EnergyAustralia

LIGHT THE WAY

Tallawarra Stage B Gas Turbine Power Station

Modification Environmental Assessment

June 2020

Executive summary

The Tallawarra Stage B Gas Turbine Power Station Project (the Project) involves the development of a gas-fired power station and associated infrastructure located adjacent to the existing Tallawarra A Power Station. The Project was approved by the then Minister for Planning on 21 December 2010 and is considered Critical State Significant Infrastructure. A modification for the extension of the Project Approval lapse date (Mod-1) was approved by the Executive Director on 6 April 2016.

The Project will provide greater energy security in NSW as large thermal generation is scheduled to retire and variable renewable generators continue to connect to the grid over the coming decade. The extension of gas generated power at Tallawarra supports EnergyAustralia's customers in providing a reliable energy supply during the transition to renewable energy. The Project will provide electricity to the National Electricity Market at short notice during periods of high electricity demand, during supply outages, or when intermittent renewable energy supply is lower than demand.

EnergyAustralia is seeking a modification of the existing Project Approval under section 5.25 of the *Environmental Planning and Assessment Act 1979*. The modification proposes to extend the Project Approval lapse date by two years to December 2022 and to amend the description of condition of approval 1.5 so that a single open cycle gas turbine may be used for the power plant.

The modified Project would provide some minor environmental improvements to air quality, greenhouse gas and noise emissions during operation compared to the approved Project. The modified Project would have a minor impact on the visual landscape due to the plume dispersion device required to support aviation safety.

EnergyAustralia has been actively pursuing the development of the Project since the approval of Mod-1 in 2016, however construction is yet to commence due to several unforeseen delays, including the requirement to satisfy condition of approval 1.6 in consultation with Civil Aviation Safety Authority (CASA) and Shellharbour City Council regarding aviation safety. Having now met condition 1.6, EnergyAustralia is proceeding with the Project development.

However, EnergyAustralia has determined that the current global COVID-19 pandemic may result in the risk of further delays to the Project because of disrupted global supply chains and associated challenges in the mobilisation of construction. The timeframes that these risks may add to the Project are uncertain. Therefore, an extension to the Project Approval lapse date is proposed to provide opportunity to best manage the construction timeframe risk.

The modification is considered justified as it would provide some minor environmental improvements and would provide EnergyAustralia with the flexibility to incorporate a contemporary and more efficient technology that was not available at the time of the 2010 Project Approval. It would support the need for a reliable energy supply at short notice and will support the transition of the electricity supply to the NEM to renewable energy sources.

Contents

1 Introduction 1

1.1 Introduction 1
1.2 Approved Project summary 1
1.2.1 Project progression 1
1.2.2 Project site and surrounds 2
1.3 Purpose of the report 2

2 Statutory context 3

2.1 Environmental Planning and Assessment Act 1979 3
2.1.1 Project approval 3
2.1.2 Proposed modification 3
2.2 Protection of the Environment Operations Act 1997 3
2.3 Biodiversity Conservation Act 2016 4
2.4 National Greenhouse and Energy Reporting Act 2007 (Commonwealth) 4

3 Strategic context and justification 5

3.1 Need for the Project 5
3.1.1 Electricity market and reliability 5
3.1.2 Requirement for peaking capacity 7
3.2 Changes to energy policy 7
3.3 Key benefits of the modification 8
3.4 Implications of the Project Approval lapsing 8

4 Modification description 10

4.1 Extension of time 10
4.2 Amendment to Condition of Approval 1.5 10

5 Stakeholder and community engagement 12

5.1 Overview 12
5.1.1 EnergyAustralia engagement principles 12
5.1.2 Desired consultation outcomes 12
5.1.3 Tallawarra Community Liaison Group 13
5.1.4 Community consultation lead 13
5.2 Consultation activities 13
5.2.1 Community engagement plan 13
5.2.2 Early consultation 13
5.2.3 Project approval 14
5.2.4 Mod-1 14
5.2.5 CASA and the aviation industry 14
5.3 Modification consultation 15

6 Environmental scoping assessment 17
7 Environmental assessment 20

7.1 Land use 20
7.1.1 Background 20
7.1.2 Existing environment 21
7.1.3 Potential impacts 24
7.1.4 Conclusion 24

7.2 Air quality 24
7.2.1 Background 24
7.2.2 Assessment methodology 25
7.2.3 Assessment criteria 27
7.2.4 Existing environment 28
7.2.5 Potential impacts 29
7.2.6 Conclusion 34
7.3 Greenhouse gas emissions 34
7.3.1 Background 34
7.3.2 Assessment methodology 34
7.3.3 Assessment criteria 34
7.3.4 Potential impacts 35
7.3.5 Conclusion 36
7.4 Noise and vibration 36
7.4.1 Background 36
7.4.2 Assessment methodology 36
7.4.3 Assessment criteria 39
7.4.4 Existing environment 41
7.4.5 Potential impacts 41
7.4.6 Conclusion 42
7.5 Visual amenity 42
7.5.1 Background 42
7.5.2 Assessment methodology 43
7.5.3 Assessment criteria 43
7.5.4 Existing environment 43
7.5.5 Potential impacts 43
7.5.6 Conclusion 45
7.6 Waste management 45
7.6.1 Background 45
7.6.2 Assessment methodology 45
7.6.3 Existing environment 45
7.6.4 Potential impacts 46
7.6.5 Conclusion 47

8 Conclusion 48
8.1 Updated conditions and management measures 48

9 References 49

Appendices

Appendix A – Air quality impact assessment
Appendix B – Noise and vibration assessment

Figures

Figure 3-1: NEM regional reference node price
Figure 3-2: Expected unserved energy, assuming Snowy 2.0 is operational by 2025

Figure 4-1 Indicative layout of the Project
Figure 7-1 Historical land use zoning (adapted from the EIS)
Figure 7-2 Proposed Tallawarra Lands development (Adapted from Cardno, 2018)
Figure 7-3 Current land use zoning.
Figure 7-4 Air quality sensitive receivers and monitoring locations
Figure 7-5 Noise sensitive receivers and monitoring locations
Figure 7-6 Viewshed of an exhaust stack up to 60 m high (adapted from the EIS)

Tables

Table 5-1 Modification consultation activities
Table 5-2: Issues raised through modification consultation to date
Table 6-1 Environmental scoping assessment
Table 7-1 Impact assessment criteria (Approved Methods)
Table 7-2 Existing air quality summary
Table 7-3 Summary of worst case operational concentration of NO_2
Table 7-4 Summary of worst case operational concentration of PM_{10}
Table 7-5 Summary of worst case operational concentration of $PM_{2.5}$
Table 7-6 Summary of BACT options
Table 7-7 NGER reporting thresholds
Table 7-8 Estimated annual operational GHG emissions and energy use of the modified Project
Table 7-9 Construction noise management levels during standard hours
Table 7-10 Modification project-specific trigger levels
Table 7-11 Low frequency noise thresholds
Table 7-12 Road traffic noise criteria
Table 7-13 Background noise levels (dBA)
Table 7-14 The visual impacts matrix (adapted from the EIS)
Table 7-15 Comparison of visual characteristics
Table 7-16 Mitigation measures – Waste management
Table 8-1 Consolidated changes to conditions of approval mitigation measures

Abbreviations and acronyms

Term	Definition
AEMO	Australian Energy Market Operator
AER	Australian Energy Regulator
Approved Methods	Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales
AQIA	Air quality impact assessment
BACT	Best Available Control Technology
BC Act	Biodiversity Conservation Act 2016
BoM	Bureau of Meteorology
CASA	Civil Aviation Safety Authority
CCGT	Combined Cycle Gas Turbine
CLG	Community Liaison Group
CO	Carbon monoxide
CO_2	Carbon dioxide
CO_2-e	Carbon dioxide equivalent
CRL	Community Relations Lead
CSSI	Critical State Significant Infrastructure
dB(A)	A-weighted decibels
dB(Z)	Z- weighted decibels
DLN	Dry Low NOx
DPIE	Department of Planning Industry and Environment
EIS	Environmental Impact Statement
EPA	Environmental Protection Authority
EP&A Act	Environmental Planning and Assessment Act 1979
EPL	Environmental Protection Licence
GHG	Greenhouse gas
GHGA	Greenhouse gas assessment
GJ	Gigajoules
Hz	Hertz
ICNG	NSW Interim Construction Noise Guideline
kt	Kilotonnes
kV	Kilovolts
LAeq	The average sound level or energy averaged noise level over a defined measurement period. These averages are made in 15 minute periods, this description is classified as L_{Aeq} (15 min). This is commonly referred to as the ambient noise level.
LA_{max}	The average sound level or energy averaged noise level over a defined measurement period. These averages are made in 15 minute periods, this description is classified as L_{Aeq} (15 min). This is commonly referred to as the ambient noise level.
MEL	Minimum Environmental Load
mg/Nm^3	Milligrams per cubic metre
Mod-1	Modification 1 (07_0124)
Mod-2	Modification 2
MW	Megawatts
MWh	Megawatt hours
NEM	National Electricity Market
NIA	Noise impact assessment
NML	noise management levels
NO	Nitric oxide
NO_2	Nitrogen dioxide
NOx	Nitrogen oxides
NPI	NSW Noise Policy for Industry

Term	Definition
NSW	New South Wales
NGER	National Greenhouse and Energy Reporting
OCGT	Open Cycle Gas Turbine
O_3	Ozone
$PM_{2.5}$	Particulate matter of 2.5 micrometres or smaller
PM_{10}	Particulate matter of 10 micrometres or smaller
POEO Act	Protection of the Environment Operations Act 1997
ppb	Parts per billion
ppmv	Parts per million by volume
ppv	Peak particle velocity
RBL	Rating background level, which represents the median assessment background level determined over the whole measurement period.
RNP	NSW Road Noise Policy
SCR	Selective Catalyst Reduction
SNCR	Selective Non-catalytic reduction
SO_2	Sulphur dioxide
SSD	State Significant Development
SSI	State Significant Infrastructure
t	Tonnes
tpa	Tonnes per annum
$\mu g/m^3$	Micrograms per cubic metre
WMP	Waste management plan

1 Introduction

1.1 Introduction

The Tallawarra Stage B Gas Turbine Power Station Project was approved as MP07-0124 by the then Minister for Planning on 21 December 2010. A modification (07_0124-Mod-1) for the extension of the Project Approval lapse date to 21 December 2020 (Mod-1) was approved by the Executive Director on 6 April 2016. The approved Project involves the development of a gas-fired power station and associated infrastructure located adjacent to the existing Tallawarra A Power Station.

EnergyAustralia, as the proponent, is now seeking a second modification (Mod-2) (the modification) to the Project for approval by the Minister or delegated authority. Through this modification, EnergyAustralia is requesting approval to extend the Project Approval lapse date by two years and to amend the description of condition of approval 1.5 so that a single open cycle gas turbine may be used for the power plant.

Further details of the modification are provided in Section 4.

1.2 Approved Project summary

The approved Project involves the construction and operation of a gas turbine power station and associated infrastructure. The approved Project comprises either:

- Two or three open cycle gas turbine (OCGT) generators with a nominal capacity of up to 450 megawatts (MW), or
- One combined cycle gas turbine (CCGT) generator with a nominal capacity of 400MW.

Both OCGT and CCGT power plant options will include:

- High voltage switchyard (extension) comprising high voltage transformers and switchgear
- Transmission line connection to the existing 132 kilovolt (kV) network
- Connecting gas pipelines, gas receiving station and gas conditioning station
- Potable/fire water tank
- Demineralised water tank
- Electrical module
- Emergency diesel generator.

The approved Project will use existing infrastructure associated with the Tallawarra A Power Station.

The approved Project will use natural gas supplied from an extension to the existing lateral line at the Tallawarra A Power Station. It will require separate gas conditioning and metering equipment to be established adjacent to the existing Tallawarra A gas conditioning and metering equipment. The Project will generate electricity at a voltage in the range of 11-22kV, depending on the final gas turbine technology. The voltage will be stepped up to 132kV by a transformer and connected to the existing feeder transmission lines via a new, dedicated switch bay adjacent to the existing switchyard.

Since the Project was approved, EnergyAustralia have decided to pursue to the development of an OCGT power station due to changes in market demand. Details on market requirements and demand are provided in Section 3.

1.2.1 Project progression

In 2010, the Project was planned to be constructed immediately to meet the then current electricity supply requirements. Following the Project Approval, a change in the energy market and potential reduced future demands led to the Project being delayed.

Following the retirement of coal generators and the forecast of further retirements, the NEM has identified a reliability gap supply shortfall and market uncertainty which has again raised the need for the Project (refer to Section 3.1). As such, EnergyAustralia has been actively pursuing the development of the Project since the approval of Mod-1 in 2016. Construction, however, has not yet commenced due to several unforeseen delays.

EnergyAustralia's Project development program has been most affected by the need to meet condition of approval 1.6. This condition requires EnergyAustralia to prepare an aviation safety report, prepared in consultation with Shellharbour City Council, with its conclusions and recommendations agreed to by the CASA. On 2 April 2020, the Department of Planning, Industry and Environment notified EnergyAustralia that condition 1.6 had been satisfied, based on the advice from CASA. Having now met condition 1.6, EnergyAustralia is able to proceed with the Project development.

However, following these unexpected delays, EnergyAustralia considers that insufficient time now remains to commence the Project before the current Project Approval expires in December 2020. EnergyAustralia has also determined that the current global COVID-19 pandemic may result in the risk of further delays because of disrupted global supply chains for construction materials and associated challenges in the mobilisation of construction. The timeframes that these risks may add to the Project are uncertain.

As such EnergyAustralia requests an extension of the Project Approval lapse date as part of this Mod-1 Project Approval modification application. The extension of the lapse date to December 2022 would enable EnergyAustralia to navigate the continued detailed design development, procure technologies and mobilise construction in the current uncertain climate.

1.2.2 Project site and surrounds

The Project is located adjacent to the existing Tallawarra A Power Station on Yallah Bay Road, Yallah. The site is located on the western bank of Lake Illawarra and on the southern footslopes of Mount Brown, which rises to about 130 metres (m). The Project is positioned in a historically disturbed location on the foundations of a former coal power station, which was decommissioned in 1989. The land is owned by EnergyAustralia.

The Tallawarra Lands surrounding the site are currently leased for low density cattle grazing and comprise of undulating grassy slopes.

Since the Project Approval, a new residential development has been constructed about 2.5 kilometres (km) southwest of the Project site at Haywards Bay. Additionally, there are future plans to redevelop some of the Tallawarra Lands to the northeast and southwest of the site (refer to Section 7.1). The future development would include residential, commercial/industrial zones, business parks and potentially aged care and education facilities.

1.3 Purpose of the report

This modification report provides an assessment of the modification in support of a request for the Minister's approval in accordance with section 5.25 of the *Environmental Planning and Assessment Act 1979* (EP&A Act). The structure of this report is as follows:

- Section 2 – Statutory context
- Section 3 – Strategic context and justification
- Section 4 – Modification description
- Section 5 – Stakeholder and community engagement
- Section 6 – Environmental scoping assessment
- Section 7 – Environmental assessment
- Section 8 – Mitigation measures
- Section 9 – Conclusion.

2 Statutory context

This section provides the statutory and planning framework for the Project and considers any changes required as a result of the modification.

2.1 Environmental Planning and Assessment Act 1979

The EP&A Act is the principal law regulating development in New South Wales (NSW). It establishes a regime for the making of development applications and modifications, assessment of their environmental impacts, and development approval.

2.1.1 Project approval

The Project (MP07-0124) was granted approval by the then Minister for Planning on 21 December 2010. The Project was declared as Critical State Significant Infrastructure (CSSI) by the Minister for Planning on 26 February 2008 in accordance with section 5.13 of the EP&A Act. The Project Approval was based upon the development described in the *Tallawarra B Gas Turbine Power Station Environmental Assessment* (SKM, 2009), and associated environmental documents herein referred to as the Environmental Impact Statement (EIS).

The Project was originally determined under Part 3A of the EP&A Act which was repealed in 2011. Major projects determined under Part 3A subsequently transitioned to either State Significant Development (SSD) or State Significant Infrastructure (SSI). CSSI projects are projects declared by the Minister for Planning to be of high priority and essential to NSW for economic, social or environmental reasons. Energy security is a recognised critical issue for the State.

The Project retained its CSSI status when it transitioned to SSI in November 2018 in accordance with Schedule 2 clause 5(7) of the *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation 2017*.

The approval modification (Mod-1) for extension of the lapse date was approved by the Executive Director on 6 April 2016, which extended the Project Approval lapse date by five years to 21 December 2020.

2.1.2 Proposed modification

This modification proposes changes to the consolidated Project Approval under section 5.25 of the EP&A Act. The proposed changes include an extension of the Project Approval lapse date by two years to December 2022 and an amendment of condition of approval 1.5 for a single OCGT to be used for the Project. Consequently, modification of the Minister's approval under section 5.25 of the EP&A Act is required.

2.2 Protection of the Environment Operations Act 1997

The *Protection of the Environment Operations Act 1997* (POEO Act) sets the statutory framework for managing environment quality in NSW with the objective of protecting, restoring and enhancing the quality of the NSW environment.

Under Schedule 1, *17 Electricity Generation* of the POEO Act, the Project is considered a scheduled activity. Therefore, the Project requires an Environmental Protection Licence (EPL) to operate under section 48 of the POEO Act. EnergyAustralia will seek to incorporate the operational requirements of the Project and any relevant conditions of approval into the existing EPL for Tallawarra A (EPL Number 555).

The *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (Approved Methods) (EPA, 2016), lists the statutory requirements for modelling and assessing emissions of air pollutants from stationary sources in NSW. The Approved Methods are given legal effect under Part 5: Air Impurities Emitted from Activities and Plant in the *Protection of the Environment Operations (Clean Air)*

Regulation 2010. The air quality impact assessment (Section 7.1) applies the criteria provided in the Approved Methods.

2.3 Biodiversity Conservation Act 2016

The *Biodiversity Conservation Act 2016* (BC Act) became operational in August 2017 to replace the *Threatened Species Conservation Act 1995*, under which the approved Project was assessed. The BC Act promotes the maintenance of a healthy, productive and resilient environment. It focuses on biodiversity conservation through ecologically sustainable development.

Section 7.27 of the BC Act addresses the requirements of biodiversity assessment for modifications. In accordance with clause 7.17 (2)(c) of the BC Act, a biodiversity development assessment report is not required as the modification would not have any additional direct or indirect impacts on biodiversity values. For further details of the modification on biodiversity, refer to Section 6.

2.4 National Greenhouse and Energy Reporting Act 2007 (Commonwealth)

The *National Greenhouse and Energy Reporting Act 2007* (NGER Act) establishes the national legislative framework for the NGER Scheme, which comprises a framework for reporting greenhouse gas emissions, greenhouse gas projects and energy consumption and production by corporations in Australia. Companies with operational control over facilities that exceed the reporting thresholds are required to report their annual emissions, energy consumption and production as part of their NGER report. The *National Greenhouse and Energy Reporting Regulations 2006* (NGER Regulations) provides further details of reporting and recognises different categories of greenhouse gas emissions referred to as ‘scopes’.

The greenhouse gas emissions impact assessment (Section 7.3) applies the criteria provided in the NGER Act and NGER Regulations. The modification would require reporting under the NGER Scheme as it would exceed both the annual greenhouse gas emissions trigger and the annual energy consumption trigger.

3 Strategic context and justification

This section describes the need for the Project in terms of its strategic setting and operational need. It identifies changes in the energy market and the justification for the modification.

3.1 Need for the Project

The Project will provide greater energy security in NSW as large thermal generation is scheduled to retire and variable renewable generation increases over the coming decade. The extension of gas generated power at Tallawarra supports EnergyAustralia's customers in providing a reliable energy supply in the transition to renewable energy. The Project would provide electricity to the National Electricity Market (NEM) at short notice during periods of high electricity demand, during supply outages, or when intermittent renewable energy supply is lower than demand.

3.1.1 Electricity market and reliability

The NEM is a wholesale market for the supply and purchase of electricity across eastern Australia. The NEM allows for generators and retailers to purchase and sell electricity from competitive sources and contract with each other to manage the volatility in demand and price. Electricity supply and demand are instantaneously matched in the spot market through a centrally coordinated process run by the Australian Energy Market Operator (AEMO). The NEM is able to profile energy demand to assess the types of electricity generating infrastructure that would be best suited for the requirements of the future market.

In recent years, wholesale electricity prices and security of supply have become significant issues as some of the older coal generators have exited the NEM, variable renewables have increased their market share and local gas supplies have fluctuated. While there have been several coal retirements in the last decade, the closure of the 540MW Northern power station in South Australia in May 2016 and the 1600MW Hazelwood power station in Victoria in March 2017 has led to a significant increase in prices across the NEM, including in NSW (Figure 3-1). Victoria also saw blackouts and load shedding in January 2019 when the combination of extreme weather conditions and generation outages led to a supply shortfall.

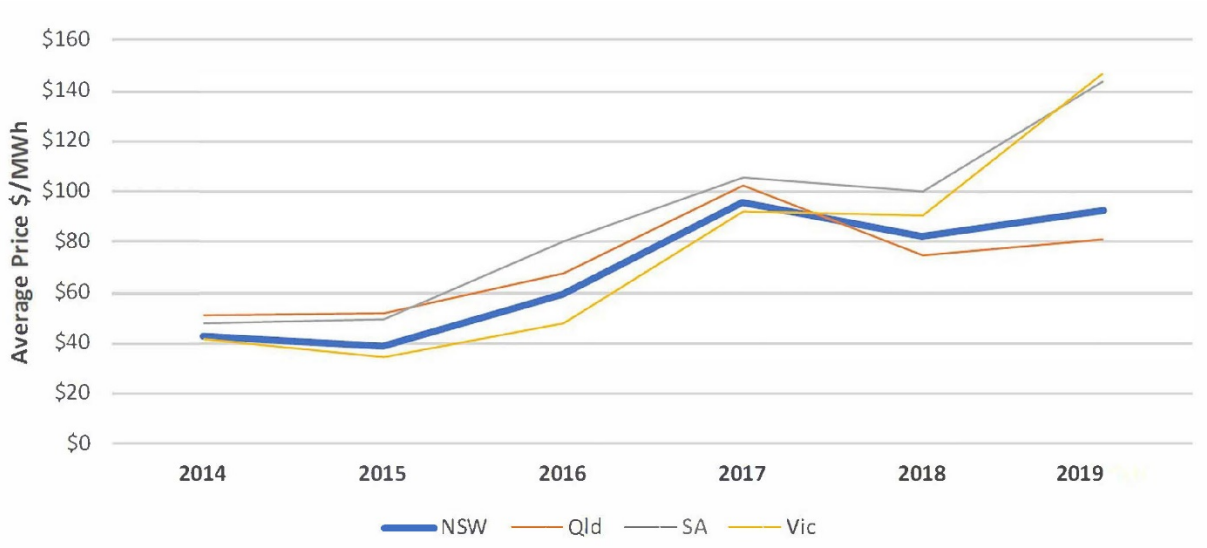

Figure 3-1: NEM regional reference node price

Source: AEMO data dashboard (2020)

AGL's planned 2022 staged retirement of the Liddell Power Station is the next expected coal power station closure in the NEM. In 2018, the AEMO forecasted a reliability gap supply shortfall in NSW, post the Liddell closure, which will grow year on year from 2022-23.

In 2019, the figures were revised following the announcement of several variable renewables planned to be operational by 2025 (AEMO, 2019). The new renewable generation coming online would make only a small improvement to the reliability outlook. By 2024, the expected unserved energy (energy that cannot be supplied to consumers due to insufficient demand response or network capability) would be marginally below the current reliability standard (Figure 3-2). Although under the current standard, the outlook for NSW contains the risk of potential significant load shedding events during infrastructure outages of the aging thermal generation fleet and extreme weather events including high temperatures, bushfires and storms (Energy Security Board, 2020; AEMO, 2019). Due to this uncertainty, the AEMO is refining the reliability standard (refer to the following section).

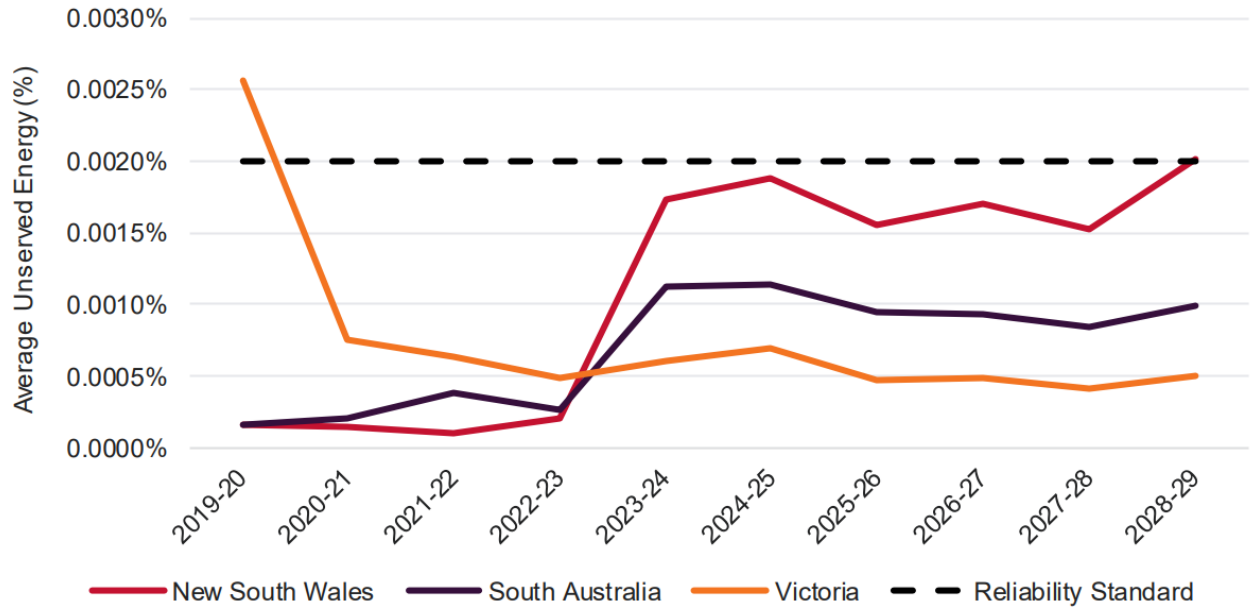

Figure 3-2: Expected unserved energy, assuming Snowy 2.0 is operational by 2025

Source: 2019 Electricity Statement of Opportunities, AEMO

The expected unserved energy estimates include an assumption that Snowy 2.0 is operational by 2025. Pumped hydro projects have long lead times and high development risks. There remains significant technical, timeline and financial risk around this project ahead of the completion of exploratory works, which are expected to take between 18 and 34 months to complete. Additionally, the completion of the Snowy 2.0 project leads to no significant projected improvement in reliability, because transmission remains a limiting factor in transferring supply to the region's load centres. Upgrades to the existing interconnectors between NSW to Queensland and Victoria and two new projects, HumeLink and EnergyConnect, to connect NSW with South Australia are in early planning stages. These new transmissions projects would provide more reliable sharing of supply across State borders and improve the supply-demand balance in NSW, however these transmission projects have not yet received full regulatory approval. Therefore, maintaining the option for gas fired generation with shorter lead times to being fully operational is important to preserving ongoing supply security for NSW.

The Project Approval modification would help to address this reliability uncertainty by providing an electricity supply to the NEM in the short term This would help to de-risk NSW against any potential delays of the Snowy 2.0 project and other energy projects in early stages of development. The Project would also provide future certainty in energy availability during extreme and unexpected weather events.

Refining the reliability standard

The current reliability standard is based on the expected unserved energy within a financial year not exceeding 0.002 percent (refer to Figure 3-2). As the application of this standard requires the averaging of annual unserved energy over all possible outcomes, it effectively averages out the risk of experiencing the rapidly growing number of extreme weather events which can cause severe load shedding, especially over the summer period.

The AEMO is currently developing a refined reliability standard that would ensure customers are not exposed to involuntary load shedding in the future uncertain market. The unreliability of ageing thermal generation fleets, extreme weather events and the periods where renewable energy supply is intermittent, increase uncertainty in energy supply.

The new standard is expected to see a reliability gap shortfall in NSW from 2023 onwards, similar to that projected in the 2018 AEMO report. Under this refined reliability standard, NSW is forecast to require another 375MW by 2023 and up to 480MW by 2028.

The Project is aligned with these industry projections and would be able to meet this requirement in the medium term. It would bridge the gap of the energy needs in NSW while large transmissions projects and variable renewable energy projects develop in the next decade.

3.1.2 Requirement for peaking capacity

When electricity demand rapidly approaches supply capacity at times of peak demand, EnergyAustralia must be able to generate electricity to provide 'peaking capacity'. During these periods, the wholesale price which EnergyAustralia pays to other generators can increase by up to 200 times the standard power cost. The Project's peaking power generation would assist in managing the cost of electricity sold to consumers and minimise market exposure. It would also provide fast start up generation capacity at times of reduced supply or reduced generation capability from other plants or sources.

As Australia's electricity market adapts to a carbon-constrained future and turns towards intermittent renewable energy sources, the Project would assist in creating a more secure energy system. Fast start power generation complements renewables by providing back-up to wind and solar energy and helps respond to peak demand.

It is recognised that variable renewable generation is the lowest cost form of new replacement energy, and it is expected that most of the annual energy historically provided by coal generators will be replaced by renewable generation. Stronger renewable energy targets with consequential increase in renewable energy generation, may also bring forward the economic closure of coal generators.

Whilst renewables provide low cost energy, peaking capacity is still required to maintain system security when renewables are not generating (i.e. dark hours, still hours or other intermittencies). Gas-fired generation enables quick responses to fluctuations in electricity supply and demand, providing security in supply for large numbers of households and businesses across the State.

The Project provides an important source of peaking energy generation to help NSW transition from an electricity system dominated by coal generation to a high renewables and low emissions future. The Project provides an important step in this progression while still meeting the consumer energy demand.

3.2 Changes to energy policy

Developments in Australian energy policy over the past decade have been characterised by continued uncertainty and market volatility. This is in part due to the lack of a clear agreed national energy policy and is also due to the broader global transition to a carbon constrained economy. Industry, government, experts, peak bodies and other stakeholders have responded in various ways to the transition and fragmentation of the energy market. Policy and legislative reforms have been made in response to rising energy costs, the decreased reliability and security of the network and the impact of changing technology on the energy market.

In NSW, the Final Report from the Energy Security Taskforce (NSW Government, 2017) stated that 'the electricity system is in a period of transition, innovation and reform'. It identified a series of risks and emerging issues for the NSW electricity system to maintain a reliable electricity supply. While instances of unserved energy have been rare, there are indicators new risks are emerging as electricity demand reaches supply in NSW, particularly with the failure of large generation plant or extreme weather events. The report recommends that Government should 'be alive to the short-term risks' and 'manage risks proactively when needed.'

Amendments recently made to the *NSW Electricity Supply Act 1995* by the *Electricity Supply Amendment (Emergency Management) Act 2017* make it clear that energy security is a high priority for the NSW Government, and it is strongly committed to preventing electricity shortages (Parliament of NSW, 2017). The independent review into the future security of the NEM 2017 (Finkel et al., 2017), found the closure of coal fired plants may pose risks to power system reliability and security, in part because the variable renewable energy sources replacing them have not yet been well integrated into the system. Elsewhere, recurrent reports from the Australian Energy Regulator (AER) and the AEMO generally reinforce the need for greater energy security through the delivery of fast start, flexible capacity into the grid.

In the 2018 *State of the Energy Market* report (AER, 2018), trends undertaken by Government to intervene in the energy market are identified, including:

- Major investments in publicly owned generation and storage
- Pricing direction to State-owned generators
- A threat of compulsory divestment of private generation assets
- National and State level renewable energy targets
- Programs offering financial assistance for grid scale renewable projects or residential solar and battery systems
- An increase in reporting, researching and publications in the field owing to public and media scrutiny of the market.

Furthermore, in May 2020, the chair of the National COVID-19 Coordination Committee has stated the importance of gas-fired energy generation in Australia's recovery following the COVID-19 pandemic. The Committee plans to focus on gas supply for its potential as a raw material for both existing and new manufacturing industry. The focus on gas-fired power generation is anticipated to preserve and create jobs as well as provide support for the transition to renewable energies (NCCC, 2020).

3.3 Key benefits of the modification

The modification of condition of approval 1.5, to enable the construction and operation of a single OCGT, would provide EnergyAustralia with the flexibility to incorporate a contemporary and more efficient technology that was not available at the time of the 2010 Project Approval. The modification would support the need for reliable energy supply at short notice and during the transition to renewable energy. The modified Project would provide some minor environmental improvements to air quality, greenhouse gas and noise emissions during operation. Further details are provided in Section 7.

The extension of time would avoid the lapse in the Project Approval and would maintain the option for the Project to proceed, supporting a more secure energy supply for NSW. As the Project is located on a brownfield site of a former coal fired power station, using existing infrastructure from Tallawarra A and planned in consideration of the future Tallawarra Lands development, it provides an ideal opportunity to meet peaking generation needs in NSW without generating adverse environmental impacts. The Project would minimise the impact of development and provide an alternative to other greenfield options such as Marulan.

3.4 Implications of the Project Approval lapsing

If the Project Approval lapses, potential consequences are likely to include:

- Delays in the Project delivery or non-delivery, potentially contributing to an anticipated shortfall in NSW electricity generation, with consequences such as increased NEM prices and insufficient or interrupted electricity supply for NSW residents, businesses and the community.
- Decreased reliability of electricity supply during peak demand periods and decreased security of electrical supply during system emergencies.
- A slower transition to a low emissions market as gas-fired facilities would take longer to come online.

- Increased social and economic impacts associated with undermining the ability of the NSW supply network to meet peak energy demands in the short term and base load demands in the medium term.
- Potential impacts to Australia's economic recovery following the COVID-19 pandemic.

If the Project Approval were to lapse, EnergyAustralia may require the development of a peaking power station on another greenfield site such as Marulan, to fill the anticipated energy shortfall.

4 Modification description

This section describes the proposed modifications to the Project Approval. EnergyAustralia seeks to extend the Project Approval lapse date by two years and amend the description of condition of approval 1.5 to enable the construction and operation of a single open cycle gas turbine (OCGT).

A detailed description of these proposed changes is provided in the following sections.

4.1 Extension of time

An extension of time is proposed to address the lapsing of the Project Approval which occurs on 21 December 2020. Condition of approval 1.4 provides that the approval lapses 10 years after the date on which the Project Approval was granted unless works have physically commenced. A two-year extension is sought which would extend the approval lapse date to 21 December 2022.

The proposed extension to the lapse date would allow EnergyAustralia further time to complete detailed design and begin construction of the Project. The extension of time would not result in any additional environmental impacts that have not already been considered and assessed in the Project Approval and would ensure that the Project benefits to the NSW energy supply network are realised.

4.2 Amendment to Condition of Approval 1.5

Condition of approval 1.5 allows for the construction and operation of a two- or three-unit gas turbine power plant. During design development of the Project, the option of one single OCGT unit has been identified to best meet the Project objectives. The modification would require an amendment to condition of approval 1.5. EnergyAustralia proposes the condition be amended to read:

"The project shall comprise ~~either~~ up to ~~a two- or~~ three-unit gas turbine power plant with a total nominal output of up to 450 megawatts operating in open cycle mode or a single unit gas turbine plant with a nominal output of 400 megawatts operating in combined cycle mode."

If one single OCGT was used, it would be positioned in the same location as the two- or three-unit gas turbines, as described in the EIS (Figure 4-1). There would be no increase to the existing footprint of the approved Project.

The modified Project would require a single exhaust stack. The single stack would be up to 50m high and would incorporate a plume dispersion device. The plume dispersion device satisfies the requirements of condition of approval 1.6. The plume dispersion device will be an integral part of the exhaust stack and its design would include a number of outlets, angled away from the vertical and each other. Preliminary design indicates that the plume dispersion device would widen from about 7m in diameter at its base to about 20m at the exit for the range of gas turbines being considered for the Project.

Other aspects of the proposal will be generally consistent with the approved Project including the potable water demand, energy generating capacity and capacity factor of about 35 percent. Whilst a 35 percent capacity factor was considered for air emissions assessment purposes, EnergyAustralia estimates actual usage will average over time in the order of 10 percent per annum. Natural gas will be the only fuel source used to fire the gas turbine. The construction methodology, including construction hours and required plant and equipment would be generally consistent with the approved Project.

Figure 4-1 Indicative layout of the Project

5 Stakeholder and community engagement

This section discusses the community engagement principles for the Project including the consultation activities undertaken to date and the consultation proposed for the future of the Project.

5.1 Overview

EnergyAustralia has undertaken community and stakeholder engagement for the Project since 2007. Engagement and consultation have been ongoing throughout the concept design, the approvals phase for the Project, Mod-1, the continuing Project design development and would continue throughout detailed design and the construction of the Project. Key stakeholders include:

- Department of Planning Industry and Environment (DPIE)
- NSW Environmental Protection Authority (EPA)
- Civil Aviation Safety Authority (CASA)
- The Tallawarra Community Liaison Group (CLG)
- Wollongong City Council
- Shellharbour City Council.

5.1.1 EnergyAustralia engagement principles

EnergyAustralia implements the following, specific principles to stakeholder and community engagement across all its operations and projects:

- What is promised is delivered— EnergyAustralia is accountable for the delivery of all commitments made to the community.
- Spend time talking with people— EnergyAustralia initiates engagement with key stakeholders early in its projects and gives priority to meaningful face to face engagement.
- Reduce the ‘don’t know’— EnergyAustralia works to actively build community awareness and trust in its operations, its approach and its people.

These engagement principles will be applied for the life of the Project.

5.1.2 Desired consultation outcomes

Community and stakeholders have been and will continue to be proactively engaged throughout the Project. The principal desired outcome from consultation activities is to make sure stakeholders feel appropriately informed of plans and actions prior to them occurring and to promote confidence in EnergyAustralia’s management approach.

Further outcomes of EnergyAustralia’s community engagement are to ensure:

- EnergyAustralia’s engagement moves to a model of proactive, well planned and timely consultation.
- Time is spent building awareness of the context for EnergyAustralia’s approach and intent for future operations within the region – with the view to providing greater community certainty.
- Early engagement on key milestones via existing channels educates stakeholders on key aspects of major projects in addition to informing them of progress.
- A core group of advocates is established to provide public support for EnergyAustralia’s approach.
- EnergyAustralia’s approach to environmental management is transparent and clearly communicated.
- Stronger brand presence is achieved as an additional outcome of community engagement.

5.1.3 Tallawarra Community Liaison Group

Tallawarra CLG was established in 2004 as the principal community liaison group for the Tallawarra Power Station and for the Project. CLG meetings are held quarterly at the Tallawarra Power Station offices.

The CLG includes members from the community and stakeholders such as: the amateur radio club, local bird watching societies, the NSW EPA, local high school, the local aboriginal land council, Illawarra National Parks Association and representatives from both Shellharbour and Wollongong City Councils. Regular updates are provided at the CLG meetings regarding all aspects of both the site operations and the Tallawarra B Project.

5.1.4 Community Relations Lead

Strong community relations have been a feature of EnergyAustralia's development programs. EnergyAustralia has appointed a dedicated Community Relations Lead (CRL) who manages the community and stakeholder engagement for the Project. The CRL is committed to open and honest communication with stakeholders. Respect and consideration for the community and stakeholders is EnergyAustralia's priority for all aspects of its operations.

The CRL is committed to:

- Engaging stakeholders early in the process
- Ensuring stakeholders have easy access to information
- Responding to all stakeholder contact in a timely manner
- Being sensitive to the needs of the community
- Honouring commitments made by the Project team
- Making every effort to minimise the impact of work on the local community
- Being consistent in word and action
- Collaborating with stakeholders
- Engage stakeholders affected by EnergyAustralia's activities in an effective and meaningful way
- Ensuring stakeholders are satisfied they have had the opportunity to provide information on activities on their property (where applicable) that may impact the Project or their property.

EnergyAustralia's CRL will ensure that best practice standards for stakeholder engagement are met across all aspects of the day to day activities of the Project.

5.2 Consultation activities

5.2.1 Community engagement plan

EnergyAustralia is committed to undertaking ongoing community and stakeholder consultation on the Project. Following its purchase of the Tallawarra site from the NSW Government and subsequent development and approvals work undertaken, EnergyAustralia has committed to continued community engagement. EnergyAustralia recognises that the local community and Project stakeholders may have an interest in the modification. To address this, EnergyAustralia is continuing to consult with the local community and Project stakeholders about the modification.

5.2.2 Early consultation

Consultation regarding the Project commenced with the then Department of Planning (now DPIE) on 13 February 2007. An application for the development of the Project was sent to the Department of Planning

which initiated consultation with the following agencies for development of the Director-General's Requirements:

- Department of Planning (now DPIE)
- Department of Water and Energy (now DPIE)
- Department of Environment and Climate Change (now DPIE)
- Wollongong City Council
- Lake Illawarra Authority (abolished)
- NSW Premiers Department (now the Department of Premier and Cabinet).

5.2.3 Project approval

During the development of the EIS, consultation was undertaken with the following agencies:

- CASA
- Department of Environment and Climate Change (now DPIE),
- Department of Primary Industries
- Airservices Australia.

Community consultation was undertaken with the Tallawarra CLG and with the broader community by quarterly Project newsletters and newspaper columns. Consultation with the CLG regarding the Project has been ongoing since February 2007.

EnergyAustralia (then TRUenergy) held a Community Information and Feedback Session at the Dapto Ribbonwood Centre 25 August 2009. This voluntary community engagement activity was structured as an informal drop-in session to provide members of the community with an opportunity to find out more about the plans for the site and to provide feedback on the Project. Members of the Project team attended the session to provide information and respond to questions from the community. Participants provided verbal feedback to members of the Project team at the session and were invited to make submissions through the formal exhibition process run by the Department of Planning. Approximately 20 members of the local community participated in the session.

The EIS was publicly exhibited from 5 August to 3 September 2009. The Department of Planning placed advertisements in newspapers, advising members of the public of the exhibition locations and the processes by which a submission could be made. The EIS and advice on the submission timing and processes were also placed on the Department of Planning website.

No submissions were received from community organisations or the general public. Seven submissions were received from agencies. In March 2010, the submissions report (SKM, 2010) was submitted to the Department of Planning which reviewed consultation responses and provided recommendations to the Project approval process.

5.2.4 Mod-1

EnergyAustralia sought to extend the original lapse date of the Project Approval by five years (Mod-1 – refer Section 2.1). The assessment for Mod-1 was publicly exhibited from 20 January to 17 February 2016. The Department of Planning provided the modification documents on its website and notified key government agencies of the application in writing. No submissions were received from community organisations or the general public. Four submissions were received from agencies, each had no objections.

5.2.5 CASA and the aviation industry

EnergyAustralia has undertaken continued engagement in order to satisfy approval condition 1.6, which relates to aviation safety. Numerous meetings were held with CASA, Shellharbour City Council and interested stakeholders from 2018 to 2020.

A detailed aviation impact assessment and engagement activity has been undertaken which lead to the notification by DPIE on 2 April 2020 that approval condition 1.6 has been satisfied. DPIE, CASA, Shellharbour Council, Shellharbour Airport and the local aviation industry were all consulted with throughout the process.

5.3 Modification consultation

EnergyAustralia recognises that the local community and Project stakeholders may have an interest in the proposed Project Approval modification. To address this, EnergyAustralia is continuing to consult with the local community and the Project stakeholders about the modification. Table 5-1 below outlines community engagement activities for the modification undertaken to date and proposed activities planned into the future.

Table 5-1 Modification consultation activities

Consultation activity	Status	Timing
Meetings with DPIE to discuss Project development and the scope of the modification.	Ongoing	10 December 2019 06 April 2020
Meeting with NSW EPA to discuss scope of the modification.	Complete	24 April 2020
Meetings with Wollongong City Council Executive and key staff to discuss the Project development.	Ongoing	September 2019 February 2020 March 2020.
Meeting with Shellharbour Council Executive and key staff to discuss the Project development.	Ongoing	July 2019 September 2019 October 2019 November 2019 April 2020
ABC Illawarra Radio Interview	Complete	14 April 2020
Newspaper advertisement for the modification.	Complete	July 2020
Consultation activities as required by condition 6.5 of the Project Approval.	During construction and operation	August 2020
Targeted consultation with DPIE and relevant State agencies during operations.	Ongoing during operation	Ongoing from 2022

Of the completed modification consultation activities, Table 5-2 outlines the issues that were raised and where they have been addressed in this modification report.

Table 5-2: Issues raised through modification consultation to date

Agency	Issue raised	Response
NSW EPA	The modification should be assessed against Best Available Control Technology (BACT), specifically for nitrogen oxides (NOx) emissions	A BACT assessment has been undertaken to identify a reasonable and feasible NOx emission control technology. Details are provided in Section 7.1.
	The noise assessment in the modification should be completed in accordance with the current *NSW Noise Policy for Industry.* The assessment should include: ■ Measured background noise levels ■ Noise trigger levels ■ A sleep disturbance assessment ■ A cumulative assessment with Tallawarra A ■ All sensitive receptors (including the Tallawarra Lands development) ■ An assessment of modifying factor corrections, particularly low frequency noise but also any other	An updated noise impact assessment has been undertaken to address potential construction and operational noise and vibration impacts of the modification. Details are provided in Section 7.4.

Agency	Issue raised	Response
	corrections applicable during operation of the power station, for example during start-up ■ Details and justification of the proposed noise mitigation and management measures.	
	The modification should address sewage management and consider alternate management options such as pump out, upgraded onsite system (for example, package plant) or connection to sewer.	An assessment of the existing sewage treatment plant has been undertaken to identify its current performance and future capacity. Details are provided in Section 7.6.
	The modification should consider the statutory requirements against the *Protection of the Environment Operations Act 1997*, Schedule 1, *17 Electricity Generation*.	EnergyAustralia will seek to incorporate the requirements of the Project into the existing EPL for Tallawarra A (EPL 555). Refer to Section 2.2.
	Confirmation of the fuel used to power the Project.	Natural gas will be the only fuel source used to fire the gas turbine.
DPIE	Details of community, council and government agency consultation should be provided.	Details of stakeholder and community consultation are provided in Section 5.
	Evidence should be provided that the requirements of section 7.17 of the BC Act is met, in that the modification would not increase the impact on biodiversity values, as compared to the approved Project	The modification would remain within the existing approved footprint. There would be no additional vegetation removal, disturbance of threatened ecological communities, species or habitat. Refer to Sections 2 and 6.
	The environmental assessment should provide a comparative analysis against the predicted impacts of the approved Project and confirmation that the conditions of the approved are met in relation to air quality, greenhouse gas emissions and noise.	An air quality impact assessment and a noise impact assessment have been undertaken to identify potential changes in impacts from the modification. Details are provided in Sections 7.1, 7.3 and 7.4.

This modification report has assessed the relevant statutory requirements and need for the modification (Section 3), the scale and nature of the proposed modifications (Section 4), the level of community involvement and interest (Section 5) and the likely impacts of the modified Project (Section 7). It has identified that the modifications would not have more than a minimal environmental impact, as such the modification is not required to be placed on public exhibition.

During the development of the modification, agencies have had the opportunity to comment on the modification. Additionally, EnergyAustralia are continuing consultation and engagement with key stakeholders and the community through the development of the Project.

6 Environmental scoping assessment

This section provides a preliminary environmental assessment to identify the environmental scope and assess potential implications of the modification. Consideration of each environmental aspect assessed in the EIS was carried out to determine the potential for change to the impacts and, therefore, whether further assessment was required. Other environmental aspects that were not addressed in the EIS, but which may be relevant, have also been considered as best practice.

Environmental aspects requiring further assessment are air quality, noise and vibration, and visual amenity. These are assessed in Section 7.

A summary of the environmental scoping assessment is provided in Table 6-1.

Table 6-1 Environmental scoping assessment

Issue	Potential change in impact?	Description
Air quality	Yes	The operation of a single OCGT has the potential for changes in air quality impacts due to the use of a single OCGT. This may include changes in emissions during start-up, full load and/or cumulative impacts with Tallawarra A. During consultation, the NSW EPA requested further assessment into BACT, specifically for NOx emissions. Additionally, DPIE requested a that a comparative analysis of air quality impacts against the approved Project be provided. An assessment of potential changes to operational air quality impacts associated with the modification is provided in Section 7.1. The assessment includes the consideration of reasonable and feasible best practice emission controls.
Plume rise	No	EnergyAustralia has undertaken operational plume rise assessments separately which identified the need for a plume dispersion device. DPIE has informed EnergyAustralia that condition of approval 1.6 regarding aviation safety has been satisfied (with conditions), therefore plume rise will not be specifically addressed in this modification. However, the addition of the plume dispersion device has been considered in the air quality assessment in Section 7.1.
Greenhouse gas emissions	Yes	The operation of a single OCGT has the potential for changes in greenhouse gas emissions due to the use of a single OCGT. However, as the modification would not exceed the approved power output of 450MW, the greenhouse gas emissions produced from a single OCGT would likely be lower than the approved Project as the single OCGT is more efficient. During consultation, DPIE requested that a comparative analysis of greenhouse gas emissions against the approved Project be provided. An assessment of potential changes to operational greenhouse gas emissions associated with the modification is provided in Section 7.3.
Noise and vibration	Yes	The operation of a single OCGT has the potential for changes in noise impacts due to the use of a single OCGT. Potential vibration and road noise impacts were not assessed in the approved Project. During consultation, the NSW EPA requested an updated operational noise impact assessment be completed in accordance with the current *NSW Noise Policy for Industry* (EPA, 2017). The EPA also requested a construction noise impact assessment and a road noise impact assessment be undertaken in accordance with the *Interim Construction Noise Guideline* (DECCW, 2009) and the *NSW Road Noise Policy* (DECCW, 2011), respectively. Additionally, DPIE requested that a comparative analysis of noise impacts against the approved Project be provided. An assessment of potential changes to operational noise and vibration as well as construction and road noise assessments are provided in Section 7.4.
Hazard and risk	No	The modification would not introduce any new hazards or risks during construction or operation. Potential impacts relating to hazards and risk would be consistent with the approved Project. No further assessment associated with the modification is considered necessary.

Water and hydrology	No	The modification would not result in an increase in water demand, the volume of earthworks or drainage pathways. There would be no change in water management practices or to the risk of flooding during construction and operation. Potential impacts relating to water and hydrology would be consistent with the approved Project. No further assessment associated with the modification is considered necessary.
Biodiversity	No	The modification would remain within the existing approved Project footprint. There would be no additional vegetation removal, disturbance of threatened ecological communities, species or habitat. Potential direct and indirect impacts relating to biodiversity would be consistent with the approved Project. No further assessment associated with the modification is considered necessary.
Aboriginal and non-Aboriginal heritage	No	The modification would remain within the existing approved Project footprint. The site is on previously disturbed land and no additional ground disturbance would occur. Potential impacts relating to Aboriginal and non-Aboriginal heritage would be consistent with the approved Project. No further assessment associated with the modification is considered necessary.
Visual amenity	Yes	The modification would require a single stack up to 50m high with a plume dispersion device, thus reducing the number of exhaust stacks from up to three to one, exhaust stack height and shape as described in the EIS. An assessment of potential changes to visual impacts associated with the modification is provided in Section 7.5.
Traffic and transport	No	During construction, the delivery of a single OCGT would require less heavy vehicle movements, however the changes are negligible. The modification would not result in any change in traffic volumes or frequency during operation. Potential impacts relating to traffic and transport would be consistent with the approved Project. No further assessment associated with the modification is considered necessary. However, the potential impacts of construction and operational traffic noise and vibration is provided in Section 7.4.
Waste	Yes	The modification would not change the volumes or types of wastes generated as described in the EIS. However, construction and maintenance workforces have potential to strain the existing on-site package sewage treatment plant. Temporary pump out toilet facilities during construction and major maintenance activities would be provided. During consultation, the NSW EPA requested further assessment into the capabilities of the existing on-site sewage treatment plant during construction, maintenance and operation. An assessment of potential changes to waste associated with the modification is provided in Section 7.6.
Other environmental aspect considerations		
Land use and property	Yes	The modification would remain within the existing footprint on EnergyAustralia owned land. There would be no additional land acquisition, leases or change to land zoning during construction or operation. However, changes to land use near the Project has occurred since the Project Approval including changes to land use zoning and the approval for the development of the surrounding Tallawarra Lands. During consultation, the NSW EPA requested a review of the land use changes in relation to noise impacts. An assessment of potential changes to land use associated with the modification is provided in Section 7.1.
Soils and contamination	No	The modification would remain within the existing approved Project footprint. There would be no changes to the risk of encountering contamination or hazardous materials during construction or operation. Potential impacts relating to soils and contamination would be consistent with the approved Project. No further assessment associated with the modification is considered necessary.
Social and economic	No	The modification would not have impacts on community values, community health and safety, and changes to access and connectivity. EnergyAustralia is continuing to consult with the local community and Project stakeholders about the modification. Details of stakeholder engagement and consultation are provided in Section 5.

Groundwater	No	The modification would not require any additional excavations or storage of potential contaminates. There would be no changes to the risk of intercepting or polluting groundwater during construction or operation. Potential impacts relating to groundwater would be consistent with the approved Project. No further assessment associated with the modification is considered necessary.

7 Environmental assessment

This section provides an assessment of the potential changes to impacts on construction and operation as a result of the modification. It also identifies any changes to mitigation measures to minimise these impacts. The environmental assessment has been informed by the environmental scoping assessment (Section 6) which identifies the issues that require further assessment as part of the modification application.

7.1 Land use

7.1.1 Background

The Project is located adjacent to the existing Tallawarra A Power Station on Yallah Bay Road, Yallah. The Project is in a historically disturbed location on the foundations of a former coal power station which was decommissioned in 1989. As a result, the majority of the Project boundary and the surrounding Tallawarra Lands is vacant and has been cleared of vegetation.

At the time of the Project Approval, the closest sensitive receivers were the residential areas of Koonawarra and Dapto Park located about 1km to the north and west of the Project site, respectively. A new residential development was in the early stages of construction at Haywards Bay, located about 2.5km to the south west. Additionally, the EIS considered the West Dapto Release Area about 3km to the west of the Project, which was not yet approved.

At this time, the Tallawarra Lands were owned by EnergyAustralia (then TRUenergy) who were preparing a separate application for the rezoning and development of the area. The Project site was then zoned ‘Special Uses’ under the Wollongong Local Environment Plan (LEP) 1990 (Figure 7-1). Most of the surrounding Tallawarra Lands were also zoned ‘Special Uses’ with some areas of ‘Special Environmental Protection’, ‘Environmental Protection Conservation’ and ‘Private Recreation’ to the north and south of the Project. The investigations into the rezoning were informed by the Tallawarra Lands Local Environmental Study (2006) which identified the suitability and capacity of the site for a range of different land uses (Wollongong City Council, 2007). The Local Environmental Study identified preferred categories of development including industrial, commercial, residential and conservation and the appropriate locations for the different land uses.

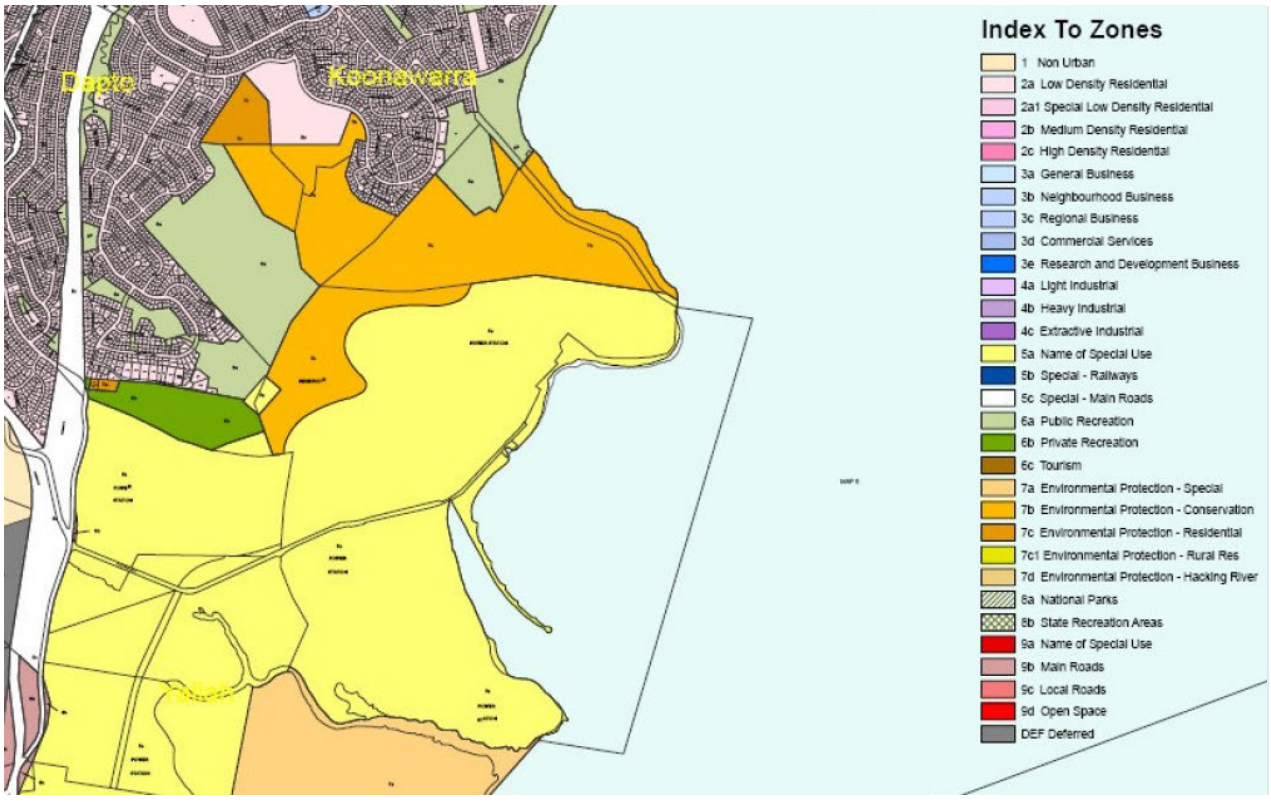

Figure 7-1 Historical land use zoning (adapted from the EIS)

The rezoning of the Tallawarra Lands enabled the 550 hectare (ha) area to be redeveloped to provide a mix of industrial, commercial, residential and community and conservation uses. The new land use zoning was published in the current Wollongong LEP 2009 on 26 February 2010. The approval for the development of Tallawarra Lands (MP09_1031) was granted by the then Minister for Planning on 23 May 2013.

Since the approval for the development of Tallawarra Lands was granted, the need for housing within the Illawarra has increased and the type of housing required has shifted as the demographics of the area have changed. As such, an application for modification of the approval, involving an extension of the development to the north and west of the Project site and an increase in housing densities is currently awaiting approval. The Tallawarra Lands development is shown in Figure 7-2 which includes the proposed extension.

The construction of the Project has been considered throughout the development of the Tallawarra Lands approvals. The Tallawarra Lands development is ongoing and is yet to commence construction.

7.1.2 Existing environment

The Tallawarra Lands are currently leased for low density cattle grazing and comprises undulating grassy slopes. Following the rezoning in 2010, the Project site is now zoned SP2- Infrastructure. The surrounding Tallawarra Lands are now zoned as a mixture of residential, industrial, public recreation and environmental protection zones (Figure 7-3). The residential area at Haywards Bay is now complete and comprises about 300 residential lots.

Various small commercial areas are located in the nearby suburbs of Koonawarra and Dapto and along the Princes Highway. These typically include restaurants, supermarkets and retail outlets, the closest of which is about 2km to the west of the Project.

Northwest of the Project is the locally listed heritage parkland Mount Brown Reserve. The reserve is predominantly eucalypt bushland and is elevated up to 130m above the Project site.

Future land use and development

If the Tallawarra Lands development goes ahead, it would result in the introduction of new sensitive receivers in proximity to the Project. These would include an industrial area about 500m to the west of the Project and residential receivers about 800m to the north, west and south of the Project.

The Illawarra region is expected to grow by about 16 percent by 2031 (DPE, 2014). The closest growth area is the West Dapto Release Area, which is expected to provide 19,500 new dwellings and an additional population of about 56,500 people once fully developed over a 50-year period (Wollongong City Council, 2018).

Figure 7-2 Proposed Tallawarra Lands development (Adapted from Cardno, 2018)

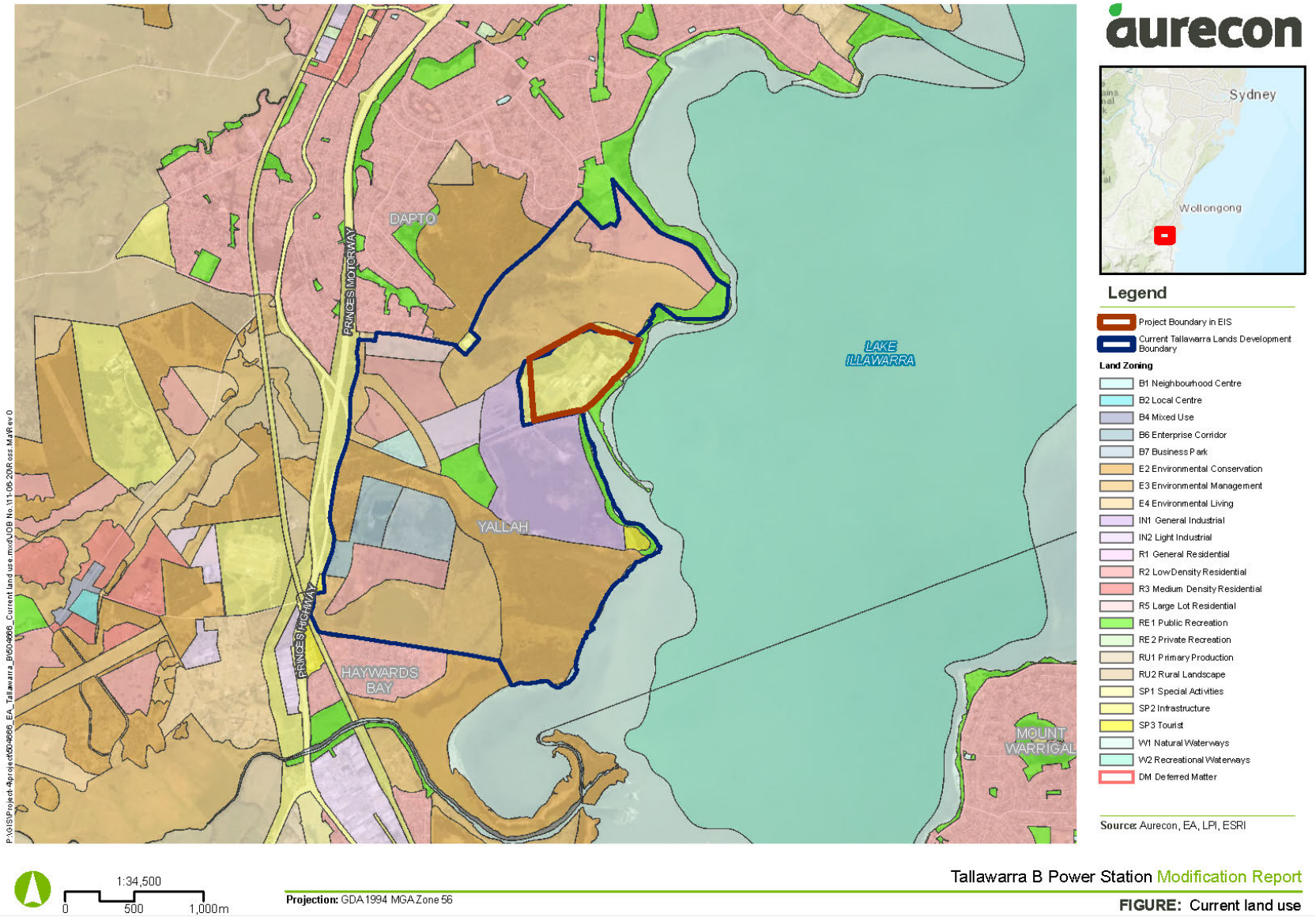

Figure 7-3 Current land use zoning.

Note: the discrepancy between the 'Project boundary in EIS' and 'Current Tallawarra Lands development boundary' are due to the former being developed prior to the rezoning of the area.

7.1.3 Potential impacts

Construction

The modification would not have any direct impacts on land use during construction. The modification would not alter the construction methodology, therefore would not require any changes to access as described in the EIS. All construction activities would remain within the Project site boundary.

The Tallawarra Lands development is not expected to have commenced before the Project. However, if it has, temporary cumulative construction impacts may occur including increased noise and vibration, road traffic and air quality impacts (potentially construction dust). The cumulative impacts of the Project would be minor in comparison to the development of the Tallawarra Lands due to the isolated nature of the Project on a previously disturbed site and the large earthworks required for the Tallawarra Lands development.

Operation

The modification would not have any direct impacts on land use during operation, however the Project would be noticeable from new future sensitive receivers that were not directly assessed in the EIS. These receivers are predominantly those associated with the development of the Tallawarra Lands.

The modified Project would provide some minor environmental improvements to air quality, greenhouse gas emissions and noise compared to the approved Project. NOx and greenhouse gas emissions from the modified Project would be about 15 percent lower and 29 percent lower than from the approved Project, respectively. Minor reductions in operational noise would also be achieved by the modified Project. Further details of potential impacts to air quality, greenhouse gas emissions and noise and vibration from the modified Project are provided in Sections 7.2, 7.3 and 7.4, respectively.

The development of the Tallawarra Lands has been planned in parallel to the Project and has been designed to minimise views of the power station site, including both Tallawarra A and the Project. The residential development at Haywards Bay would also have partial views of the Project's exhaust stack. Nevertheless, this development already has partial views of the existing 60m exhaust stack of Tallawarra A and this area would be shielded from views once the Tallawarra Lands are developed in the future. Further details on visual impacts from the modified Project are provided in Section 7.5.

7.1.4 Conclusion

The modification would not have any direct impacts on land use during construction or operation. Changes to land use near the Project have occurred since the Project Approval. Principally, changes to the surrounding land use zoning and the approval for the development of the surrounding Tallawarra Lands which is currently undergoing further planning development. Although the modified Project would not have direct impacts on land use, changes to associated impacts including air quality, greenhouse gas emissions, noise and visual amenity would be received differently to that assessed in the EIS. Details of potential impacts to air quality, greenhouse gas emissions, noise and vibration and visual amenity from the modified Project are provided in Sections 7.2, 7.3, 7.4 and 7.5, respectively. These have been assessed taking into account these changes to land use that have occurred since the Project Approval.

7.2 Air quality

7.2.1 Background

An air quality assessment was undertaken as part of the EIS to assess the potential air quality impacts of the Project. The assessment modelled the Project exhaust stack emissions, and cumulative ground-level air quality impacts of the Project operating with Tallawarra A, at 100 percent, 50 percent and start load capacity scenarios. The assessment considered the local air quality impacts of nitrogen dioxide (NO_2), particulate

matter (PM_{10}) and sulphur dioxide (SO_2) and the regional air quality impacts ozone (O_3), as a measure of photo chemical smog. The assessment concluded that all air quality emissions would be below the then relevant criteria (DEC, 2005).

The assessment also considered the BACT to minimise oxides of nitrogen (NOx) for the Project. It concluded that to guarantee NOx emissions lower than 25 parts per million by volume (ppmv) (51 milligrams per cubic metre ($mg/Nm^{3)}$) under gas firing would require control measures such as Selective Catalyst Reduction (SCR) in addition to Dry Low NOx (DLN) burners.

The modification requires the construction and operation of a single OCGT which has the potential to change air quality impacts. Additionally, during consultation for this modification, the NSW EPA requested further assessment into the BACT, specifically for NOx emissions (refer to Section 5.3). A summary of the assessment is provided below, and the full air quality assessment is provided in Appendix A.

7.2.2 Assessment methodology

Air quality

An air quality impact assessment (AQIA) (Katestone Environmental, 2020) (Appendix A) has been undertaken to address the potential operational air quality impacts of the modified Project. The AQIA includes:

- Identification of the existing environment including local climate, terrain, meteorological patterns and existing polluting sources
- Identification of sensitive receivers in the Lake Illawarra region
- Generation of an emissions inventory based on the 'worst case' stack characteristics, emissions concentrations and dispersion rates
- Modelling of the modified Project's operational air quality emissions including NO_2, PM_{10}, $PM_{2.5}$ and O_3
- Assessments of the potential operational air quality impacts to sensitive receivers of the modified Project compared to the approved Project.

A further detailed methodology is provided in Appendix A.

Existing air quality

Existing air quality and meteorological data was obtained from four monitoring locations operated by DPIE and the Bureau of Meteorology (BoM) which are shown in Figure 7-4. Existing air quality was obtained from the monitoring locations at Albion Park South, Kembla Grange and Wollongong between 2015-2019. The metrological modelling, using the TAMP model, included the 2018 data from the Albion Park BoM monitoring location as it was considered the most representative of typical conditions. The sensitive receivers used in the AQIA are shown in Figure 7-4.

aurecon

Legend

- Project Boundary in EIS
- M — Air Quality Monitoring Locations

Sensitive Receivers

- Industrial
- Residential

Source: Aurecon, EA, LPI, ESRI

1:120,000
0 2,000 4,000 m

Projection: GDA 1994 MGA Zone 56

Tallawarra B Power Station Modification Report

FIGURE: Air quality monitoring locations and receivers

Figure 7-4 Air quality sensitive receivers and monitoring locations

Operational air quality modelling

Predicted ground-level concentrations of air pollutants (NO_2, PM_{10}, $PM_{2.5}$) were modelled using the TAPM dispersion model to compare the potential local air quality impacts of the modified Project compared to the approved Project. Air pollutant concentrations were calculated at sensitive receivers considering dispersion characteristics with the implementation of the plume dispersion device. The model assessed emissions of the modified Project (with a single F-Class OCGT) operating both in isolation and cumulatively with Tallawarra A at 100 percent load and Minimum Environmental Load (MEL). MEL is defined as the minimum load at which compliance with NOx limits can be maintained. The worst-case concentrations would not be observed by a specific sensitive receiver but represent the worst possible emissions at any location.

Regional air quality was assessed by a Level 1 screening ozone (O_3) assessment which follows the methods in the *Tiered Ozone Procedure* (Environ Australia, 2011).

Details of the dispersion model, modelling assumptions and the Level 1 assessment are provided in Appendix A.

Best Available Control Technology

EnergyAustralia has separately assessed options for the BACT for emission control of NOx. The assessment includes:

- Identification of the best commercially available NOx control technologies that could be deployed to reduce NOx emissions from gas turbines including:
  - Water or Steam Injection (Wet Control)
  - Dry Low NOx (DLN) burners
  - Selective Catalytic Reduction (SCR)
  - Selective Non-catalytic reduction (SNCR)
  - SCONOX
- Assessment of the technical feasibility of the identified technologies
- Recommendation of the most reasonable and feasible commercially available control technology for the Project.

Dry Low NOx (DLN) burners are the technology proposed for the modified Project (refer Section 7.2.5 and Table 7-6) and are considered a reasonable and feasible commercially available control technology for the Project. DLN burners provide a proven, safe, efficient and flexible NOx control option that meet the Project emissions criteria and the Project need in providing reliable electricity at short notice.

7.2.3 Assessment criteria

Air quality

The AQIA has been conducted in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (Approved Methods) (EPA, 2016). Impact assessment criteria detailed in the Approved Methods that are relevant to the assessment are reproduced in Table 7-1.

Table 7-1 Impact assessment criteria (Approved Methods)

Pollutant	Averaging Period	Impact Assessment Criteria (µg/m³)
NO2	1-hour	246
	Annual	62
PM10	24-hour	50
	Annual	25

Pollutant	Averaging Period	Impact Assessment Criteria (µg/m³)
PM2.5	24-hour	25
	Annual	8
Photochemical oxidants (as O_3)	1-hour	214
	4-hour	171

Table note: µg/m³ = micrograms per cubic metre

In regard to regional air quality (O_3) the assessment criteria that determine whether a Level 2 ozone assessment is required, in accordance with the *Tiered Ozone Procedure*, are as follows:

- Maximum allowable increment (1-hour average): 1 particle per billion (ppb)
- Maximum allowable increment (4-hour average): 1 ppb.

Best Available Control Technology

Condition of approval 3.24 states that under normal Project operations, emissions of NOx must not exceed 51 mg/Nm^3 (1 hour rolling average, 15 percent O_2). The Project Approval also states that the Project operating cumulatively with Tallawarra A should not exceed a NOx mass load of 900 tonnes per annum (tpa). The BACT assessment has been conducted to identify and assess options that meet, or are below, these criteria (refer Section 7.2.5 and Table 7-6).

7.2.4 Existing environment

The existing air quality environment as described in the EIS remains similar to the present environment. However, the AQIA has considered additional air pollutant emitting facilities not included in the EIS and modelled the existing air quality environment based on recent data. The closest pollutant emitting facility (with the exception of Tallawarra A) is the Kembla Grange Asphalt Plant located 6km to the north of the Project site. The AQIA and the EIS both considered sensitive receivers up to about 8.5km away. The sensitive receivers assessed in the AQIA are shown in Figure 7-4.

A summary of the existing ambient air quality regarding the criteria listed in the Approved Methods is provided in Table 7-2 from 2015 to 2019.

Table 7-2 Existing air quality summary

Pollutant	Description
NO_2	The maximum 1-hour average and annual average concentrations of NO_2 were below the criteria for all locations for all years.
PM_{10}	The maximum 24-hour average concentrations of PM_{10} were above the criteria for all locations and all years expect Albion Park South in 2015-2017 and Wollongong in 2015. Across the five years, the criterion was exceeded for 16 days at Albion Park, 40 days at Kembla Grange and 25 days at Wollongong. Although there were numerous days with exceedances, the annual average concentrations of PM_{10} were below the criterion for all locations and all years expect Kembla Grange in 2019.
$PM_{2.5}$	The maximum 24-hour average concentrations of $PM_{2.5}$ were above the criterion for a number of locations and years, including at Albion Park South in 2016 and 2018-2019, Kembla Grange in 2016 and 2019 and Wollongong in all years expect 2017. Across the five years, the criterion was exceeded for 15 days at Albion Park, 14 days at Kembla Grange and 21 days at Wollongong. The annual average concentrations of $PM_{2.5}$ were below the criterion for all locations in years 2015-2018. In 2019, all locations were above the criterion.
O_3	The maximum 1-hour average concentrations of O_3 were above the criterion on a number of occasions including at Albion Park in 2017, Kembla Grange in 2016 and 2017 and Wollongong in 2019. At these occurrences, the 1-hour average concentrations were exceeded for between one to three hours at a time. Maximum 4-hour average concentrations of O_3 were above the criterion on a number of occasions including at Albion Park in 2016 and 2017, Kembla Grange in 2016, 2017 and 2019 and Wollongong in 2017 and 2019. At these occurrences, the 4-hour average concentration were exceeded between three to four times.

7.2.5 Potential impacts

Local air quality

The modified Project has been assessed for ground-level NO_2, PM_{10} and $PM_{2.5}$ levels on a conservative basis of operating at 100 percent load, both in isolation or cumulatively with Tallawarra-A.

Emissions when operating in isolation under 100 percent load and MEL would be below the criteria for NO_2, PM_{10} and $PM_{2.5}$. When added to the existing air quality and the operation of Tallawarra A, the maximum concentrations of PM_{10} are expected to exceed the criteria for 10 days per year. However, this can be attributed to the poor existing air quality as these exceedances are already observed. The modification would not contribute to more days exceeding the criterion. Details of projected emissions are provided in the following sections. Overall, the air quality emissions from the modified Project would be lower than that of the approved Project. Additionally, the worst case air quality emissions would be generally received in residential areas of South Dapto and Windang which is consistent with the expected worst case air quality emissions for the approved Project.

Nitrogen dioxide (NO_2)

Higher emissions of NO_2 are expected when operating at 100 percent load than MEL. Worst case NO_2 concentrations under most operating conditions would be experienced at South Dapto to the west of the Project.

Worst case maximum 1-hour average concentrations of NO_2 would be while operating at 100 percent load cumulatively with Tallawarra A and is expected to be up to 172.92 µg/m³ or 70 percent of the criterion.

Worst case annual average concentrations of NO_2 would be while operating at 100 percent load cumulatively with Tallawarra A and is expected to be up to 19.05 µg/m³ or 31 percent of the criterion. This is about 15 percent less than that of the two E-class turbines as described in the EIS. A summary of the worst case concentrations are provided in Table 7-3.

Table 7-3 Summary of worst case operational concentration of NO_2

Measurement	Criteria	Operating capacity		Concentration at most impacted sensitive receiver	Highest overall concentration
Maximum 1-hour average (µg/m³)	246	100% load	Isolation	87.93 (South Dapto)	91.92
			Cumulative	170.22 (South Dapto)	172.92
		MEL	Isolation	40.93(South Dapto)	44.75
			Cumulative	125.35 (South Dapto)	127.29
Annual Average (µg/m³)	62	100% load	Isolation	0.30 (South Dapto)	6.56
			Cumulative	8.69 (South Dapto and Windang)	19.05
		MEL	Isolation	0.17 (South Dapto)	3.74
			Cumulative	8.0 (Yallah)	17.39

Particulate matter (PM_{10})

Higher emissions of PM_{10} are expected when operating cumulatively with Tallawarra A, under both 100 percent load and MEL, due to the contribution of the existing local air quality. Worst case PM_{10} concentrations would be experienced at various sensitive receivers.

Worst case maximum 24-hour average concentrations of PM_{10} would be while operating in isolation at 100 percent load and is expected to be up to 1.95 µg/m³ or four percent of the criterion.

When operating cumulatively with Tallawarra A at 100 percent load and MEL, maximum 24-hour average concentrations of PM_{10} would be up to 72.77 µg/m³ which exceeds the criterion (50 µg/m³), this is expected to occur 10 days per year. However, as the modification provides only a small component (about 4 percent)

of these emissions, the exceedances are attributed to the existing air quality which already exceeds this criterion. The modification is not expected to contribute to more days exceeding the criterion.

Worst case annual average concentrations of PM_{10} would be while operating at 100 percent load cumulatively with Tallawarra A and is expected to be up to 23.62 µg/m³ or 94 percent of the criterion. A summary of the worst case concentrations are provided in Table 7-4.

Table 7-4 Summary of worst case operational concentration of PM_{10}

Measurement	Criteria	Operating capacity		Concentration at most impacted sensitive receiver	Highest overall concentration
Maximum 24-hour average (µg/m³)	50	100% load	Isolation	1.03 (Windang)	1.95
			Cumulative	72.23 (South East Dapto)	72.77
		MEL	Isolation	0.62 (Windang)	0.10
			Cumulative	72.23 (South East Dapto)	71.80
Annual Average (µg/m³)	25	100% load	Isolation	0.03 (Primbee, South Dapto and Windang)	0.66
			Cumulative	19.93 (South Dapto)	23.62
		MEL	Isolation	0.02 (Primbee, South Dapto, Windang and Yallah)	0.41
			Cumulative	19.92 (South Dapto)	23.37

Particulate matter ($PM_{2.5}$)

Higher emissions of $PM_{2.5}$ are expected when operating cumulatively with Tallawarra A, under both 100 percent load and MEL, due to the contribution of the existing local air quality. Worst case $PM_{2.5}$ concentrations would generally be experienced at Windang and Yallah.

Worst case maximum 24-hour average concentrations of $PM_{2.5}$ would be while operating in isolation at 100 percent load cumulatively with Tallawarra A and is expected to be up to 1.95 µg/m³ or four percent of the criterion. The contribution of $PM_{2.5}$ emissions from the modified Project are negligible as gas fired power generation typically produces little to no $PM_{2.5}$ emissions.

Worst case annual average concentrations of $PM_{2.5}$ would be while operating at 100 percent load cumulatively with Tallawarra A and is expected to be up to 22.17 µg/m³ or 45 percent of the criterion. A summary of the worst case concentrations are provided in Table 7-5.

Table 7-5 Summary of worst case operational concentration of $PM_{2.5}$

Measurement	Criteria	Operating capacity		Concentration at most impacted sensitive receiver	Highest overall concentration
Maximum 24-hour average (µg/m³)	50	100% load	Isolation	1.03 (Windang)	1.95
			Cumulative	22.53 (Yallah)	22.31
		MEL	Isolation	0.62 (Windang)	1.50
			Cumulative	22.49 (Yallah)	22.17
Annual Average (µg/m³)	25	100% load	Isolation	0.04 (Yallah)	0.66
			Cumulative	9.95 (Yallah)	7.16
		MEL	Isolation	0.02 (Primbee, South Dapto, Windang and Yallah)	0.41
			Cumulative	6.94 (Yallah)	7.05

Cumulative impacts

Although not expected, if the Tallawarra Lands development has commenced before the Project, cumulative localised air quality impacts would occur during construction due to dust generation and vehicle emissions (refer to Section 7.1). However, any cumulative air quality impacts would be minor in comparison to the development of the Tallawarra Lands due to the isolated nature of the Project on a previously disturbed site and the large area of earthworks required for the Tallawarra Lands development.

Regional air quality (O_3)

Emissions from the modification are expected to be below the criteria (1 ppb) for O_3 to trigger further assessment. The maximum 1-hour and 4-hour incremental concentrations of O_3 would be 0.39 ppb and 0.26 ppb, respectively.

7.2.6 Best Available Control Technology

Oxides of nitrogen (NO_x) are formed during the combustion of air and fuel at high temperature and the conversion of fuel bonded nitrogen. A number of nitrogen oxides are formed in these processes including nitric oxide (NO) and nitrogen dioxide (NO_2). The outcomes of the BACT assessment on the five commercially available NOx control technologies are summarised in Table 7-6.

Dry Low NOx (DLN) burners are considered a reasonable and feasible commercially available control technology for the Project. DLN burners provide a proven, safe, efficient and flexible NOx control option that meet the Project emissions criteria and the Project need in providing reliable electricity at short notice. The implementation of DNL burners would guarantee that NOx emissions do not exceed 25 ppmv. The modified Project includes the use of DLN burners.

The addition of other pre-and-post combustion controls to reduce NOx emissions below 25 ppmv is not considered reasonable and feasible for various reasons including the operating temperatures, the lack of sufficient commercial experience, high installation and operating costs, and the incompatibility with other Project requirements. Further details for each control option and justification for the determination of what is reasonable and feasible is provided in Table 7-6.

Table 7-6 Summary of BACT options

BACT option	Description	Advantages	Disadvantages	Project feasibility
Dry Low NOx (DLN) burners	DNL burners are a primary control treatment in which fuel is blended with air and combustion is delayed until mixing has occurred. This lowers the peak flame temperature thereby reducing the NOx formation.	▪ Well established technology commonly used for gas turbines operating on natural gas fuel in Australia ▪ NOx levels of 25ppmv are being guaranteed by original equipment manufacturers but in practice NOx levels will be lower than 25ppmv ▪ Additional reductions below 25ppmv are possible	▪ When NOx is reduced typically CO emissions increase due to incomplete combustion of fuel at lower temperature. ▪ Additional reductions below 25ppmv would be at the expense of lower plant output and efficiency ▪ Combustion can only take place above MEL	This option is considered feasible due to: ▪ The technology is well established and frequently used in Australia ▪ It is efficient at the expected operating load of the Project ▪ It is not expected to reduce the Project economics.
Water or Steam Injection (Wet Control)	Wet control is a primary control treatment in which water or steam is injected into the combustion zone. this lowers the peak flame temperature thereby reducing the NOx formation.	▪ Well established technology commonly used for gas turbines operating on liquid (diesel) fuel and also in standard annular combustors for gas firing. ▪ NOx levels of around 25ppmv for natural gas and 42ppmv for liquid fuel can be attained.	▪ Pure demineralised water, which adds to the overall plant operating cost ▪ Injection rates are high as the gas turbines have high firing temperatures which can cause internal damage to the turbines ▪ Although NOx is reduced, the chilling effect of the water results in increased production of carbon monoxide (CO) and unburned hydrocarbon (UHC)	This option is not considered feasible due to: ▪ Emissions being no better than those obtained from DLN burners ▪ The requirement of a continuous high-quality demineralised water in large quantities.
Selective Catalytic Reduction (SCR)	SCR is a post combustion control treatment in which a nitrogen-based reagent such as ammonia (NH3) is injected into the flue gas stream. The reagent reacts with NOx in the presence of a catalyst to form molecular nitrogen and water.	▪ NOx emissions can be reduced by about 80% to 90% and, when used in combination with other primary control measures can reduce emission further ▪ Can be used in combination with DLN burners	▪ More suitable and cost effective for use in CCGT due to lower operating temperatures needed for the process ▪ When operating at lower than ideal temperatures, ammonia and particulate matter may be emitted. Additional control measures would be required ▪ The higher temperatures required for OCGT, requires the use of high cost Zeolite based catalysts ▪ Requires air dilution or tempering to reduce temperatures which increased back pressure thus	This option is not considered feasible due to: ▪ The temperature range in which it operates is not suitable to the Project and would likely lower performance and efficiency ▪ The requirement of an increased construction footprint and additional noise ▪ Health and safety risks of additional storage, handling and emissions of ammonia and additional emissions of particulate matter

BACT option	Description	Advantages	Disadvantages	Project feasibility
			impacting performance, efficiency, is incompatible with the proposed plume dispersion device, would require a larger construction footprint (about double) and additional noise. These impacts would require redesign, greater environmental impacts, increase the project schedule and cost. ■ Limited commercial experience of SCR on large frame OCGTs globally and no experience of SCR on OCGTs in the NEM	■ Increased waste due to continuous disposal of reagents ■ The limited commercial experience of SCR used on large frame OCGTs ■ It would adversely impact the Project economics and schedule ■ It would invalidate all work done on the plume dispersion device and require a complete re-engineering of this solution and potential re-litigate condition 1.6
Selective Non-catalytic reduction (SNCR)	SNCR is a post combustion control treatment in which an ammonia-based reagent is injected into the fuel gas stream. The reagent reacts with NOx to form nitrogen and water without the need for a catalyst.	■ NOx emissions can be reduced.	■ Can only operate within a specific temperature range of 870 to 1,320°C. ■ Not suitable for gas turbine installations as gas turbine exhaust temperatures are much lower ■ No commercial experience of this technology on gas turbine installations in Australia or globally, therefore the degree of possible NOx emissions is unknown	This option is not considered feasible due to: ■ The temperature range in which it operates is not suitable to the Project ■ The lack of commercial experience
SCONOX	SCNOX is a post combustion control treatment in which potassium carbonate and platinum are used as a catalyst to reduce NOx and CO.	■ NOx emissions of less than 2ppmv and CO of less than 1ppmv could be achieved ■ It does not require an ammonia-based reagent	■ Performance is highly sensitive to presence of even small amounts of sulphur in the fuel, including natural gas ■ More suitable for use in CCGT due to lower operating temperatures needed for the process ■ Reductions in back pressure can reduce efficiency by twice of a SCR. ■ No commercial experience of this technology in turbines over 100MW ■ High cost of installation	This option is not considered feasible due to: ■ The temperature range in which it operates is not suitable to the Project ■ The reduction of performance and efficiency ■ It would adversely impact the Project economics

7.2.7 Conclusion

EnergyAustralia will implement DNL burners to the Project to control emissions of NOx. DNL burners are considered the most reasonable and feasible commercially available control technology for the Project. This technology meets current best practice emissions control and is consistent with the approved Project.

The modified Project would provide minor improvements (15 percent lower annual emissions of NOx and 29 percent lower annual GHG emissions) to air quality impacts as assessed in the EIS for the approved Project. The emissions from the modified Project would also be consistent with current air quality criteria. Consequently, additional measures to avoid, mitigate and manage impacts are not required. All relevant mitigation measures and conditions of approval relating to air quality under the approved Project are expected to adequately manage air quality and would be implemented.

7.3 Greenhouse gas emissions

7.3.1 Background

A greenhouse gas (GHG) assessment was undertaken as part of the EIS to assess the potential GHG emissions for the Project. The assessment described the then relevant GHG emissions policies, estimated the GHG emissions from construction and operation of the Project and provided measures to mitigate and manage emissions. The EIS concluded that the approved Project is expected to emit about 735 kilotonnes of carbon dioxide equivalents (Kt CO_2-e) per year when operating at a 35 percent capacity factor. This emission intensity was considered to be low in comparison to other Australian power stations which was compliant with the then relevant national GHG emission policy.

The modified Project requires the construction and operation of a single OCGT which has the potential to change GHG emissions compared to the approved Project. During consultation for this modification, DPIE requested that a comparative analysis of GHG emissions against the approved Project be provided (refer to Section 5.3). The full GHG assessment is provided in Appendix A.

7.3.2 Assessment methodology

A GHG assessment (GHGA) (Katestone Environmental, 2020) (Appendix A) has been undertaken to address the potential operational air quality impacts of the modified Project. The GHGA includes:

- Consideration of current NSW, national and international policies and regulatory frameworks
- Assessment of the modified Project's operational GHG emissions at a 35 percent capacity factor
- Comparison of the modified Project's GHG emissions in the NSW and national context.

A further detailed methodology is provided in Appendix A.

7.3.3 Assessment criteria

National Greenhouse and Energy Reporting (NGER)

This NGER Scheme sets out the national reporting requirements for greenhouse gas emissions, emitting projects and energy consumption and production by corporations in Australia. Companies with operational control over facilities that exceed the reporting thresholds are required to report their annual emissions, energy consumption and production as part of their NGER report. The NGER reporting thresholds are summarised in Table 7-7. EnergyAustralia currently has corporate reporting obligations for Tallawarra A.

Table 7-7 NGER reporting thresholds

Threshold level	Threshold type	
	GHG (kt CO_2-e)	Energy consumption (terrajoules (TJ))
Facility	25	100
Corporate	50	200

The *National Greenhouse and Energy Reporting Regulations 2006* (NGER Regulations) recognises two 'scopes' of emissions which are categorised as follows:

- Scope 1 emissions – in relation to a facility, means the release of GHG into the atmosphere as a direct result of an activity or series of activities (including ancillary activities) that constitute the facility.
- Scope 2 emissions – in relation to a facility, means the release of GHG into the atmosphere as a direct result of one or more activities that generate electricity, heating, cooling or steam that is consumed by the facility but that do not form part of the facility.

State and national emissions inventories

The GHG emissions for the approved Project and the modified Project would contribute to the total emissions inventories for NSW and Australia. The most recent published data in 2017, states that the total annual emissions in NSW and Australia were about 144.1 and 554.1 million tonnes (Mt) CO_2-e, respectively (DISER, 2019). The annual GHG emission of the modified Project has been compared to these 2017 values.

7.3.4 Potential impacts

Construction

Construction activities would be minor and temporary. All GHG emissions associated with the construction of the Project would be insignificant compared to the operational emissions. The modification would not alter the construction methodology, therefore would not change the GHG emissions during construction of the Project.

Operation

Annual GHG emissions from the modified Project would predominantly be associated with the combustion of natural gas to produce electricity which are scope 1 emissions. The Project does not require the use of grid electricity and hence there are no scope 2 emissions. The annual GHG emissions of the modified Project would be about 588kt CO2-e. This is about 20 percent less than that of the two E-class turbines as described in the EIS (735kt CO_2-e per year) and therefore compliant with the Project Approval. The estimated annual GHG emissions and energy use of the modified Project are provided in Table 7-8.

Table 7-8 Estimated annual operational GHG emissions and energy use of the modified Project

Parameter	Quantity
Electricity production	1,177,804MWh
Natural gas consumption	11,420.34TJ
GHG emissions	588.49ktCO_2-e

The annual GHG emissions would exceed the NGER reporting facility thresholds for both the GHG emissions and energy consumption criteria (25 ktCO2-e and 100TJ). As such, EnergyAustralia would be required to report annual GHG emissions and energy use for the modified Project.

The GHG emissions would contribute to the NSW and national emissions inventories. The modified Project would contribute about 0.11 percent and 0.52 percent of the total emissions in Australia and NSW respectively.

7.3.5 Conclusion

The modified Project would reduce the GHG emissions assessed in the EIS and predicted for the approved Project. Consequently, additional measures to avoid, mitigate and manage impacts are not required. Due to the volumes of emissions, EnergyAustralia would be required to report annual GHG emissions and energy use for the modified Project. All relevant mitigation measures and conditions of approval relating to GHG emissions under the approved Project would be implemented.

7.4 Noise and vibration

7.4.1 Background

A noise assessment was undertaken as part of the EIS to assess the potential noise impacts for the approved Project. The assessment described the existing environment, identified the then relevant noise criteria, assessed potential construction and operational noise impacts and identified measures to mitigate and manage impacts. The assessment considered the noise impacts of two E-Class OCGTs with a nominal capacity of 300 to 450MW as well as the cumulative operational noise with Tallawarra A. No assessment of vibration or road noise impacts was undertaken.

The EIS concluded that operational noise would be lower than the then relevant criteria (*Industrial Noise Policy*, EPA, 2000) for all sensitive receivers outside the Tallawarra Lands boundary including the Haywards Bay residential area (refer to Section 7.1). The future development of the Tallawarra Lands was considered in the assessment and specific noise levels were set for these sensitive receivers in the Project Approval At locations where there were exceedances, noise attenuation measures were recommended. Construction noise was not expected to be audible to any sensitive receivers outside the Tallawarra Lands boundary during standard working hours.

The modified Project requires the construction and operation of a single OCGT which has the potential to change noise impacts compared to the approved Project. The nature of the receiving environment has also changed since the EIS (refer to Section 7.1). During consultation for this modification, the NSW EPA requested that a new noise impact assessment be undertaken which assesses the current noise environment in accordance with contemporary noise guidelines, including for construction, operation, road noise and vibration (refer to Section 5.3). A summary of the assessment is provided below and the full noise impact assessment is provided in Appendix B.

7.4.2 Assessment methodology

A noise impact assessment (NIA) (Benbow Environmental, 2020) (Appendix B) has been undertaken to address the potential construction and operational noise impacts of the modified Project. The NIA includes:

- Identification of the existing and potential future sensitive receivers and land uses
- Unattended noise monitoring of the existing background noise levels, without the operational noise of Tallawarra A
- Attended short term noise measurements to determine the various noise sources influencing the existing noise environment
- Calculation of the rating background level (RBL) to give an indication of background noise levels at various monitoring locations during the day, evening and night
- Modelling of the modified Projects operational noise (a single F-class 300-400 MW generating OCGT) including low frequency (start-up noise) and road traffic noise
- Assessments of the potential noise and vibration impacts associated with construction, operation and road traffic to sensitive receivers of the modified Project compared to the approved Project.

As the levels of noise vary across the day, the levels of noise have been assessed separately for daytime, evening and night-time periods. These periods are as follows:

- Day: 7am to 6pm on Monday to Saturday and 8am to 6pm on Sundays and public holidays
- Evening: 6pm to 10pm all days
- Night: 10pm to 7am on Monday to Saturday and 10pm to 8am on Sundays and public holidays.

The detailed methodology for the noise impact assessment is provided in Appendix B.

Background noise monitoring

Unattended noise monitoring was undertaken from 7 - 28 May 2019 when Tallawarra A was inactive due to maintenance. Additional noise monitoring was undertaken at Tallawarra A from 19 - 27 June 2019 to record the operational noise of Tallawarra A. Unattended and attended noise monitoring was undertaken at five locations around the Tallawarra Lands. The noise monitoring locations and sensitive receivers used in the NIA are shown in Figure 7-5.

Construction noise and vibration modelling

The predicted noise levels were modelled under three construction scenarios using SoundPLAN software with ISO 9613 algorithms. The scenarios were developed to provide 'worst-case' activity sequences for different construction stages and are all expected to occur during standard construction hours. These scenarios summarised below:

- Scenario 1: Concrete removal and earthworks
- Scenario 2: Concrete works
- Scenario 3: Structure works.

The sound power levels for key noise sources (i.e. concrete saw, excavator) were established from the Benbow Environmental database, *AS 2436-2010 Guide to noise and vibration control on construction, demolition and maintenance sites* (Australian Standards, 2010) and the *Update of noise database for prediction of noise on construction and open sites* (DEFRA, 2006).

Further details of the noise model, modelling assumptions and noise sources are provided in Appendix B.

Operational noise modelling

The predicted noise levels were modelled under three operating scenarios using SoundPLAN software with Concawe algorithms to compare the potential noise impacts of the modified Project against the approved Project. The three scenarios are:

- Scenario 1: operation of Tallawarra A Power Station only
- Scenario 2: operation of Tallawarra A and Tallawarra B with a single (F-Class) OCGT (the modification)
- Scenario 3: operation of Tallawarra A and Tallawarra B with two (E-Class) OCGT (the approved Project).

The calculated noise levels represent the 'worst case scenario' within a 15 minute period, which considers an operating load of 100 percent at both power stations, surrounding topography and buildings, meteorological conditions and distance from the closest sensitive receiver.

The sound power levels for key noise sources (i.e. turbines, air intakes, exhaust stacks) were established from on-site measurements and from the Benbow Environmental database. The on-site measurements included unattended noise monitoring collected when the Tallawarra A was operational.

Further details of the noise model, modelling assumptions and noise sources are provided in Appendix B.

Figure 7-5 Noise sensitive receivers and monitoring locations

7.4.3 Assessment criteria

Construction noise and vibration

Construction noise

The *NSW Interim Construction Noise Guideline* (ICNG) (DECC, 2009) requires project-specific noise management levels (NMLs) to be established for noise-affected receivers. The residential NMLs have been determined based on the existing RBLs plus an additional allowance of 10 dB during the standard work hours and 5 dB outside of standard hours. The ICNG also states that where construction noise levels are above 75 dBA at residential receivers during standard hours, they are considered 'highly noise affected' and require additional consideration in terms of noise mitigation and management measures. The NMLs for residential receivers presented in Table 7-10. Further details on the construction noise criteria is provided in Appendix B.

Table 7-9 Construction noise management levels during standard hours

Receiver	Type of Receiver	$L_{Aeq\ (15\ min)}$
R1-R5	Existing residential - rural	46
R6-R13, R18-R28	Existing and future residential - rural	45
R14-R17	Future residential - rural	48
R29-R30	Future commercial	70
R31-R31B	Future school	55
R32	Future holiday accommodation	58

Construction vibration

The *British Standard 7385* (British Standard, 1993) is used as a guide to assess the likelihood of building damage from ground vibration such as that caused by construction activities and equipment. The standard recommends levels at which damage might occur based on the type of structure affected, using the peak particle velocity (PPV) parameter.

Human comfort from construction vibration is assessed in accordance with the guideline *Assessing Vibration – A Technical Guideline* (DEC, 2006). This guideline provides criteria to assess the human comfort levels of occupants of buildings. Further details on the structural damage criteria and the human comfort criteria are provided in Appendix B.

Operational noise

The *NSW Noise Policy for Industry* (NPI) (EPA, 2017) provides the framework for assessment of noise emissions from industrial sites regulated by the NSW EPA. The policy sets out two components that are used to assess potential site-related noise impacts: intrusiveness and amenity noise levels. The intrusiveness noise level aims at controlling intrusive noise impacts in the short-term for residences. The amenity noise level aims at maintaining a suitable amenity for particular land uses including residences in the long-term. The more stringent of the intrusiveness or amenity level becomes the project-specific trigger levels at each sensitive receiver.

The NPI also states the criteria for assessing sleep disturbance which are the maximum noise level events that can disturb sleep during the night-time period at residential receivers. The project trigger levels and sleep disturbance levels are summarised in Table 7-10. Further details of the intrusive, amenity and project-specific trigger levels and sleep disturbance criteria are provided in Appendix B.

Table 7-10 Modification project-specific trigger levels

Receiver	Type of Receiver	Time of day	Project trigger levels $L_{Aeq\ (15\ min)}$	Sleep disturbance L_{Amax}
R1-R2	Existing residential - rural	Day	41	-
		Evening	41	-
		Night	38	52
R3-R5	Existing residential - rural	Day	41	-
		Evening	39	-
		Night	45	52
R6-R13 and R28	Existing and future residential - rural	Day	40	-
		Evening	40	-
		Night	38	52
R14-R17	Future residential - rural	Day	43	-
		Evening	43	-
		Night	36	52
R18-R27	Future residential - rural	Day	40	-
		Evening	39	-
		Night	36	52
R29-R30	Future commercial	When in use	65	-
R31-R31B	Future school	When in use	50	-
R32	Future holiday accommodation	Day	53	-
		Evening	48	-
		Night	43	N/A

The NIA has also considered low frequency noise including start up noise. Low frequency noise is noise containing major components in the low-frequency range (10 hertz [Hz] to 160 Hz). Low frequency noise has the potential to result in annoying noise characteristics that are often difficult to manage. The low frequency noise thresholds are summarised in Table 7-11. If the low frequency noise thresholds are exceeded, penalties are applied to the project trigger levels. If thresholds are exceeded by 1-5 dB(Z) a 2 dB(A) penalty applies and if the threshold is exceeded by more than 5 dB(Z) a 5 dB(A) penalty applies. Further details of low frequency noise criteria are provided in Appendix B.

Table 7-11 Low frequency noise thresholds

Hz/dB(Z)	One-third octave $L_{Zeq,15min}$ threshold level												
Frequency (Hz)	10	12.5	16	20	25	31.5	40	50	63	80	100	125	160
dB(Z)	92	89	86	77	6	61	54	50	50	48	48	46	44

Road noise

The *NSW Road Noise Policy* (RNP) (DECCW, 2011) has been adopted to establish the noise criteria for the potential noise impact associated with additional road traffic generated by development.

The NIA assesses the Princes Highway as it is the closest road to sensitive receivers that maybe impacted by road noise. The road traffic noise criteria for residential land uses along the Princes Highway is listed in Table 7-12. Further details on the road traffic noise criteria is provided in Appendix B.

Table 7-12 Road traffic noise criteria

Road	Road classification	Assessment criteria dB(A)	
		Day (7am – 10pm)	**Night (10pm – 7am)**
Princes Highway	Freeway or motorway/ arterial road	$L_{Aeq\ (15\ hour)}$ 60 dB	$LA_{eq\ (9\ hour)}$ 55 dB

7.4.4 Existing environment

The local noise environment as described in the EIS remains similar to the modification. However, the NIA has considered additional future sensitive receivers not included in the EIS (refer to Section 7.1) and additional background noise monitoring has been carried out to further refine the existing noise environment.

The closest existing residential area is located approximately one kilometre to the north of the site. The potential development of the Tallawarra Lands would result in future sensitive receivers being closer to the Project. This would locate sensitive residential receivers as close as 800m to the north, west and south of the Project. Sensitive receivers are shown in Figure 7-5. Further details of sensitive receivers and land use are provided in Section 7.1.

The unattended background noise monitoring illustrates the background noise levels when Tallawarra A was inactive. These noise levels are described as rating background levels (RBLs) and ambient noise level (L_{Aeq}) and are summarised in Table 7-13. Attended noise monitoring also identified that other ambient background noise sources included fauna (i.e. birds and dogs), vehicles, wind and aeroplanes.

Table 7-13 Background noise levels (dBA)

Location	Day		Evening		Night	
	RBL	**L_{Aeq}**	**RBL**	**L_{Aeq}**	**RBL**	**L_{Aeq}**
A	38	54	41	48	31	50
B	36	53	42	48	34	47
C	36	54	34	48	30	47
D	33	49	34	45	31	43
E	35	55	42	51	34	49

Existing road noise are primarily from staff vehicles during operation and maintenance works of Tallawarra A. Vehicles typically travel along the Princes Highway and Yallah Bay Road. During normal operations of Tallawarra A, there are about 30 staff vehicle movements along this route per day.

7.4.5 Potential impacts

Construction noise and vibration

Construction noise levels have been predicted for each potential sensitive receiver under the three construction scenarios (refer to Section 7.4.2). Noise levels would be compliant with the construction noise management levels at all noise sensitive receivers under each construction scenario. Additionally, noise levels would be below the 'highly noise affected' criteria of 75 dB(A) and, therefore, no additional noise mitigation is required. The full list of projected noise levels under each scenario are provided in Appendix B.

During construction, equipment that would result in significant vibration would not be required. The closest building is located over 30m for the construction works. Given the limited vibration generating equipment and the distance from other buildings, cosmetic damage and human discomfort are not expected during construction.

Although not expected, if the Tallawarra Lands development has commenced before the Project, cumulative noise impacts would occur during construction (refer to Section 7.1). However, any cumulative noise and vibration impacts would be minor in comparison to the development of the Tallawarra Lands due to the isolated nature of the Project on a previously disturbed site and the large earthworks required for the Tallawarra Lands development.

Operational noise and vibration

Operational noise levels have been predicted for each potential sensitive receiver under the three operational scenarios (refer to Section 7.4.2). Noise levels, including start-up noise, would be compliant with the NPI criteria at all noise sensitive receivers under each scenario. The full list of projected noise levels

under each scenario are provided in Appendix B. The operational noise emissions of the modified Project would be slightly lower to that of the approved Project and therefore compliant with the Project Approval.

The worst case low frequency noise would be at a future residential receiver to the west of the Project (sensitive receiver R14 in Figure 7-5). Low frequency noise at this receiver would exceed the threshold by 3 dB(Z) at 50 Hz for scenario 2 and 3 and by 1 dB (Z) at 80 Hz for scenario 2. However, with the application of the 2 dB(A) penalties (refer to Section 7.4.3), the project-specific trigger levels would not be exceeded, therefore remaining compliant with the criteria.

Operational noise levels would not cause sleep disturbance impacts.

Given the limited vibration generated during operation and the distance from other buildings, cosmetic damage and human discomfort are not expected during operation.

Road noise

The operational workforce for the Project would be up to five personnel which would make a combined 35 personnel with Tallawarra A. Therefore, during normal operations there would be about 30 light vehicle movements per day. Major maintenance of the Project would occur for up to two months every five years. During these periods, about 200 additional staff would be required which would result in up to 460 vehicle movements per day.

During operational and maintenance periods, vehicle movements are only expected to be during the day-time period and would be comply with the RNP criteria (60 dB(A)). Road traffic noise would be experienced the most from the residential property of 6 Semillion Place, Dapto, which is adjacent to the Princes Highway. At this receiver, the road traffic noise from the Project would contribute 15 dB(A) during operation and 25 dB(A) during maintenance periods, which is about 25 percent and 42 percent of the criteria, respectively.

7.4.6 Conclusion

The modified Project would provide minor noise and vibration improvements and would not alter the construction methodology or traffic volumes as described in the EIS. It is therefore consistent with the EIS and approved Project. The construction and operational noise and vibration of the modified Project would also be consistent with current noise and vibration criteria. Consequently, additional measures to avoid, mitigate and manage impacts are not required. All relevant mitigation measures and conditions of approval relating to air quality under the approved Project would be implemented.

7.5 Visual amenity

7.5.1 Background

A visual assessment was undertaken as part of the EIS to assess the potential visual impacts of the Project. The assessment described the existing and proposed visual environment, assessed the significance of potential operational visual impacts to sensitive receivers and identified measures to mitigate and manage impacts. The assessment considered the visual impacts of the new facility including two or three exhaust stacks at about 40m high.

As the Project Approval considers the construction of either an OCGT or a CCGT, the EIS additionally assessed the potential visual impacts of a CCGT including a single exhaust stack at about 60m high which is higher than the proposed exhaust stack for the modified Project The EIS concluded that operational visual impacts would be moderate for sensitive receivers to the north associated with the planned development of Tallawarra Lands. The residential dwellings would be slightly elevated on the ridges of Mount Brown and would have direct views down to the Project. Residual visual impacts for all other sensitive receivers would be low following the implementation of screening vegetation.

The modified Project requires a single exhaust stack up to 50m tall and a plume dispersion device incorporated into the exhaust stack which has the potential to change visual impacts. Therefore, further assessment of visual impacts has been undertaken.

7.5.2 Assessment methodology

The visual impact assessment undertakes a comparative approach of the assessment provided in the EIS and considered the additional impact of the plume dispersion device. As the stack height of the modified Project is slightly shorter (about 10m) that that of the CCGT, this assessment reviews and compares the visual impacts of the approved Project CCGT stack to the modified Project which provides a 'worst case' scenario. The assessment includes:

- Reviewing of the existing environment using recent aerial imagery
- Identification of the existing and potential future sensitive receivers and land uses
- Comparing the visual features of the modified Project against the OCGT and CCGT in the approved Project, including the addition of the plume dispersion device
- Assessments of the modified Projects additional visual impacts associated with the plume dispersion device in addition to the approved impacts of the CCGT.

7.5.3 Assessment criteria

The degree of visual impact is identified by considering both the scale of visual modification and the visual sensitivity of receivers. The assessment criteria used in this assessment is derived from the EIS in order to keep consistency across the assessments. The visual impact matrix used to identify the degree of impact is provided in Table 7-14.

Table 7-14 The visual impacts matrix (adapted from the EIS)

Sensitivity	Consequence			
	High	Medium	Low	
High	High	High	Medium	
Moderate	High	Medium	Low	
Low	Medium	Low	Low	

7.5.4 Existing environment

The visual environment as described in the EIS remains applicable to the modification. However, since the Project Approval, a new residential development has been constructed about 2.5km southwest of the Project at Haywards Bay. No other notable change to the topography or landscape have occurred since the preparation of the EIS (refer to Section 7.1).

The closest visual receivers would be the future industrial development within the Tallawarra Lands to the south of the Project. Sensitivity of these receivers is considered to be low due to the industrial land use. Future residential developments to the north and west of the Project would be subject to setback and height restrictions. This would generally position them below the ridgelines and therefore would limit direct views of the Project. Where necessary, landscape treatments such as large forest scale trees would be implemented to minimise views (Cardno, 2018).

7.5.5 Potential impacts

The modified Project would require a single stack about 10m taller than that assessed for the OCGT in the EIS, but about 10m shorter that that assessed for the CCGT in the EIS. The single stack would incorporate a plume dispersion device for aviation safety which would widen from about 7m in diameter at its base to about 20m at the exit (refer to Section 4.2).

The visual characteristics of the modified Project compared to the CCGT and OCGT are provided in Table 7-15. The modification would not result in any change to associated infrastructure including the high voltage switchyard, transmission lines, gas receiving station, water tanks etc (refer to Section 4).

Table 7-15 Comparison of visual characteristics

Feature	Modification	OCGT	CCGT
Number of stacks	One	Two to three	One
Stack height	Up to 50m	All up to 40m	Up to 60m
Stack diameter	7m	7m	7m
Plume dispersion device	1 plume diffuser device on top of the stack with a tapered width of 7-20m	Nil	Nil
Lighting	Aviation safety lighting atop to stack, only active when the power station is operational.	Not specified in the EIS, however Tallawarra A stack includes operational lighting	Not specified in the EIS, however Tallawarra A stack includes operational lighting
Building	An enclosure expected to be smaller than the existing footprint.	A turbine building about a 1ha footprint and 25m high	A turbine building about a 1ha footprint and 25m high

The modification would not change the number of residential receivers that could view the stack, as assessed under both the OCGT and the CCGT. The exhaust stack would still be visible from recreational land to the south and residential land to the north and on the eastern foreshore of Lake Illawarra. The new residential development at Haywards Bay, that was not specifically assessed in the EIS, may also have partial views of the Project's exhaust stack. Nevertheless, this development may have partial views of the existing 60m-tall exhaust stack of Tallawarra A and this area would be shielded from views once the Tallawarra Lands are developed in the future and relevant landscape treatments are implemented.

The modification would not result in any other current or future sensitive receivers having views of the exhaust stack. The areas in which a stack up to 60m-tall could be viewed are shown in Figure 7-6. However, the visual impact of the modified Project would be slightly less as the stack would be up to 50m tall.

Figure 7-6 Viewshed of an exhaust stack up to 60 m high (adapted from the EIS)

The addition of the plume dispersion device would have a low visual impact. The scale of visual modification would be low due to the device being noticeable but not markedly contrasting with the existing environment and the other power station infrastructure. The sensitivity of impact would be moderate to low for future sensitive receivers due to their distance from the Project, line of sight and land use (i.e. residential, commercial).

The overall the modification would be similar in style to Tallawarra A and would largely be shielded from views of most future sensitive receivers by vegetation and landform.

7.5.6 Conclusion

The modified Project would require a single exhaust stack up to 50m-tall which would incorporate a plume dispersion device, thus altering the number of exhaust stacks, exhaust stack height and shape. The modification would have minor changes to the visual environment in comparison to the OCGT assessed in the EIS, primarily due to the addition of the plume dispersion device. However, the overall visual impact would be similar to the CCGT assessed under the Project Approval. The mitigation measures in the EIS statement of commitments are considered suitable to minimise visual impacts. Consequently, additional measures to avoid, mitigate and manage impacts are not required. All relevant mitigation measures and conditions of approval relating to visual impacts under the approved Project would be implemented.

7.6 Waste management

7.6.1 Background

Section 5.6.3 of the EIS addresses the treatment of sewage as part of the Project. The EIS states that only a small amount of wastewater would be generated by the construction and operational staff of the Project which would be managed by the existing package sewage treatment plant. The EIS states that no augmentation of the existing system would be required by the Project during construction or operation.

The construction workforce for the Project would require up to 250 personnel. Operation of the Project would require up to five full time staff, in addition to the 30 staff currently required to operate Tallawarra A Power Station. During periods of major maintenance for the Project, about 200 maintenance staff may be temporarily required. Maintenance of the Tallawarra A Power Station would similarly require up to 200 maintenance staff on occasion, however it is unlikely that the Tallawarra A and Tallawarra B Power Stations would undergo major maintenance activities concurrently.

During consultation for this modification, the NSW EPA requested further assessment of the capabilities and capacity of the existing on-site sewage system during construction, maintenance and operation (refer to Section 5.3). Therefore, further assessment of waste management has been undertaken.

7.6.2 Assessment methodology

An environmental audit of the existing sewage treatment plant was undertaken on 22 May 2020 (Aurecon, 2020). The audit included an assessment of the current performance of the treatment plant and identification of future capacity associated with the Project. The audit considered the following documents:

- *Licensing Guidelines for Sewage Treatment Systems* (NSW EPA, 2003)
- *Use of Effluent by Irrigation* (DEC, 2004)
- *Environmental Protection Licence* (EPL) 555.

7.6.3 Existing environment

The existing sewage treatment plant is a self-contained package plant associated with the Tallawarra A Power Station. The treatment plant was installed in 2004 to replace the previous system and to accommodate an increase in operational staff for the Tallawarra A Power Station. The system also still

utilises some pits and pipes associated with the previous system which date back to the former coal-fired power station.

In the existing treatment plant, wastewater is passed through a series of tanks which utilise anoxic and aerobic treatment. The treated effluent from the plant is discharged into existing effluent ponds and is utilised for irrigation on designated grassed areas adjacent to the Project site. The process requires the removal and off-site disposal of sludge by road tanker up to twice a year. Operation of the treatment plant is managed under the existing EPL for Tallawarra A (EPL 555).

The treatment plant is designed to cater for up to 35 existing staff during normal operations, which equates to the treatment of about 1500 litres of wastewater per day. During major maintenance, the treatment plant is designed to cater for about 85 people and up to 150 people during construction periods (Ludowici, 2004). This additional treatment volume is provided by a balance tank in the treatment system. During recent maintenance activities of Tallawarra A, the treatment plant adequately catered for about 200 maintenance staff.

7.6.4 Potential impacts

Construction

The construction workforce has the potential to strain the existing treatment plant as it exceeds the maximum design capacity by up to 250 personnel. As a result, there is potential for inadequately treated effluent to be released to the environment.

Inadequately treated wastewater releases have the potential to impact human health and environmental health. Pathogens in overflows can cause mild to severe gastroenteritis and other health issues in people that come into contact with the wastewater. The severity of the impact on human health would depend on the duration of exposure to an overflow and the levels of pollutants in the overflow. Exposure to pathogens could be via inhalation or direct skin contact.

Potential environmental impacts from the release of inadequately treated wastewater include increases to:

- Sediment loads in water runoff which causes turbidity and water clarity
- Nutrient loads, particularly nitrogen and phosphorus which can stimulate growth of algae and undesirable aquatic plants
- Toxicants, including metals, pesticides and commonly used chemicals which can be detrimental to aquatic life
- Substances which create a biochemical demand for oxygen
- Gross pollutants, including plastic and paper products.

Contaminated water runoff has the potential to contaminate Yallah Creek which is located about 60m to the southwest and the downstream environment of Lake Illawarra.

Temporary pump-out toilet facilities would be provided during construction activities. With the implementation of this mitigation measure, the risk of impacts from wastewater during construction would be low.

Operation

The operational workforce for the Project would be up to five personnel which would make up to 35 personnel combined with Tallawarra A. The existing treatment plant has sufficient capacity to cater for the additional Project operational staff. No augmentation of the existing treatment plant would be required. The risk of sewage overflow during operation is negligible.

Temporary pump-out toilet facilities would be provided during maintenance activities. With the implementation of this mitigation measure, the risk of impacts from wastewater during maintenance activities would be low.

7.6.5 Conclusion

The modification would not have any additional waste management impacts or waste volumes as described in the EIS. It is therefore consistent with the EIS and approved Project. However, the requirement for additional pump out toilet facilities would be required during construction and major maintenance activities for the Project.

All relevant mitigation measures and conditions of approval relating to waste management under the approved Project would be followed. The proposed changes to the EIS statement of commitments are provided in Table 7-16. Additions are shown in red.

Table 7-16 Mitigation measures – Waste management

Issue	Mitigation measure	Reference
Waste management	■ A waste management plan (WMP) will be developed for incorporation into the Construction Environmental Management Plan (CEMP). ■ The WMP will include: – procedures for the management of construction wastes from the site; – the locations and management of temporary wastewater collection and pump-out facilities; – an inventory of all waste types anticipated; and – the preferred options for re-use, recycling or disposal. ■ The WMP will seek to ensure that all waste generated at the site is recorded to help achieve waste minimisation. ■ Waste for disposal will be removed by a licensed waste contractor and disposed of at a licensed landfill facility. ■ Where required, any asbestos, contaminated soil and spoil generated from the power station site and the previous power station foundations (subsurface) will be retained and contained on site in the existing DECC approved site asbestos repository established as part of the Tallawarra A approval.	Table 9-1, Chapter 9 of the EIS

8 Conclusion

EnergyAustralia is seeking a modification of the existing Project Approval for the Tallawarra Stage B Gas Turbine Power Station Project. The modification proposes to extend the Project Approval lapse date by two years to December 2022 and to amend the description of condition of approval 1.5 so that a single open cycle gas turbine may be used for the power plant.

This modification report provides an assessment of the modification in support of a request for the Minister's approval in accordance with section 5.25 of the EP&A Act. The modified Project would provide some minor environmental improvements to air quality, greenhouse gas and noise emissions during operation. It would have a minor impact on the visual landscape due to the plume dispersion device required to support aviation safety, proposed in compliance with the existing Project Approval.

The modification is considered justified as it would provide EnergyAustralia with the flexibility to incorporate a contemporary and more efficient technology that was not available at the time of the 2010 Project Approval. It would support the need for a reliable energy supply at short notice and will support the transition of the electricity supply to the NEM to renewable energy sources.

8.1 Updated conditions and management measures

A consolidated list of all changes to conditions of approval and mitigation measures is provided in Table 8-1. Additions are shown in red and redactions are shown as strikethrough.

Table 8-1 Consolidated changes to conditions of approval mitigation measures

Issue	Mitigation measure/condition of approval	Reference
Limits of approval	This project approval shall lapse twelve years after the date on which it is granted, unless construction has physically commenced on or before that time.	Condition of approval 1.4
Limits of approval	The project shall comprise ~~either~~ up to ~~a two or~~ three-unit gas turbine power plant with a total nominal output of up to 450 megawatts operating in open cycle mode or a single unit gas turbine plant with a nominal output of 400 megawatts operating in combined cycle mode.	Condition of approval 1.5
Waste management	■ A waste management plan (WMP) will be developed for incorporation into the CEMP. ■ The WMP will include: – procedures for the management of construction wastes from the site; – the locations and management of portable toilet facilities; – an inventory of all waste types anticipated; and – the preferred options for re-use, recycling or disposal. ■ The WMP will seek to ensure that all waste generated at the site is recorded to help achieve waste minimisation. ■ Waste for disposal will be removed by a licensed waste contractor and disposed of at a licensed landfill facility. ■ Where required, any asbestos, contaminated soil and spoil generated from the power station site and the previous power station foundations (subsurface) will be retained and contained on site in the existing DECC approved site asbestos repository established as part of the Tallawarra A approval.	Table 9-1, Chapter 9 of the EIS

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Appendix A – Air quality impact assessment

Appendix B – Noise and vibration impact assessment

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