Non standard conditions (NSC)

Where the proposed activities require conditions outside the standard conditions suite DER will impose one or more non-standard conditions. These include both premises and sector specific conditions, and are likely to occur within few licences. Where used, justification for the application of these conditions will be included in Section 4.

2 Administrative summary

Administrative details		
Application type	Works Approval ☒ New Licence ☐ Licence amendment ☐ Works Approval amendment ☐	
Activities that cause the premises to become prescribed premises	**Category number(s)**	**Assessed design capacity**
	52	149MW in aggregate per annual period
Application verified Application fee paid	Date: 20/08/2014 Date: 04/09/2014	
Works Approval has been complied with Compliance Certificate received	Yes☐ No☐ N/A☒ Yes☐ No☐ N/A☒	
Commercial-in-confidence claim	Yes☐ No☒	
Commercial-in-confidence claim outcome		
Is the proposal a Major Resource Project?	Yes☒ No☐	
Was the proposal referred to the Environmental Protection Authority (EPA) under Part IV of the *Environmental Protection Act 1986*?	Yes☒ No☐	Referral decision No: Managed under Part V ☒ Assessed under Part IV ☐
Is the proposal subject to Ministerial Conditions?	Yes☐ No☒	Ministerial statement No: EPA Report No:
Does the proposal involve a discharge of waste into a designated area (as defined in section 57 of the *Environmental Protection Act 1986*)?	Yes☐ No☒ Department of Water consulted Yes ☐ No ☒	
Is the Premises within an Environmental Protection Policy (EPP) Area Yes☐ No☒ If Yes include details of which EPP(s) here.		
Is the Premises subject to any EPP requirements? Yes☐ No☒ If Yes, include details here, eg Site is subject to SO_2 requirements of Kwinana EPP.		

3 Executive summary of proposal and assessment

TEC Hedland Pty Ltd (TECH) proposes to construct and operate the duel fuel South Hedland Power Station (Power Station) located in Boodarie Industrial Estate in Port Hedland. This proposal involves the construction and operation of two gas turbines and one steam turbine arranged in a combined cycle gas turbine (CCGT) block configuration and one open cycle turbine (OCGT) unit, with an overall nominal net capacity of 149MW.

The Power Station will be located on Lot 601 on Deposited Plan 70566 within the Boodarie Industrial Estate approximately 13km south of Port Hedland and approximately 6km west of South Hedland. The Power Station is adjacent to the existing Alinta DEWAP Pty Ltd Port Hedland Power Station. The Power Station area is located within the Gas Power Station Buffer Special Control Area, zoned 'Strategic Industry' under the Town of Port Hedland Planning Scheme 5. The Power Station is located within the northern boundary of the Turner River Water Reserve, a Public Drinking Water Source Area (PDWSA), which has not been assigned a Protection Area rating by the Department of Water (DoW). The nearest residences to the power station are:

- the South Hedland Rural Estate, 5 km to the east southeast;
- the town of South Hedland, 6 km to the northeast; and
- Boodarie Homestead, approximately 8 km to the west.

Figure 1 outlines the premises site plan.

There is an existing gas turbine facility on the site that is owned by Horizon Power (HP); but currently is not operational. The facility includes a temporary 68MW gas turbine generating unit. The existing facility includes, but is not limited to:

- Diesel fuel oil storage and supply;
- Raw water storage and supply;
- Water treatment and demineralised water storage and supply;
- Natural gas supply and conditioning;
- Stormwater drainage, sedimentation and discharge facilities;
- Process effluent collection and evaporative ponds; and
- High voltage substation and transmission facilities, supporting the operation of an on-site temporary power generation facility owned by HP.

The proposed TECH Power Station to be installed on site will consist of the following in a 107MW nominal capacity CCGT block configuration:

- Two gas turbine generators;
- Two once-through steam generators;
- One stream turbine generator;
- An air-cooled condenser; and
- Associated balance of plant equipment and infrastructure.

One 42MW nominal capacity OCGT and its auxiliary equipment will supplement the installed generating capacity to meet maximum power demand requirements.

The OCGT consists of an air inlet system where air is compressed and a fuel added and ignited, generating high temperature and pressure gas stream. This stream then enters a turbine where the gas expands and drives the turbine, which in turn drives a generator, producing electrical power. The CCGT is made of OCGT units as above, but with the exhaust gas energy of each gas turbine supplied to a heat recovery system, utilising once-through steam generator technology that produces steam, which is then supplied and expanded within a common steam turbine generator that in turn produces electrical power. Exhaust steam from the steam turbine is fully condensed in an air-cooled condenser, with the condensed water returned to the cycle for re-use.

HP currently has works approval W5048 for the construction of the temporary 68MW power station (Stage 1) and the permanent 120MW (Stage 2) power station. To date HP has only constructed the

temporary Stage 1 68MW power station. The proposed TECH facility will replace the current HP temporary and originally proposed Stage 2 120MW power generation facility, while the existing HP Stage 1 infrastructure will be reused and augmented as required into the TECH Power Station and will not comprise additional infrastructure. Stage 2 of W5048 will not be constructed by HP.

Existing services constructed under W5048 will be adapted and augmented into the Power Station to meet the required operating requirements of the TECH Power Station and will include, but are not limited to the following:

- Fuel gas supply system, increased and augmented to meet site supply;
- Increase in potable water supply with integration of existing storage capacity;
- Integration and expansion of demineralised water systems and storage capacity. Water supplied from Water Corporation scheme;
- Integration and expansion of fire detection systems;
- Integration and expansion of stormwater and drainage systems; and
- Wastewater amount to be accommodated within the current wastewater and effluent disposal method. Current method is discharge to lined evaporation ponds with capacity of 24,000 kL per annum.

Each gas turbine of the Power Station will use natural gas as its primary fuel source to be supplied via the adjacent Pilbara Energy Pipe Line (PEPL). Diesel fuel will be stored onsite in the existing fuel oil storage tanks as an emergency back-up fuel source in the event of any disruption to the gas supply. The Power Station will be connected to the North West Interconnected System (NWIC) servicing key regional centres in the Pilbara.

HP is currently commissioning the temporary Stage 1 68MW power station under W5048. The TECH Power Station, once constructed, will then become the permanent power station.

TECH proposes to commence construction of the Power Station in January 2015. Commissioning of the OCGT is scheduled to take place in Q3 2016 and the CCGT system will be commissioned in Q4 2017. The Power Station is expected to be completed in 2017 and operate continuously for the life of the Power Station; approximately 25 years.

Figure 1 site layout

Decision table

All applications are assessed in line with the *Environmental Protection Act 1986*, the *Environmental Protection Regulations 1987*, DER's Policy Statement No 7- Operational Risk Management, and DER's Operational Procedure on Assessing Emissions and Discharges from Prescribed Premises. Where other references have been used in making the decision they are detailed in the decision document.

DECISION TABLE				
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**OSC or NSC**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
General conditions	W1.2.1 W1.2.3	OSC	**Construction and Commissioning** TECH has requested in the works approval application that commissioning of the Power Station be allowed to occur under the works approval. Accordingly, OSC W1.2.3 has been added to the works approval to allow commissioning in accordance with OSC W4.1.1. Commissioning will allow the proponent to measure actual emissions discharged (point source air and noise emissions) from the Power Station and compare them to expected emissions.	General provisions of the *Environmental Protection Act 1986.* Application supporting documentation.
	L1.2.5 L1.3.2	OSC	**Operation** <u>Emission Description</u> *Emission:* Contaminated or potentially contaminated stormwater from activities on the Premises including hydrocarbon fuel spills. *Impact:* Contamination of surrounding land and surface water drainage systems. Potential impacts on ecology of surface water from the addition of sediment and hydrocarbons. *Controls:* The proponent will store approximately 550 000 litres of diesel fuel on site in five self bunded storage tanks. There will be existing hydrocarbon traps to eliminate the potential for spills to enter the environment at transfer points. Waste oils will be stored on site in self bunded containers prior to disposal off site. Oily water will be collected and separated on site at various locations and will be directed to numerous oil water separator units on site. Oily water will be treated to less than 10mg/L Total Recoverable Hydrocarbons (TRH). Service	

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			water and demineralised water from Plant operations will be directed to the two dedicated 10^{-9} m/s lined evaporation ponds. The Evaporation ponds are designed to capture rainfall from a 1:100 year ARI event. Process and demineralised water will be treated and controlled using a microprocessor based controller and water will be tested for pH and neutralised to ensure there is no damage to the liner. The Proponent has committed to installing monitoring bores and groundwater monitoring will occur to ensure there are no groundwater impacts from the evaporation ponds. Evaporative cooler blowdown water will be discharged to the stormwater drainage system. All general surface runoff will be managed in accordance with Department of Water, *Water Quality Protection Note 52: Stormwater Management at Industrial Sites*. Risk Assessment *Consequence*: Minor *Likelihood:* Possible *Risk Rating:* Moderate Regulatory Controls OSC L1.2.5 will be added to the operating licence to require appropriate management of contaminated stormwater on-site. Residual Risk *Consequence*: Insignificant *Likelihood:* Unlikely *Risk Rating:* Low	
Emissions general		N/A	**Construction and Commissioning** No specific conditions regarding general emissions have been added to the	General provisions of the

DECISION TABLE				
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**OSC or NSC**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
	L2.1.1	OSC	works approval in relation to construction and commissioning of the Power Station. **Operation** Descriptive limits will be set through condition 2.6.2 of the licence and therefore OSC regarding recording and investigation of exceedances of limits or targets will be included.	*Environmental Protection Act 1986.*
Point source emissions to air including monitoring	W4.1.1 L1.2.3 L2.2 L3.1 L3.2	N/A OSC OSC	**Construction** There will be no point source emissions to air during construction of the Power Station. The bulk of the civil works to allow construction will have already been undertaken during construction under W5048. No specified conditions relating to point source emissions to air or the monitoring of these emissions are required to be added to the works approval for the Power Station. Dust emissions are discussed under Fugitive Emissions below. **Commissioning** DER's assessment and decision making are detailed in Appendix A. **Operation** DER's assessment and decision making are detailed in Appendix A.	General provisions of the *Environmental Protection Act 1986.* Ambient Air Assessment Criteria, National Environmental Protection Measure (Ambient Air Quality). Application supporting documentation.
Point source emissions to surface water		N/A	**Construction, Commissioning and Operation** There will be no point source emissions to surface water during construction and	General provisions of the *Environmental*

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including monitoring			operation of the Power Station. No specific conditions regarding point source emissions to surface water including monitoring have been added to the works approval. Closest watercourse to the Power Station is the South West Creek approximately 1km to the north east.	*Protection Act 1986.* Application supporting documentation.
Point source emissions to groundwater including monitoring		N/A	**Construction, Commissioning and Operation** There will be no point source emissions to groundwater during the construction and operation of the Power Station. No specified conditions relating to point source emissions to groundwater or the monitoring of these emissions are required to be added to the works approval. Depth to groundwater is between 4-7m. Groundwater is generally brackish, being around 1000-3000mg/L Total Dissolved Solids.	General provisions of the *Environmental Protection Act 1986.* Application supporting documentation.
Emissions to land including monitoring	L2.5.1	N/A OSC	**Construction and Commissioning** There will be no discharges to land during construction or commissioning of the Power Station. No specified conditions relating to emissions to land including monitoring are required to be added to the works approval or licence. **Operation** Stormwater from paved areas, building roofs and service yard areas will report to a number of oil water separators for treatment prior to discharging treated water to the drainage systems. All water will be treated to less than 10mg/L TRH prior to disposal. Licence conditions will be required to allow treated water to be discharged and a TRH limit of 15mg/L will be added to the licence. Monitoring conditions will be required.	General provisions of the *Environmental Protection Act 1986.* Application supporting documentation.

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Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**OSC or NSC**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
			Demineralised water is used in the gas turbine peak capacity power augmentation systems and as make-up to the CCGT block steam and water systems. The existing demineralisation water treatment plant and supply systems will be reused and integrated within the proposed Power Station with demineralised water storage capacity being augmented. All wastewater will be discharged to the two existing synthetic lined evaporation ponds which are not considered a discharge to the environment. The evaporation ponds have been designed to capture rainfall from a 1:100-year ARI event. General conditions above discuss management of the two evaporation ponds under containment conditions.	
Fugitive emissions	W2	N/A	**Construction and Commissioning** Emission Description *Emission:* Potential dust emissions (PM_{10}) from site preparation works, vehicle movement, wind blowing over cleared ground and stockpiles of uncovered loads etc. Potential light overspill during construction and operation as activities are proposed to be carried out 24 hours per day. *Impact:* Reduced local air quality due to dust emissions, adverse impact on local fauna due to light pollution. *Controls:* Dust emissions will be monitored and dust management strategies such as wetting surface areas etc will be implemented. Lighting will be restricted to that which is necessary for safety requirements and will be designed to restrict light overspill as much as possible. Risk Assessment *Consequence:* Insignificant. *Likelihood*: Rare.	General provisions of the *Environmental Protection Act 1986.* Application supporting documentation.

DECISION TABLE				
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**OSC or NSC**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
	L2.6.1 L2.6.2	OSC	*Risk Rating:* Low. Regulatory Controls No specific conditions to regulate fugitive dust or light emissions from the Premises are considered necessary to be added to the works approval for the Power Station. Residual Risk *Consequence:* Insignificant *Likelihood:* Rare *Risk rating:* Low **Operation** Emission Description *Emission:* Potential dust emissions (PM_{10}) from site works, vehicle movement etc. Potential light overspill during construction and operation as activities are proposed to be carried out 24 hours per day. *Impact:* Reduced local air quality due to dust emissions, adverse impact on local fauna due to light pollution. *Controls:* TECH has undertaken an air quality assessment of the Power Station and the results are provided in Appendix A. Water carts will be employed to wet dusty surfaces. Vehicle speeds will be restricted on site. Visual monitoring of dust will occur during operation of the Power Station. Risk Assessment *Consequence:* Minor. *Likelihood*: Unlikely. *Risk Rating:* Moderate.	

DECISION TABLE				
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**OSC or NSC**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
			Regulatory Controls Optional Conditions 2.6.1 and 2.6.2 are considered necessary to be added to the licence to manage dust emissions from of the Power Station. There is no need to add conditions to manage light emissions from the Power Station. Residual Risk *Consequence:* Insignificant *Likelihood:* Unlikely *Risk rating:* Low	
Odour		N/A	**Construction, Commissioning and Operation** There will be no odour emissions during the construction, commissioning or operation of the Power Station. No specified conditions relating to odour are required to be added to the works approval.	General provisions of the *Environmental Protection Act 1986.* Application supporting documentation.
Noise	L2.8 L3.1	OSC	**Construction, Commissioning and Operation** DER's assessment and decision making are detailed in Appendix A	General provisions of the *Environmental Protection Act 1986.* Application supporting documentation.

DECISION TABLE				
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**OSC or NSC**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
Monitoring general	W3	N/A	**Construction** There is no requirement to monitor during construction of the Power Station. No specific conditions for monitoring while construction occurs.	General provisions of the *Environmental Protection Act 1986.*
	W3.1-3.2	OSC	**Commissioning** Monitoring will occur under condition 4.1.1 of the commissioning plan so there will be specific general monitoring conditions on the works approval to allow monitoring under the Commissioning phase.	Application supporting documentation.
	L3.1	OSC	**Operation** TECH will be required to undertake ambient air quality monitoring at the Power Station so monitoring general conditions will need to coincide with this requirement. Monitoring general conditions will be added to the licence that regulates the type of monitoring such as applicable standards, frequency and calibration requirements. Monitoring of TRH prior to disposal to site drainage systems.	
Monitoring of inputs and outputs		N/A	**Construction, Commissioning and Operation** There will be no monitoring of inputs and outputs during the construction, commissioning or operation of the Power Station. No specified conditions relating to monitoring of inputs and outputs are required to be added to the works approval.	General provisions of the *Environmental Protection Act 1986.* Application supporting documentation.
Process monitoring		N/A	**Construction, Commissioning and Operation**	General provisions of the

DECISION TABLE				
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**OSC or NSC**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
			There will be no process monitoring required during the construction, commissioning or operation of the Power Station. Submission of the commissioning report required under W5.1.4 will outline how the Power Station is performing but there will be no specific conditions on the Works Approval regarding process monitoring.	*Environmental Protection Act 1986.* Application supporting documentation.
Ambient quality monitoring	 L3.8.1	N/A OSC	**Construction and Commissioning** There will be no ambient quality monitoring required during the construction and commissioning of the Power Station. There will be no specific conditions on the Works Approval regarding ambient quality monitoring. **Operation** Monitoring has been justified in the Section 1, general emissions.	General provisions of the *Environmental Protection Act 1986.*
Meteorological monitoring		N/A	**Construction, Commissioning and Operation** There will be no meteorological monitoring required during the construction or operation of the Power Station. There will be no specific conditions on the Works Approval regarding meteorological monitoring.	General provisions of the *Environmental Protection Act 1986.* Application supporting documentation.
Improvements	W4.1.1 L4.1	OSC	**Construction and Commissioning** OSC 4.1.1 IR1 has been drafted onto the works approval requiring submission of a commissioning plan as the proponent has requested commissioning occurs under the works approval. The commissioning plan will detail the activities	General provisions of the *Environmental Protection Act 1986.*

DECISION TABLE				
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**OSC or NSC**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
			expected during commissioning, expected emissions and discharges, how these will be managed and their environmental implications. OSC 4.1.1 IR2 has been added to the works approval requiring the submission of a noise assessment report after TECH has conducted noise monitoring / assessment of the Power Station during commissioning. OSC 4.1.1, IR3 has been included to determine the actual impacts of the emissions once commissioning has taken place. DER does not consider the modelling to be conservative, with particular regard to other industry in the area and operating parameters modelled. DR will review its requirement for monitoring within the licence, based on the outcome of the AQA validation. DER's assessment and decision making are detailed in Appendix A. **Operation** There will be no improvements required during operation of the Power Station. There will be no specific conditions on the licence regarding improvements.	Application supporting documentation.
Information	W5.1.3 W5.1.4 W5.2.1 L5.1 L5.2 L5.3	OSC	**Construction, Commissioning and Operation** TECH is required to submit a commissioning report for the Power Station. OSC 5.1.3 has been drafted onto the works approval requiring the works approval holder to submit to the CEO within one month of the completion of commissioning. OSC 5.1.4 outlines the information required within the commissioning report. TECH has requested that commissioning occur during the works approval so OSC 5.2.1 has been drafted onto the works approval which requires the works approval holder to notify the CEO of the commencement of	General provisions of the *Environmental Protection Act 1986.* Application supporting documentation.

DECISION TABLE				
Works Approval / Licence section	**Condition number W = Works Approval L= Licence**	**OSC or NSC**	**Justification (including risk description & decision methodology where relevant)**	**Reference documents**
			commissioning seven days prior to the start and seven days after completion. TECH will be required to submit an annual environmental report (AER) and an annual audit compliance report (AACR) under the licence. Air emissions monitoring data will be required to be submitted in the AER. TECH will be required to submit notification reports under condition 5.3.1 if there is a breach of licence conditions or any malfunction.	

5 Advertisement and consultation table

Date	Event	Comments received/Notes	How comments were taken into consideration
08/09/2014	Application advertised in West Australian (or other relevant newspaper)	No comments received	N/A
05/12/2014 12/12/2014	Proponent sent a copy of draft instrument Proponent sent second copy of draft documents after meeting.	Minor comments received	Minor changes to documents as discussed with proponent.

6. Risk Assessment

Note: This matrix is taken from the DER Corporate Policy Statement No. 07 - Operational Risk Management

Table 1: Emissions Risk Matrix

Likelihood	Consequence				
	Insignificant	Minor	Moderate	Major	Severe
Almost Certain	Moderate	High	High	Extreme	Extreme
Likely	Moderate	Moderate	High	High	Extreme
Possible	Low	Moderate	Moderate	High	Extreme
Unlikely	Low	Moderate	Moderate	Moderate	High
Rare	Low	Low	Moderate	Moderate	High

Appendix A

Noise

This proposal involves the construction and operation of two gas turbines and one steam turbine arranged in a CCGT block configuration and one OCGT unit, with an overall nominal net capacity of 149MW. Noise emissions are expected during construction, commissioning and operation of the Power Station. Therefore noise emissions may affect sensitive receptors. Noise emissions are regulated under the *Environmental Protection (Noise) Regulations 1997* (Noise Regulations) and TECH has a statutory responsibility to comply with the Noise Regulations.

TECH has undertaken noise modelling as part of the works approval application. The noise data represents the Power Station design with the existing HP balance of plant included. The aim of the noise modelling was to assess noise emissions from the proposed Power Station and to assess the noise impacts at the nearby noise sensitive premises and at the industry to industry boundary. The noise model has been updated using new noise data provided by the proponent and various options, layouts and noise mitigation measures were modelled and assessed to determine the final Power Station design.

The Power Station will be located approximately 13 km south of Port Hedland and approximately 6 km west of South Hedland. The Power Station is adjacent to the existing Alinta DEWAP Pty Ltd Port Hedland Power Station. The nearest residences to the power station are:

- the South Hedland Rural Estate, 5 km to the east southeast;
- the town of South Hedland, 6 km to the northeast; and
- Boodarie Homestead, approximately 8 km to the west.

Table 2 outlines the applicable assigned noise levels for noise sensitive premises for this proposal taken from the Noise Regulations.

Table 2 Assigned noise levels

		Assigned Noise Level[8]		
	Time of day	L_{A10}	L_{A1}	L_{AMax}
Residential	0700 to 1900 hours Monday to Saturday	45	55	65
	0900 to 1900 hours Sundays and public holidays	40	50	65
	1900 to 2200 hours all days	40	50	55
	2200 hours on any day to 0700 hours Monday to Saturday and 0900 hours Sunday and public holidays	**35**	45	55
Industrial and utility premises	All Hours	65	80	90

Compliance with night time L_{A10} noise level of 30dB has been used in the assessment at all noise sensitive locations for a number of reasons but mainly because the L_{A10} noise level is the most representative of continuous noise emissions from the Power Station and the night time criteria has been selected because it is the most stringent of all time periods and the Power Station is assumed to be a 24 hour operation. A 5dB penalty has been applied to the L_{A10} 35 criteria for a non-significant contributor. According to the Noise Regulations, in order for the Power station to be considered a 'non-significant' contributor to noise levels at sensitive locations its contribution must be 5dB less than the assigned noise level of 35dB. No tonality penalty has been applied because the Power Station is greater than 5km from the noise sensitive premises and no noise tonality has been applied to the industry to industry boundary because it was not possible to assess whether signal will be tonal at the neighbouring industry boundary. It is however proposed that tonality will be assessed during commissioning.

Table 3 represent the compliance assessment for residential noise sensitive premises. There is no exceedance with compliance levels.

Table 3 Compliance assessment L_{A10} residential premises

Noise Sensitive Premises	Model Result L_{A10} Noise Levels	Assigned L_{A10} Noise Level	Exceedance
Boodarie Homestead	7.9	30	No
Boodarie Locality	16.2	30	No
South Hedland Townsite	13.8	30	No

Table 4 represent the compliance assessment for industry to industry boundary noise sensitive premises. There is no exceedance with compliance levels.

Table 4 Compliance assessment L_{A10} industry to industry boundary

Noise Sensitive Premises	Model Result L_{A10} Noise Levels	Assigned L_{A10} Noise Level	Exceedance
Northern Boundary Receiver 1	60.0	65	No
Northern Boundary Receiver 2	61.3	65	No
Northern Boundary Receiver 3	59.7	65	No
Eastern Boundary Receiver 1	59.5	65	No
Eastern Boundary Receiver 2	63.1	65	No
Eastern Boundary Receiver 3	59.2	65	No

Construction

Emission Description

Emission: Noise emissions from construction of Power Station.
Impact: Unacceptable noise emissions affecting environment, health and wellbeing of people at nearest sensitive receptor and adjacent industry.
Controls: TECH has a statutory responsibility to comply with the Noise Regulations. Noise emissions modelling indicates no exceedance of L_{A10} which is the most stringent assessment level and therefore the Power Station is not considered to have a significant impact on existing noise levels. TECH will implement a range of noise emission management measures during construction including but not limited to, compliance with Australian Standard 2436-1981-*Guide to control noise on construction, maintenance and demolition sites*, compliance with assigned construction and operational levels at noise sensitive premises and the appropriate use of noise reduction technology. Construction will also be limited to day time Mondays to Saturdays wherever possible. Construction traffic will be minimal as large loads will be transported on the dedicated high-load route from Port Hedland.

Risk Assessment

Consequence: Minor
Likelihood: Rare
Risk Rating: Low

Regulatory Controls
No specific conditions to regulate noise emissions during construction from the Premises are considered necessary.

Residual Risk
Consequence: Minor
Likelihood: Rare
Risk rating: Low

Commissioning
Emission Description
Emission: Noise emissions from operation of Power Station.
Impact: Unacceptable noise emissions affecting health and wellbeing of people at nearest sensitive receptor at Hedland Rural Estate which is 5km away. Excessive noise may also cause disturbance to fauna inhabiting (nesting, breeding etc) nearby areas.
Controls: TECH has a statutory responsibility to comply with the Noise Regulations. Noise emissions modelling indicates no exceedance of L_{A10} which is the most stringent assessment level and therefore the Power Station is not considered to have a significant impact on existing noise levels.

Risk Assessment
Consequence: Minor
Likelihood: Unlikely
Risk Rating: Moderate

Regulatory Controls
Optional condition 4.1.1 IR2 has been drafted on the works approval requiring TECH to submit a noise assessment report. TECH shall undertake a noise assessment of the Premises during commissioning. A report on the noise assessment shall be prepared in accordance with Part 3 of the Noise Regulations. The report shall be submitted to the CEO and shall include, but not limited to, methods used for monitoring and modelling of noise, an assessment of whether noise emissions from the Premises comply with the assigned noise level in the Noise Regulations at noise sensitive receptors and industry to industry boundaries; and where they are not met, proposed measures to reduce noise emissions to assigned levels together with timescales for implementing the proposed measures. The noise assessment undertaken during commissioning will assess actual noise emissions against those proposed in the noise modelling and assigned noise levels under the Noise Regulations and thus an assessment will be undertaken the verify noise emissions at the Power Station.

Residual Risk
Consequence: Minor
Likelihood: Unlikely
Risk rating: Moderate

Operation
Emission Description
Emission: Noise emissions from operation of Power Station.
Impact: Unacceptable noise emissions affecting health and wellbeing of people at nearest sensitive receptor, the accommodation camp. Excessive noise may also cause disturbance to fauna inhabiting (nesting, breeding etc) nearby areas.
Controls: TECH has a statutory responsibility to comply with the Noise Regulations.

Risk Assessment
Consequence: Minor
Likelihood: Unlikely
Risk Rating: Moderate

Regulatory Controls
Optional licence condition L3.1 requiring noise monitoring and standard condition 5.2.1 will require the submission of an annual noise monitoring report.

Residual Risk
Consequence: Minor
Likelihood: Unlikely
Risk rating: Low

Point source emissions to air including monitoring
This proposal involves the construction and operation of two gas turbines and one steam turbine arranged in a CCGT block configuration and two OCGT units, with an overall nominal net capacity of 149MW. The proposed units will be LM6000PF SPRINT GT units which will have Dry Low Emission (DLE) or similar combustion abatement technology. Air emissions are expected during commissioning and operation of the Power Station. Therefore air emissions may impact the local environment and affect sensitive receptors.

The proponent conducted an Air Quality Assessment (AQA) for the following compounds, oxides of nitrogen (NO_x) including Nitrogen dioxide (NO_2), Sulphur dioxide (SO_2), Carbon dioxide (CO) and Particulate matter (PM) for the Power Station using AERMOD (version 14134) which was used to predict Ground Level Concentrations (GLC). The cumulative impact of NO_x emissions from the Power Station, other existing power station sources and other approved sources within the region have been evaluated using air dispersion modelling.

Source emission data was compared to the relevant National Environment Protection (Ambient Air Quality) Measure (NEPM) air quality standards and criteria in Table 2 of the NSW *Protection of the Environment Operations (Clean Air) Regulations 2010* (CAR). The applicable NEPM and CAR standards are provided in Table 5 and Table 6 below respectively. DER recommends the adoption of the NEPM. In the absence of any applicable air emission standard in Western Australia, DER acknowledges the applicable CAR standards. The AQA was reviewed by DER's Air Quality Section (AQS).

Table 5: NEPM Ambient Air Quality Standards and Goals

Pollutant	Averaging Period	Standard	Units[1]	Goals[2]
NO_2	1-hour	0.12	ppm	1 day a year
	Annual	0.03	ppm	None
CO	8-hour	9.0	ppm	1 day a year
SO_2	1-hour	0.20	ppm	1 day a year
	24-hour	0.08	ppm	1 day a year
	Annual	0.02	ppm	None
PM_{10}	24-hour	50	$\mu g/m^3$	5 day a year
$PM_{2.5}$ [3]	24-hour	25	$\mu g/m^3$	na
	Annual	8	$\mu g/m^3$	na

Notes
1. $\mu g/m^3$ referenced to 0°C and 101.3kPa
2. Maximum number of allowable exceedances
3. advisory reporting standard

The Port Hedland Industries Council (PHIC) has established a network of ambient air quality monitoring stations around Port Hedland. While the focus of the network is predominantly particulate matter, ambient NO_2 and SO_2 are being monitored at a number of locations to determine the relative change in the ambient concentration of these emissions over time. The monitoring locations nearest to the Power Station are Acacia Way, Wedgefield and the Bureau of Meteorology (BoM); only Acacia Way and BoM measure NO_2 and SO_2. The most recent short term 1-hour monitoring results (PHIC, 2013) indicate highest ambient concentrations for NO_2 and SO_2 comply with the relevant NEPM

criteria and were approximately 33% and 10% of the criteria respectively. Historically ambient PM_{10} concentrations have been elevated due to dust generated by the port and industry as well as high dust background levels and as such on a number of occasions the PM_{10} concentration exceeded ambient criteria.

Table 6: Emission standards for Electricity Generation [1]

Activity	Pollutant	Standard (mg/Nm^3) [2]
Any turbine operating on gas, being a turbine used in conjunction with an electricity generation system	NO_2 or nitric oxide (NO), or both, as NO_2 equivalent	70 [34ppm]
Any turbine operating on a fuel other than natural gas, being a turbine used in conjunction with an electricity generation system		90 [44ppm]

Notes
1. NSW Protection of the Environment Operations (Clean Air) Regulations for Group 6 activity (i.e. activity commenced after 1 September 2005), and for units with a generating capacity of more than 30MW.
2. Mg/Nm^3 dry, at STP (0°C, 101.3 kPa), referenced to 15% 0_2.

The maximum NO_x emission specification of the proposed Power Station Gas Turbines (GT) during normal operating parameters is 25 ppmv (dry, at 15% O_2) for natural gas and is within the NSW emission standard. For distillate fuel operations the maximum NO_x emission is 85 ppmv (dry, at 15% O_2) which does not achieve the NSW emission standard. However, the Power Station will only use distillate fuel in emergency situations and the potential air quality impact with NO_x emissions during emergency operations has been partially considered in the modelling. It should be noted that for the purposes of NO_x emissions specifications, normal GT operations is defined as the operating range from 75 – 100% of full load.

The AQA considered emissions from the proposed Power Station under three different operating scenarios as follows:
1. Full load - Natural Gas: both CCGTs and OCGT's operating at full load, fuelled by natural gas.
2. Part Load – Natural Gas: both CCGTs operating at full load and the OCGT's operating at part load (50%), fuelled by natural gas.
3. Emergency – Distillate Fuel: both CCGTs and both OCGTs operating at full load, fuelled by distillate.

The study did not consider start-up operations as these are not expected to be significant. DER also notes that the "Part Load" assessment only considered one turbine operating at half load, where operations are significantly higher than normal operations. This may reflect the operational mode of the plant; however this is unclear from the AQA or application. Additionally, DER would expect the "Emergency" operation of the plant to make an assessment of turbines at half load as it seems likely that the plant may, under emergency conditions, only be operated on full load.

Other emission sources considered are the adjacent Alinta 30MW power station and the Boodarie Waste to Energy Materials Recovery Facility. It should be noted that modelling of cumulative impacts has been confined to NO_x emissions. DER notes that the Roy Hill Infrastructure Temporary Power Station has not been accounted for in the modelling estimations. Additionally, assumptions have been regarding the exit velocity of the Port Hedland Power station that isn't appropriately justified. Figure 3 and 4 provide receptor locations used in the AQA.

Power Station in Isolation Modelling Results

The modelling results presented in Table 7 indicate that the air quality impacts due to emissions from the Power Station in isolation are predicted to be well below the NEPM ambient criteria at all receptor locations for all operating scenarios.

- Full Load – Natural Gas the maximum 1-hour average GLC of NO_2 was equal to 30% of the ambient criteria and the annual was equal to 5% of the criteria. The maximum 8-hour average GLC of CO is equal to less than 1% of the criteria.
- Part Load – Natural Gas the maximum 1-hour average GLC of NO_2 was equal to 67% of the ambient criteria and the annual was equal to14% of the criteria. The maximum 8-hour average GLC of CO is equal to 1% of the criteria.
- Emergency Distillate Fuel the maximum 1-hour average GLC of NO_2 and the maximum 8-hour average GLC of CO are very similar the Part Load – Natural Gas scenario. Air quality for SO_2 and PM_{10} were also considered. The maximum GLC of SO_2 is equal to less than 1% of the criteria. The maximum 24-hour average GLC of PM_{10} is equal to 6% of the criteria. SO_2 and PM_{10} impacts are considered negligible within the context of ambient concentrations and distillate fuel will only be used in emergency circumstances.

Power Station Cumulative Impacts Modelling Results

Cumulative impacts have been modelled for the Power Station, Existing Port Hedland Power Station and Boodarie Waste to Energy Facility. NO_2 concentrations are measured at Acacia Way (M2) and BoM (M3) monitoring sites. Marginally higher 1-hour and annual average concentrations of NO_2 were measured at Acacia Way during the 2012-13 periods and therefore have been used as 'worst-case' background pollutant concentrations. It should be noted that this AQA is particularly conservative for the short term averaging times as it is assumed that the maximum predicted GLCs from the modelled emission sources coincides with the highest measured background concentrations which is unlikely to occur in reality. Modelling results presented in Table 8 indicate the cumulative maximum GLCs of NO_2 predicted at the nominated receptor locations comply with the NEPM guidelines.

- Full Load – Natural Gas the maximum 1-hour average GLC of NO_2 at receptor locations will not exceed 92 µg/m^3 or 41% of the ambient criteria. Further, modelling predictions indicate the cumulative 1-hour average GLC of NO_2 for all modelled emissions (excluding measured background concentrations) will not exceed 18 µg/m^3 or 8% of the criteria. In terms of long term average GLCs of NO_2 model predictions of the annual average GLC of NO_2 indicate that the cumulative impact will not exceed 10.5 µg/m^3 or 19% of the criteria.
- Part Load – Natural Gas the maximum 1-hour average GLC of NO_2 at receptor locations will not exceed 109 µg/m^3 or 48% of the criteria. Further, modelling predictions indicate the cumulative 1-hour average GLC of NO_2 for all modelled emissions (excluding measured background concentrations) will not exceed 83 µg/m^3 or 37% of the criteria. In terms of long term average GLCs of NO_2 model predictions of the annual average GLC of NO_2 indicate that the cumulative impact will not exceed 11 µg/m^3 or 20% of the criteria.
- Emergency Distillate Fuel the maximum 1-hour average GLC of NO_2 will not exceed 113 µg/m^3 or 50%. Further, modelling predictions indicate the cumulative 1-hour average GLC of NO_2 for all modelled emissions (excluding measured background concentrations) will not exceed 39 µg/m^3 or 17% of the criteria.

Model predictions indicate that the GLC of NO_2 at receptor locations will increase marginally due to emissions from the proposed Power Station however it should be noted that DER does not consider the modelling to be a conservative estimation of the impacts.

Emission Risk Assessment – Commissioning

Emission Description

Emission: Air emissions of NO_x and SO_2 as discharges from the Power Station.
Impact: High concentrations of NO_2 and SO_2 can have adverse effects on human health and reduced local air quality at nearest sensitive receptor at Port Hedland Rural Estate 5km away.
Controls: Gas turbines will be fitted with dry low-emission combustion technology suitable for operation without water or steam injection on both natural gas and diesel fuel operation. Sampling ports will be provided in each stack.

Risk Assessment

Consequence: Moderate
Likelihood: Unlikely
Risk rating: Moderate

Regulatory Controls

TECH has requested that commissioning of the Power Station be allowed to occur and a general commissioning condition for the works approval to allow commissioning in accordance with OSC works approval condition 4.1.1 IR1 has been added to the works approval.

Works Approval conditions 2.2.1 and 2.2.2 have been added to the works approval to allow air emissions during the commissioning phase. Works Approval conditions 3.1 and 3.2 have been added to the works approval to allow monitoring of air emissions during the Commissioning phase.

Commissioning will allow the proponent to measure emissions discharged from the Power Station and compare them to expected discharges. As the commissioning report has yet to be submitted to the CEO, DER has included monitoring and limits (condition based on data used within the application) for the proponent to meet during the commissioning stage.

Residual Risk

Consequence: Moderate
Likelihood: Unlikely
Risk Rating: Moderate

Emission Risk Assessment – Operations

Emission Description

Emission: Oxides of nitrogen (NOx) from Power Station operations (Part Load, Full Load and Emergency).
Impact: Reduction in local air quality, potentially above the NEPM standard. Nearest sensitive receptor is 5km away. Emissions modelling demonstrate cumulative emission on a worst case scenario is well below NEPM guidelines. Model predictions, although not considered conservative, indicate that the GLC of NO_2 at receptor locations will increase marginally due to emissions for the Power Station. The increase in the maximum 1-hour average GLCs of NO_2 is predicted to be less than 10 $\mu g/m^3$ for Full Load – Natural Gas and 26 $\mu g/m^3$ for Part Load – Natural Gas.
Controls: All GTs will be fitted with DLE technology for NO_x control that will reduce NO_x emissions to 25 ppmv (dry at 15% O_2) during natural gas operations and 85 ppmv (dry at 15% O_2) during distillate fuel operations. Monitoring will be undertaken to assess emissions discharged to the environment.

Risk Assessment

Consequence: Moderate
Likelihood: Possible
Risk Rating: Moderate

Regulatory Controls

IR 1 requires TECH to submit a commissioning plan consistent with works approval condition 4.1.1 and a commissioning report consistent with works approval condition 5.1.3 and 5.1.4. The commissioning report will provide information, including but not limited to, performance data for air emissions from the Power Station. As the commissioning plan has yet to be submitted to the CEO, DER has included monitoring and limits (condition based on data used within the application) for the proponent to meet during the commissioning stage.

Anticipated licence conditions include, but not limited to:

Standard outcome based condition 1.2.2 requiring maintenance of the pollution control equipment.

Based on the findings of the air quality assessment, DER may impose an emission limit for NOx through works approval conditions 2.2.1 and 2.2.2. The monitoring data submitted as part of the works approval commissioning report will verify emissions discharged from the Power Station and determine which conditions will take place in the licence.

Monitoring requirements have been imposed through condition 3.2.1 for the NOx limit to demonstrate compliance with the emission limit value. The method for monitoring is consistent with that proposed by the proponent and is considered appropriate at this point in time.

DER notes that modelling is not considered conservative and has required the proponent to validate the impacts of emissions, as considered within the AQA, on a conservative basis.

Continuous Emissions Monitoring (CEMS) may be required in a full or near full air shed. Conditions 3.2.2-3.2.4 may be included to require all Continuous Emissions Monitoring (CEMS) to be undertaken in accordance with the DER's CEMS Code, for CEMS equipment to be appropriately maintained and calibrated and for all laboratory sampling and analysis to be undertaken by a NATA accredited laboratory. These conditions are required to ensure the monitoring data is reliable and accurate.

Residual Risk

Consequence: Moderate
Likelihood: Unlikely
Risk Rating: Moderate

By applying regulatory controls DER is satisfied that that the risk has been reduced to an acceptable level.

Table 7 Maximum predicted GLC Power Station in Isolation

Table 7: Maximum Predicted GLC (µg/m^3) [1] – Power Station in Isolation											
Compound	Averaging Period	Full Load – Natural Gas			Part Load – Natural Gas			Emergency - Distillate			Ambient Criteria [2]
		Model Domain	Receptors		Model Domain	Receptors		Model Domain	Receptors		
NO_2	1-h	67	9	R2	152	26	R1	146	31	R2	226
	Annual	3	0.3	R1	8	8	R1	-	-	-	56
CO	8-h	25	2	R1	108	7	R1	28	2	R1	10,311
SO_2	1-h	-	-	-	-	-	-	0.6	0.08	R2	524
	24-h	-	-	-	-	-	-	0.3	0.02	R1	209
	Annual	-	-	-	-	-	-	0.03	0.003	R1	52
PM_{10}	24-h	-	-	-	-	-	-	3	0.2	R1	46

Notes
1 µg/m^3 is assumed to be referenced to 25°C and 101.3 kPa, as predicted by AERMOD.
2 Ambient air quality criteria referenced to 25°C and 101.3 kPa, to ensure consistency with AERMOD predictions.

Table 8 Maximum predicted GLC Power Station in Isolation

Table 8: Maximum Predicted GLC (µg/m^3) [1] – Power Station Cumulative Impact								
Averaging Period	Receptor	Measured Concentration [2] µg/m^3	Model Predictions			Measured Concentration and Model Predictions		Ambient Criteria [3]
			Existing Sources	Approved Sources	Cumulative Part Load- Natural Gas	Approved Sources	Cumulative Part Load – Natural Gas	
1-hour	M1	-	6	6	24	-	-	226
	M2	74	6	6	25	80	99	
	M3	70	5	6	23	76	93	
	R1	74	8	9	35	83	109	
	R2	74	7	7	32	82	106	
	R3	74	6	6	23	80	97	
	R4	74	6	7	25	81	99	
	R5	74	6	7	24	81	98	
	R6	74	7	7	28	81	102	
	R7	74	6	6	25	80	99	
	R8	74	6	7	24	81	98	
	R9	74	6	7	24	81	98	
	R10	74	7	7	23	81	97	
Annual	M1	-	0.3	0.3	10.0	-	-	56
	M2	9.8	0.3	0.3	10.2	10.1	10.5	
	M3	9.4	0.3	0.3	10.0	9.7	9.9	
	R1	9.8	0.4	0.4	10.6	10.2	11.0	
	R2	9.8	0.3	0.3	10.1	10.1	10.4	
	R3	9.8	0.3	0.3	10.0	10.1	10.3	
	R4	9.8	0.3	0.3	10.1	10.1	10.4	
	R5	9.8	0.3	0.3	10.2	10.1	10.5	
	R6	9.8	0.3	0.4	10.3	10.1	10.6	
	R7	9.8	0.3	0.4	10.3	10.1	10.7	
	R8	9.8	0.4	0.4	10.4	10.2	10.8	
	R9	9.8	0.3	0.3	10.2	10.1	10.5	
	R10	9.8	0.3	0.3	10.1	10.1	10.4	

Notes
1 All measured and predicted concentrations (µg/m^3) are assumed to be referenced to 25°C and 101.3 kPa, to ensure consistency with AERMOD predictions.
2 The highest 1-hour and annual average concentrations measured at the Acacia Way (M2) monitoring site have been used to define existing 'worst-case' pollutant levels in the region
3 Ambient air quality criteria referenced to 25°C and 101.3 kPa, to ensure consistency with AERMOD predictions.

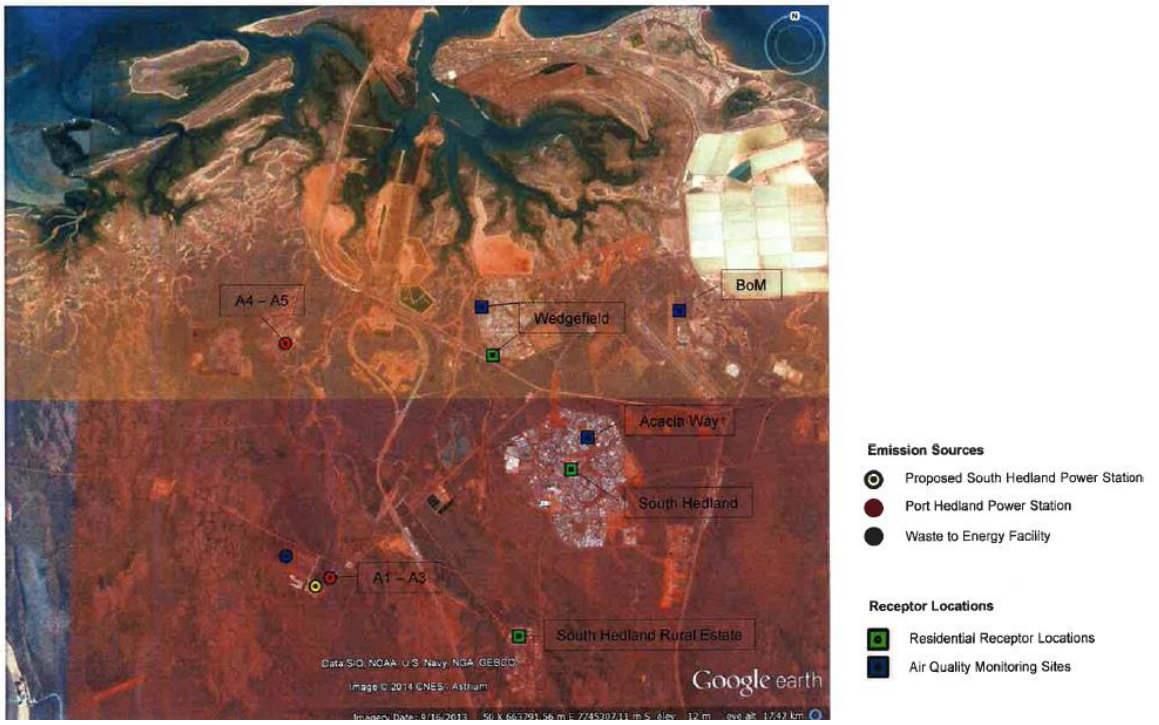

Figure 3 receptor locations

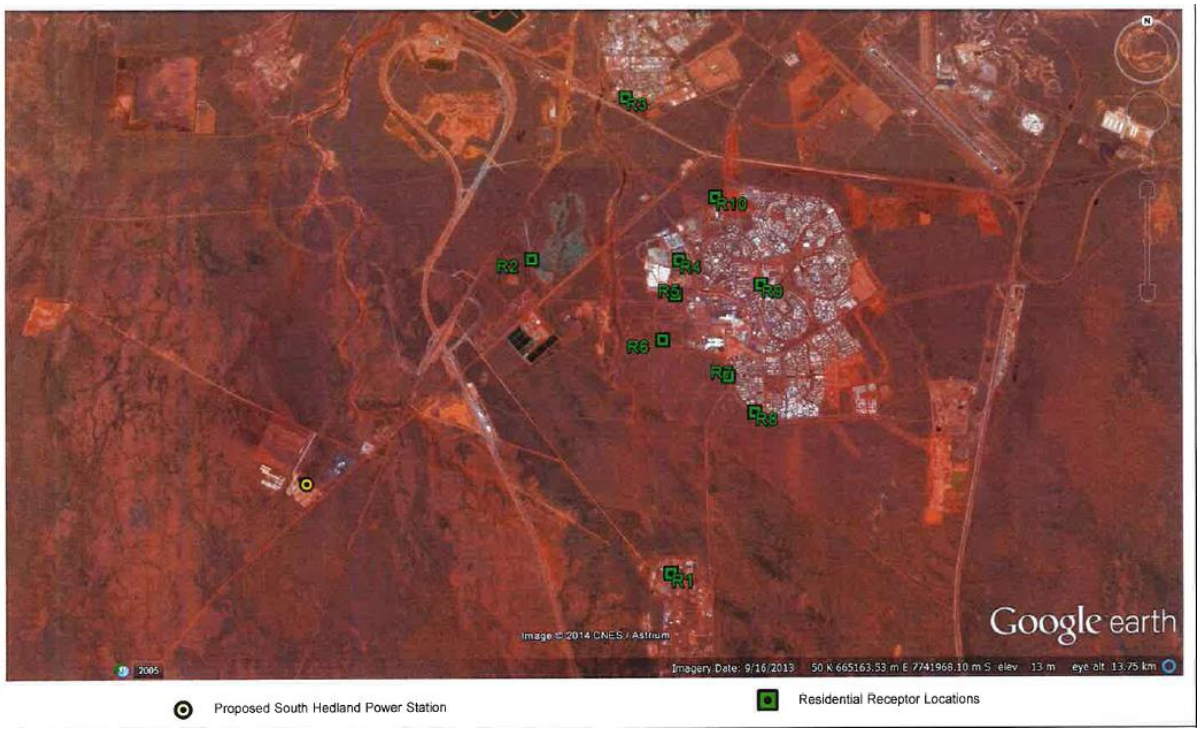

Figure 4 receptor locations