



Newcastle Coal
INFRASTRUCTURE GROUP



Coal Export Terminal Optimisation

Statement of Environmental Effects
Project Approval (06_0009) Modification Report
APRIL 2020

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1 Introduction

The Newcastle Coal Infrastructure Group (NCIG) Coal Export Terminal (CET) is located on Kooragang Island in Newcastle, New South Wales (NSW) (Figure 1-1). The NCIG CET was granted Project Approval (06_0009) on 13 April 2007.

The overall NCIG CET includes the construction and operation of a CET up to 66 million tonnes per annum (Mtpa), including associated rail and coal handling infrastructure and wharf/shiplading facilities on the south arm of the Hunter River.

NCIG is the proponent of the approved NCIG CET and is a consortium of the following group entities:

-  BHP Billiton Limited
-  Yancoal Australia Limited
-  Whitehaven Coal Limited
-  Peabody Energy Corporation
-  Banpu Public Company Limited

The NCIG CET operates as a highly automated and innovative facility that serves as critical infrastructure to the NSW coal mining industry, enabling access to global export markets.

This Modification Report is a Statement of Environmental Effects that has been prepared by NCIG to support a request to modify the Project Approval (06_0009) under section 4.55 of the NSW Environmental Planning and Assessment Act, 1979 (EP&A Act) (the Modification).

NCIG currently operates within the existing approved throughput capacity limit of 66 Mtpa. However, the business has identified a need for this throughput capacity limit to be increased to 79 Mtpa, to match the technical feasibility of the terminal as a result of the optimisation improvements.

NCIG, therefore, seeks to increase the approved throughput capacity of the existing terminal (as defined by Project Approval 06_0009) from 66 Mtpa to 79 Mtpa. This capacity increase would be enabled by a number of internally identified initiatives, such as on-site control system and operational process improvements, that improve the efficiency of the operation within the existing

CET boundary, using existing CET infrastructure and at a low capital cost.

Further detail regarding the NCIG CET can be found on NCIG's website: www.ncig.com.au.

1.1 BACKGROUND

1.1.1 NCIG Development History

The NCIG CET was assessed in the Newcastle Coal Infrastructure Group Coal Export Terminal Environmental Assessment (NCIG, 2006a) (NCIG CET EA) and was approved by the NSW Minister for Planning on 13 April 2007.

Two modifications to Project Approval (06_0009) have since been granted under the EP&A Act:

- November 2007 for subdivision of land to facilitate registration of leasehold over the land area by the State Property Authority (to allow NCIG to lease the land for the construction and operation of the NCIG CET) (MOD 1).
- May 2013 for a grade separation of the northern rail spur, minor realignments of the Kooragang Island mainline and other associated ancillary infrastructure (known as the Rail Flyover Modification) (MOD 2).

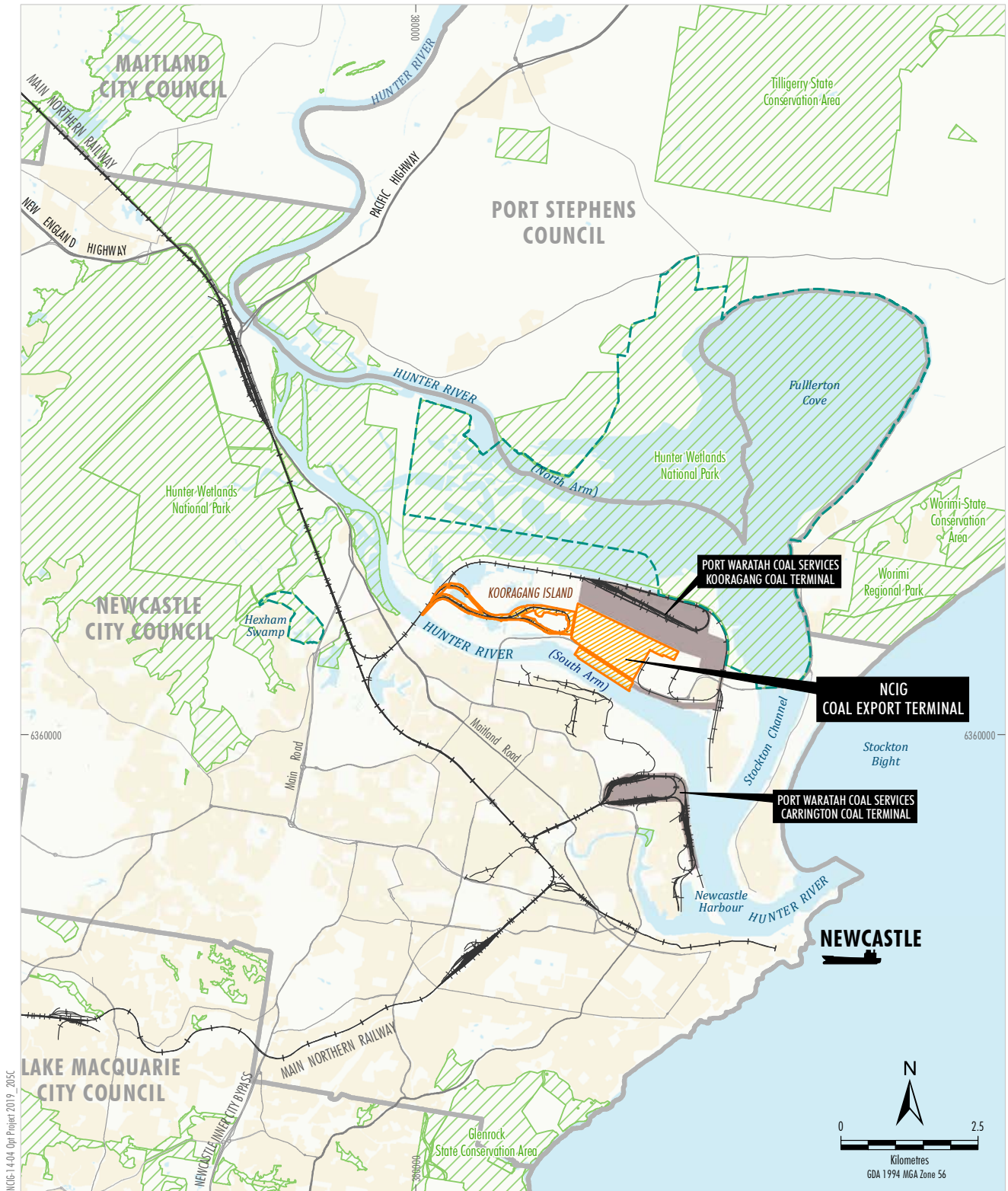
A copy of the original Project Approval (06_0009) is provided in Attachment 1. Copies of the Modification of Minister's Approval for the two modifications (MOD 1 and MOD 2) are provided in Attachments 2 and 3.

Construction of the NCIG CET commenced in February 2008 and was completed in three main stages:

STAGE 1	total capacity of 30 Mtpa was completed in May 2010.
STAGE 2AA	total capacity of 53 Mtpa was completed in June 2012.
STAGE 2F	total capacity of 66 Mtpa was completed in June 2013.

Construction of the grade separation of the northern rail spur (the rail flyover) was completed in 2015.

The general arrangement of the existing/approved NCIG CET components is shown on Figure 1-2.



NCIG-1.4-04 Dpr Project 2019_205C

Source: NSW Spatial Services (2019)



- LEGEND**
- Railway
 - National Park/Conservation Area
 - Hunter Estuary Wetlands Ramsar Site
 - Local Government Area Boundary
 - Approximate Extent of Approved NCIG CET

Newcastle Coal
 INFRASTRUCTURE GROUP
MODIFICATION REPORT
 Regional Location

Figure 1-1

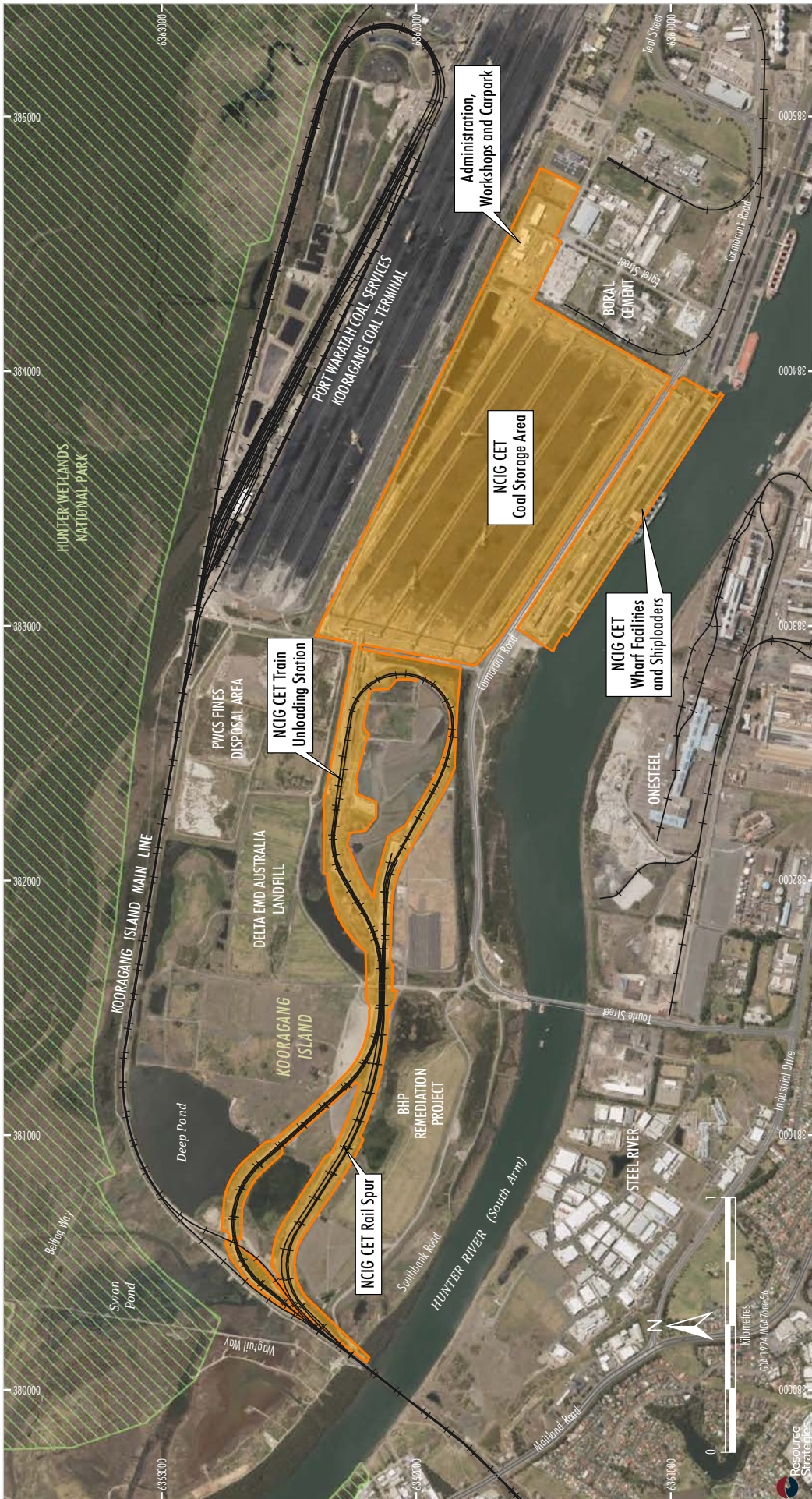


Figure 1-2

Source: NSW Spatial Services (2019)
Orthophoto: NSW Spatial Services (2019)

1.1.2 Description of Approved Operations

The NCIG CET is located on Kooragang Island within the Port of Newcastle and is comprised of the following key infrastructure and surface facilities:

- rail infrastructure (including rail spur, rail sidings, rail loops and overpass and train unloading stations);
- coal storage area;
- coal handling infrastructure (including stacker/reclaimers, coal conveyors and transfer points, buffer bins and sampling stations);
- wharf facilities and shiploaders (including navigational aids);
- water management infrastructure; and
- other ancillary infrastructure and services (including electricity supply and distribution infrastructure and administration and workshop buildings).

Environmental Monitoring and Management

Environmental management during the construction and operation of the NCIG CET has included the development and implementation of a range of environmental management plans, procedures and environmental monitoring programs.

Examples of relevant NCIG CET environmental management plans, protocols and programs include:

- *Construction Environmental Management Plan (CEMP)* (NCIG, 2012), including the following plans required as part of the CEMP:
 - *Acid Sulfate Soil Management Plan;*
 - *Construction Surface Water Management Plan;*
 - *Construction Noise Management Plan; and*
 - *Construction Traffic Management Protocol;*
- *Operation Environmental Management Plan (OEMP)* (NCIG, 2018), including the following plans required as part of the OEMP:
 - *Operation Dust and Air Quality Management Plan (AQMP);*
 - *Operation Noise Management Plan (ONMP);*
 - *Operation Water Management Plan;*
 - *Operation Spontaneous Combustion Management Plan;*
 - *Ecological and Land Management Plan;*
 - *Spill and Pollution Incident Response Management Plan; and*
 - *Waste Management Plan;*

- *Green and Golden Bell Frog Management Plan* (NCIG, 2013)¹;
- *Compensatory Habitat and Ecological Monitoring Program* (NCIG, 2015); and
- *Coordinated Works Program* (NCIG, 2007).

NCIG maintains an extensive environmental monitoring network for the NCIG CET, including meteorological, ambient dust, noise and water. The NCIG CET environmental monitoring programs are conducted in a co-ordinated manner with the Port Waratah Coal Services (PWCS) Kooragang Coal Terminal in accordance with the existing Co-ordinated Environmental Monitoring and Management Procedure, included as part of the OEMP.

NCIG tracks compliance with the requirements of Project Approval (06_0009) in accordance with a *Compliance Tracking Program* (NCIG, 2019). Compliance status reviews, including independent environmental audits, are conducted periodically and reported to the Secretary of the Department of Planning, Industry and Environment (DPIE).

An overview of environmental management actions and environmental monitoring results, including review of the NCIG’s performance against the requirements of the environmental management plans, protocols and programs, is presented each year in an Annual Environmental Management Report and distributed to government agencies, stakeholders and interested parties.

NCIG also continues to implement the requirements of its Sustainable Development Policy (Figure 1-3).

NCIG has had a strong track record of environmental performance in its 10 years of operation, with zero major non-compliances. This is evidenced by NCIG not having been prosecuted for any environmental offence during its 10 years of operation.

NCIG’s environmental management plans and reporting documentation can be found on NCIG’s website: www.ncig.com.au.



¹ The *Green and Golden Bell Frog Management Plan* is now part of the *Ecological and Land Management Plan*.

Sustainable Development Policy

Creating A Sustainable Business

The Newcastle Coal Infrastructure Group (NCIG) plays an important role in the coal export industry of the Hunter Valley. In fulfilling this role, NCIG acknowledges that it is of vital importance to balance the needs of all stakeholders in our business. Through the consideration of shareholders, employees, contractors, suppliers, the community and the environment, NCIG aims to make a significant contribution to the region, ensuring a sustainable business model.

Critical to the achievement of sustainability is our objective to maintain an environment in which we:

- **Commit** to zero harm to safety, health and the environment;
- **Identify, evaluate** and **manage** risks to employees, contractors, visitors, the environment and our local community that may arise from our activities;
- Meet all legislative requirements and seek to continuously improve safety and environmental systems on our site to meet or exceed industry and internationally recognised standards;
- **Promote** and **improve** the health of our workplace, positively contribute to the community and protect the environment in which we operate, particularly through the prevention of pollution;
- Achieve our stated vision and mission by upholding our values;
- Promote a positive, high performance culture, through the support of a work environment where all people are treated fairly and with respect and encouraged to reach their full potential;
- Respect the indigenous and non-indigenous cultural and heritage value of the people, the terminal site and its surrounds;
- Regularly review our performance, set and achieve targets that promote the achievement of our stated goals;
- Engage regularly, openly and honestly with all stakeholders and consider any views and concerns raised in decision making; and
- Develop relationships that foster the sustainable development of our local communities.

In implementing this Policy, NCIG will engage with and support our shareholders, employees, contractors, suppliers, customers, business partners and local communities in sharing responsibility for meeting our stated requirements.

We will be successful when our stakeholders determine that our contribution is valued.



Philip Garling
Chairman

Revision: D | June 2018

Figure 1-3 - NCIG Sustainable Development Policy

Workforce

The approved workforce assessed in the NCIG CET EA was up to 500 people during construction (NCIG employees and contractors).

The combined workforce at the NCIG CET (NCIG employees and contractors) is currently approximately 130 operational personnel (around 100 NCIG employees and 30 contractors). The number of personnel on-site can increase to approximately 230 people (100 NCIG personnel and 130 contractors) as a result of high demand maintenance activities (i.e. planned outages).

1.1.3 Optimisation Initiatives at the NCIG CET

Following completion of construction of the NCIG CET, NCIG has undertaken reviews of its operations to identify areas to improve efficiency, inherent unutilised capacity and opportunities to handle additional tonnes.

As a result of this review, NCIG has, to date, identified and has implemented a number of on-site control system and operational process improvements that improve the efficiency of the operation within the existing CET boundary, using existing CET infrastructure and at a low capital cost.

The on-site improvements have largely been developed through the innovative ideas identified by NCIG personnel. These optimisation initiatives have been collated and implemented as part of the optimisation phases at the NCIG CET. These phases have primarily involved a process of shortlisting, prioritising, measuring and evaluating the effects of each initiative on improving overall terminal capacity.

Control system upgrades and process efficiency improvements implemented to date include:

- streamlining train approach times to unloading stations through the increased use of automated processes;
- decreasing time between unloading of trains carrying the same coal type, and process and network changes to promote sequencing of trains carrying the same coal type;
- extending stockpiles to the eastern limit of the existing stockyard pads;
- improved utilisation of the existing coal stockpiles up to the approved height of 25 metres (m);
- optimising the operation of stackers/reclaimers and improving average reclaim rates through software and hardware upgrades;
- improvements to coal conveyors through the upgrade of hardware to increase capacity of the train unloading stations from 8,500 tonnes per hour (tph) to approximately 10,000 tph;
- better utilising existing buffer bin capacity through infrastructure, operational and process control improvements;
- improving shiploader hatch changes; and
- improving shipping vessel arrival and departure processes.

Optimisation Process



Innovative Ideas
Generated by NCIG
Workforce

Analysis of
Efficiency Gains

Optimisation Initiatives
Implemented

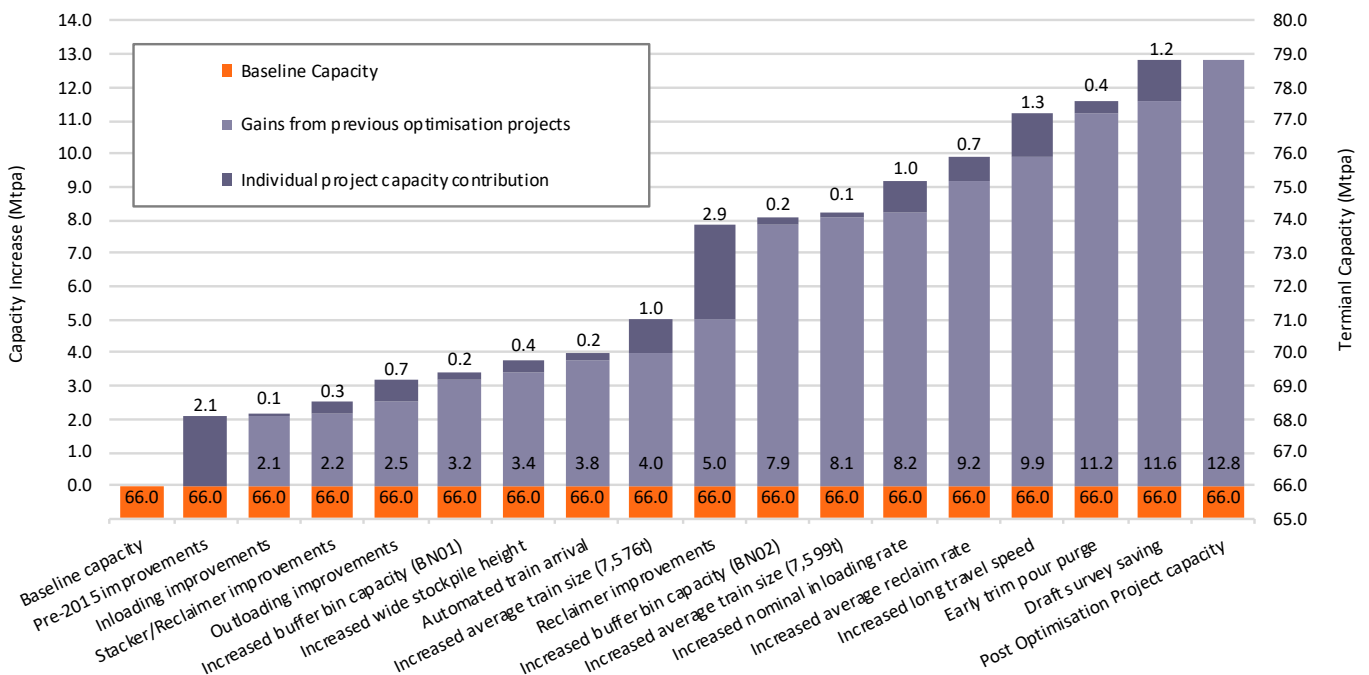
Modification to Realise
Terminal Benefits

The incremental improvement in the operating capability of the NCIG CET is shown on Graph 1-1. This illustrates the increase in capability from the currently approved 66 Mtpa to 79 Mtpa.

Transport efficiency gains by third parties have also allowed improvements to throughput capacity at the NCIG CET, including ongoing improvements to the rail network as part of the Australian Rail Track Corporation (ARTC) Hunter Valley Corridor Capacity Strategy.

The effect of these improvements is that when annualised, it is technically feasible for the peak existing daily/weekly throughput capacity of the NCIG CET to exceed 66 Mtpa. The annual capacity of the existing NCIG CET, when optimised, is approximately 79 Mtpa.

Realisation of Initiatives
 The Modification is required to keep pace with throughput capacity of the existing infrastructure.



Graph 1-1: Optimisation Initiatives Contribution to Existing NCIG CET Capacity

This graph shows that as a result of the incremental improvements in the operating capability of the existing NCIG CET (i.e. as a result of control system upgrades and process efficiency improvements), the technical feasibility of the terminal is 79 Mtpa.

NCIG currently operates within the existing approved throughput capacity limit of 66 Mtpa. However, it has identified a need for this throughput capacity limit to be increased to 79 Mtpa, to match the technical feasibility of the terminal enabled by optimisation improvements. (Graph 1-2).

1.2 MODIFICATION OVERVIEW

NCIG seeks to increase the Project Approval (06_0009) throughput capacity limit of 66 Mtpa to 79 Mtpa to keep pace with the innovative optimisation initiatives of the existing infrastructure.

No other changes to existing Project Approval limits, including environmental performance limits are required.

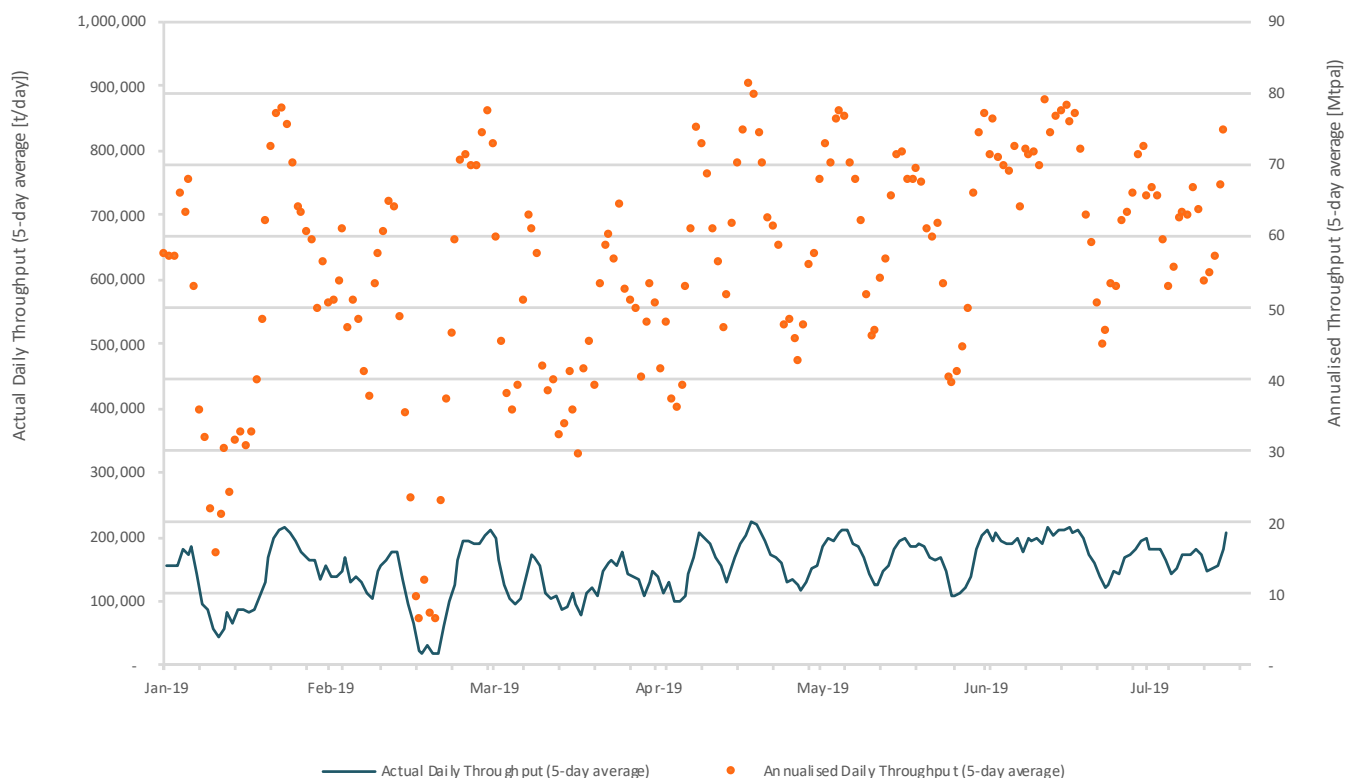
The optimisation initiatives do **not** involve any change to the NCIG CET for the following development components:

- extent of NCIG CET disturbance;
- rail spur, rail sidings or rail loops;

- approved coal stockpile heights or coal storage area extent;
- total coal storage capacity;
- peak train movements;
- number of stackers/reclaimers;
- number or location of coal conveyors, transfer points or buffer bins;
- number of berths, wharf structure, number of shiploaders or peak shiploader capacity;
- peak workforce numbers;
- project life; or
- hours of operation.

The suite of optimisation initiatives identified to increase throughput capacity are collectively referred to as the Optimisation Project.

A video prepared by NCIG provides further information on the optimisation initiatives implemented to date to improve the efficiency of the existing infrastructure. This video can be found on NCIG's website: www.ncig.com.au.



Graph 1-2: Daily and Annualised Throughput of Approved NCIG Cet (5-Day Average)

The peaks (orange data points) on this graph show that when annualised, historic peak daily throughput rates (5 day average) would be equivalent to 79 Mtpa, demonstrating the existing infrastructure could achieve > 66 Mtpa if not constrained by the current throughput limit.

1.3 INTERACTIONS WITH OTHER PROJECTS

Coal from NCIG’s customers would continue to be stockpiled and handled at the NCIG CET at an increased throughput capacity of 79 Mtpa.

The initiatives of the Modification are not linked to any specific increase in total export through the Port of Newcastle. Rather, the Modification would allow for more efficient management of already approved output from mining developments owned by NCIG’s customers.

The handling of coal beyond the NCIG CET site (e.g. transport via the rail network) is not part of the Modification and would occur in accordance with relevant approvals.

The interaction of the NCIG CET with other mining developments is, therefore, limited to the continued use of NCIG’s unique stockpiling capacity arrangement for NCIG’s customers to access global export markets.

The NCIG CET is one of three existing Port of Newcastle terminals, in addition to the PWCS Carrington Coal Terminal and PWCS Kooragang Coal Terminal. There would be no increased interaction between the NCIG terminal and the other terminals as a result of the incremental increase in approved throughput to 79 Mtpa.

Coal would continue to be exported via ships from the NCIG CET, which would occur in accordance with relevant approvals. These activities do not form part of the Modification.

The interaction of the NCIG terminal with other major developments within the Port of Newcastle and in the region as a result of the incremental increase in approved throughput to 79 Mtpa is limited.

1.4 STRUCTURE OF THIS MODIFICATION REPORT

This Report is structured as follows:

- Section 1 Provides an overview of the existing/ approved NCIG CET and the nature of the terminal optimisation initiatives.
- Section 2 Provides a description of the Modification.
- Section 3 Provides a description of the strategic context in relation to the Modification and the Optimisation Project initiatives.
- Section 4 Provides a description of the statutory context in relation to the Modification.
- Section 5 Describes the consultation undertaken in relation to the Modification.
- Section 6 Provides a review of the existing environment and assesses the increase in throughput to 79 Mtpa.
- Section 7 Provides a description of the justification for the Modification and an evaluation of merits.
- Section 8 References.
- Section 9 Abbreviations, acronyms and glossary.

Attachments 1 to 6 and Appendices A and B provide supporting information as follows:

- Attachment 1 NCIG CET Development Application Area and Real Property Descriptions.
- Attachment 2 NCIG CET Original Project Approval (06_0009).
- Attachment 3 NCIG CET Modification of Minister’s Approval and Plan of Subdivision (MOD 1).
- Attachment 4 NCIG CET Modification of Minister’s Approval (MOD 2).
- Attachment 5 NCIG CET EPBC Act Particular Manner Decision 2006/2987.
- Attachment 6 NCIG CET EPL 12693.
- Appendix A Noise Impact Assessment Review.
- Appendix B Air Quality and Greenhouse Gas Assessment Review.

2 Description of the Modification

The innovative control system and operational process improvement works identified for the NCIG CET would provide a throughput capability of approximately 79 Mtpa.

There would be no capital development or footprint expansion works involved to achieve this increased level of terminal capacity and no construction activities or material changes to the operational activities at the NCIG CET would be required.

NCIG therefore seeks to increase the approved maximum capacity of the NCIG CET from 66 Mtpa to 79 Mtpa to keep pace with the innovative optimisation of the existing infrastructure.

Table 2-1 provides a summary comparison of the currently approved NCIG CET and the NCIG CET incorporating the Modification (i.e. operating at a capacity of 79 Mtpa).

2.1 TRAIN MOVEMENTS

The Modification does not involve any change to the NCIG CET rail spur, rail sidings or rail loop. As the existing NCIG CET operates at a maximum capacity of 66 Mtpa, an average of approximately 26 trains are unloaded per day, with a maximum of up to 40 trains unloaded on any one day.

The increase in approved throughput to 79 Mtpa would increase the average daily train movements to approximately 28 trains unloaded per day (depending on the length and capacity of the trains).

There would be no change to the maximum approved limit of 40 trains unloaded on any one day.

2.2 SHIPS

The Modification does not involve any change to the number of berths, wharf structure, number of shiploaders or peak capacity of the shiploaders.

The increase in approved throughput to 79 Mtpa would increase the number of ships loaded up to approximately 16 ships per week (i.e. up to approximately 815 ships per year), compared to the current loading of up to approximately 12 ships per week at the existing NCIG CET operating at a capacity of 66 Mtpa.

2.3 WATER MANAGEMENT

The majority of water use at the NCIG CET is associated with ongoing dust suppression on the coal storage area, the footprint of which would not change as a result of the Modification.

Water use for other activities at the NCIG CET may change for the Modification, which would occur proportionately with the increased throughput from 66 Mtpa to 79 Mtpa. However, the water demand of these other activities is relatively minor.

As there is no change to the water use for ongoing dust suppression on the coal storage area, overall water usage per tonne of coal processed is anticipated to decrease as a result of the Modification.

Water supply requirements would continue to be preferentially met from stormwater contained on site. This would be supplemented by water purchased from the Hunter Water Corporation.

NCIG would review the Operation Water Management Plan for the increase in approved throughput to 79 Mtpa.

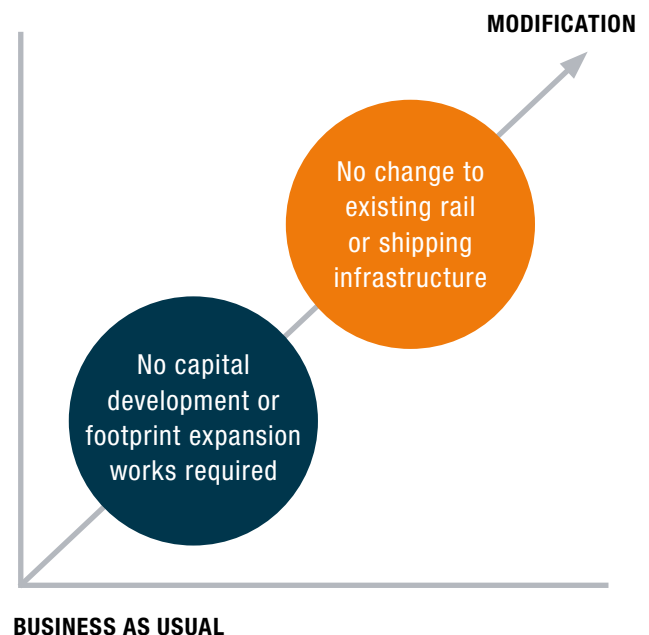


Table 2-1 Summary Comparison of Approved and Modified NCIG CET

Development Component	Approved NCIG CET*	NCIG CET incorporating Modification
Coal Throughput	Approved throughput of 66 Mtpa.	Proposed throughput of 79 Mtpa using existing coal handling infrastructure.
Coal Transport	Coal trains enter the NCIG CET site from the Kooragang Island mainline via a grade separation flyover to the rail spurs, follow the rail loops and empty their wagons into a hopper at train unloading stations. An average of approximately 26 trains unloaded each day. Up to a maximum approved limit of 40 trains unloaded on any one day.	An average of approximately 28 trains would be unloaded each day. No change to the maximum of 40 trains unloaded on any one day.
Train Unloading	Two train unloading stations.	The two train unloading stations would operate at up to 10,000 tph.
Coal Stockpiles	Coal stacked to a maximum height of approximately 25 m allowing a maximum design capacity of up to 6.6 million tonnes of coal to be stockpiled at the CET. Coal stockpiles served by rail mounted combined stacker/reclaimers and associated conveyor systems.	Unchanged.
Wharf Facilities and Shiploaders	Three berths served by two rail-mounted shiploaders. Coal transferred from the coal stockpiles to the shiploaders via conveyors over Cormorant Road.	Unchanged.
Shipping	Wharf capable of receiving Cape size vessels which carry up to 230,000 tonnes of coal. Up to approximately 12 ships loaded per week.	Up to approximately 815 ships per year or approximately 16 ships per week would be loaded.
Water Supply	Water supply requirements met from stormwater contained on-site and water purchased from the Hunter Water Corporation. Water recycled on-site to reduce the quantity of water purchased.	No change to sources of water supply. No change to water demand associated with ongoing dust suppression on the coal storage area. Potential change in water demand associated with other activities to be met via existing water supply sources.
Water Management System	Network of water management structures including sub-grade drainage system in the coal stockpile pads, comprises of a series of underground drains, pits/sumps and transfer pumps to control drainage from the coal storage area. Primary and secondary settling ponds and overflow pond constructed to the north of the coal storage area capture water from sub-grade drainage system and rainfall run-off.	Unchanged.
Project Life	Expected to exceed 30 years dependent on the future development of coal reserves in the Hunter Valley and Gunnedah Basin.	Unchanged.
Employment	Construction workforce of up to 500 employees. The current NCIG operational workforce comprises a peak of approximately 230 personnel (including around 100 NCIG employees, 30 full time contractors and 100 contractors during shutdown activities).	Unchanged (i.e. no increase in peak workforce).
Construction	Installation, construction and commissioning of rail infrastructure, coal storage area, wharf facilities and shiploaders. Construction materials provided from dredging activities associated with the approved Extension of Shipping Channels within the Port of Newcastle (DA-134-3-2003-i). [^]	Unchanged (i.e. no additional construction activities required).
Hours of Operation	Construction activities with the potential to be audible at surrounding residential areas generally undertaken between 7.00 am and 6.00 pm, up to seven days per week. Oversize loads may be transported outside of these times to minimise traffic impacts. Dredged material from the south arm of the Hunter River deposited at the NCIG CET site 24 hours per day and seven days per week. CET operations take place 24 hours per day, seven days per week. Trains and shipping operate 24 hours per day, seven days per week.	Unchanged. (i.e. CET hours of operations unchanged and no additional construction activities required).
Access Roads	During the operation of the CET, the main access point for the NCIG CET is via the entrance to the administration and workshop buildings located off the western end of Raven Street near the intersection of Egret Street and Raven Street. Secondary access points are available to the wharf and rail infrastructure areas. Construction access via Transport for NSW (TfNSW) approved access points.	Unchanged.
Administration, Store and Workshop Buildings	Infrastructure and services including administration building, offices, general workstation areas, first aid room, store and workshop buildings.	Unchanged.
Electricity Supply and Distribution	An internal power reticulation network developed for the NCIG CET. Electricity supply infrastructure to the NCIG CET provided by Energy Australia.	Unchanged.

* As described in the NCIG CET EA (2006a).

[^] In accordance with Condition 2.47 of Project Approval (06_0009) NCIG sought and obtained the agreement of the Director-General of the Department of Planning and Infrastructure (now Secretary of the DPIE) to import construction fill at the NCIG CET site from local quarries with heavy vehicle movements of up to 120 truck deliveries per day over a 10 month period between 7:00 am to 6.00 pm, six days per week (Monday to Saturday).

3 Strategic Context

The NCIG CET is an existing facility developed at the Port of Newcastle for coal export services.

Since its development, the NCIG CET has operated as an advanced and innovative facility that serves as critical infrastructure to the NSW coal mining industry.

The strategic context of the Modification includes consideration of the following:

- optimisation of NCIG’s existing operations;
- supporting innovation by NCIG’s personnel;
- benefits for NCIG’s customers;
- importance to the Newcastle port; and
- efficiency across the Hunter Valley Coal Chain rail network.

3.1 OPTIMISATION OF EXISTING INFRASTRUCTURE

Since operations commenced in 2010, NCIG has invested in innovative projects to optimise the efficiency of coal handling infrastructure at the NCIG CET (Section 1.1.3). The innovative projects have primarily been identified by NCIG personnel and focus on operational process efficiencies and control systems improvements.

With the implementation of these innovations, NCIG has found that the existing infrastructure could achieve throughput capacity, when annualised, of 79 Mtpa, an increase of the currently approved maximum throughput of 66 Mtpa (Graph 1-1).

Approval of the increase in NCIG terminal capacity to 79 Mtpa would allow throughput to keep pace with these innovations.

Footprint expansion works are not required to achieve this level of terminal capability, with no additional surface disturbance outside of the existing disturbance footprint. The increased terminal capacity can be implemented in a manner that achieves compliance with existing environmental performance limits, including for noise and air quality (Sections 6.1 and 6.2).

3.2 BENEFITS FOR NCIG’S CUSTOMERS

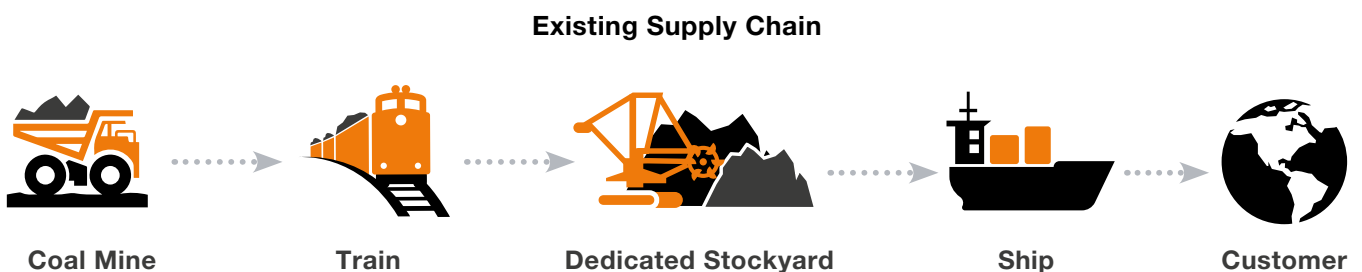
The Hunter Valley Coal Chain supplies coal into the three existing Port of Newcastle terminals (the PWCS Carrington Coal Terminal, PWCS Kooragang Coal Terminal as well as the NCIG terminal).

NCIG is the only terminal that operates with a dedicated stockyard arrangement, providing customers unique long-term (up to approximately 25-30 days) stockpiling capacity at the Port of Newcastle (in comparison to just in-time export facilities).

This unique stockpiling capacity arrangement provides flexibility and efficiency for NCIG’s customers as it de-links the rail transport and ship loading stages of the export process.

This is of particular importance to customers with operations located furthest from the Port, who have more restrictions on their access to rail paths (due to single line infrastructure).

In addition, this stockpiling flexibility and de-linking of rail and shipping also reduces demurrage costs borne by NCIG’s customers associated with delays to shipping. Significant recent mining developments have occurred in these areas and the Modification would facilitate the efficient management of the already approved output from these developments.



NCIG’s unique stockpiling arrangement provides 25-30 days of stockpiling capacity. It therefore provides flexibility and efficiency for NCIG’s customers, as it de-links the rail transport and ship loading stages of the export process. This is particularly important for customers located further from the Port of Newcastle.

The Modification is not linked to any specific increase in total export through the Port of Newcastle or a need for infrastructure to meet any increased demand. Rather, it would provide flexibility and option value for NCIG’s customers to gain further access to NCIG’s unique stockpiling capacity arrangements.

3.3 IMPORTANCE TO PORT OF NEWCASTLE

All but a very small proportion of the export coal shipped through Newcastle is transported by rail for shipping from the three existing Port of Newcastle terminals, as described in the *2019 Hunter Valley Corridor Capacity Strategy* by the Australian Rail Track Corporation (ARTC) (2019).

The NCIG CET is therefore critical infrastructure to the Port of Newcastle as it provides a link between the Port and global export markets, providing approximately 33% of the Port’s coal export capacity (ARTC, 2019).

The Rail Capacity Group (comprising representatives of coal producers, the Hunter Valley Coal Chain Coordinator [HVCCC], the rail infrastructure owner [ARTC] and rail operators) estimates prospective coal volumes that will be exported through the Port of Newcastle. The most recent estimates are presented in the *2019 Hunter Valley Corridor Capacity Strategy* (HVCCS) (ARTC, 2019).

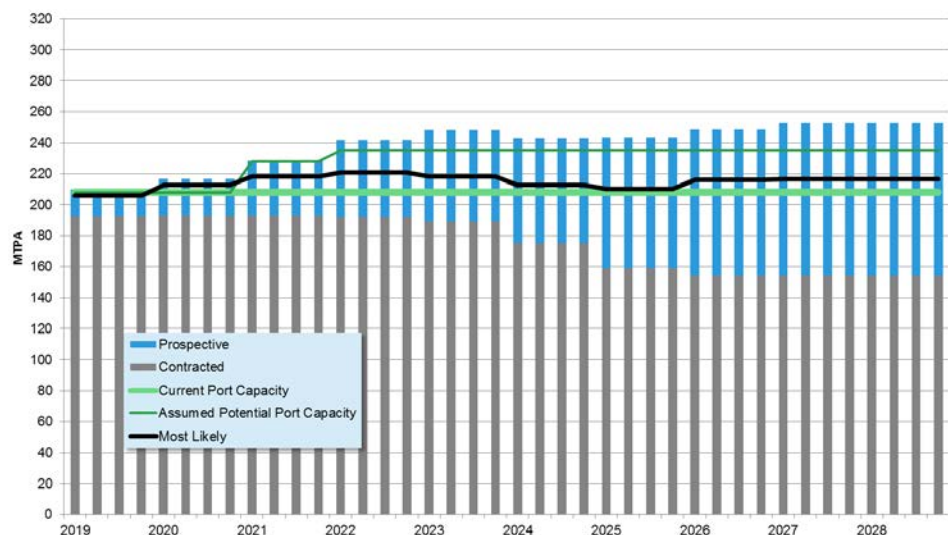
There is currently no requirement for additional terminal capacity for ARTC contracted volumes (ARTC, 2019). The current total capacity of the terminals of 208 Mtpa provides more than sufficient capacity to service the contracted export volumes of 193.5 Mtpa for 2019 and beyond (ARTC, 2019).

The ARTC estimates that potential increases in future export volumes could increase to a potential peak of 225 Mtpa in 2022. The HVCCS has for some years assumed that in order to meet this demand it would be possible to achieve some incremental capacity through enhancement of existing terminals, up to a throughput in the order of 235 Mtpa. (Graph 3-1)

The potential requirement for growth in terminal capacity had been expected to be met by PWCS Terminal 4. The Terminal 4 Project had been on hold since it was granted planning approval on 30 September 2015 and PWCS advised on 31 May 2018 that it would not be proceeding with the development of Terminal 4 (ARTC, 2019).

Through the implementation of NCIG’s innovative projects, the Modification may relieve the need for further infrastructure expansion to meet production from already approved mining developments of the Hunter Valley coal industry, providing flexibility and efficiency across the supply chain.

Critical Infrastructure
33% of Port of Newcastle coal export capacity supplied by NCIG



Graph 3-1: Contracted and Forecast Export Volumes at Port of Newcastle (Source: ARTC, 2019)

Consistent with ARTC assumptions, the Modification provides an opportunity for incremental increase in capacity at the Port of Newcastle without the requirement for new infrastructure.

3.4 HUNTER VALLEY COAL CHAIN EFFICIENCY

The Hunter Valley Coal Chain includes approximately 35 coal mines operated by 11 coal producers (HVCCC, 2019).

The ability of individual Hunter Valley coal producers to meet potential market demand for their coal depends on there being sufficient capacity in the coal supply chain (i.e. railway and port infrastructure) to facilitate export.

The Hunter Valley rail network is an integral part of the world's largest coal export supply chain. The entire supply chain is interlinked, with the stockpiling and loading capacity of the mines and Port terminals affecting the operation of the supply chain.

The de-linking of rail transport and ship loading helps to alleviate congestion and improve efficiency on the rail network, as rail movements can be spread more evenly (i.e. rail movements are not determined by the timing of ships arriving at the Port).

NCIG's unique stockpiling capacity arrangement therefore provides flexibility and efficiency not only for NCIG's customers, but also across the supply chain.

Consistent with the *Port of Newcastle Port Master Plan 2040*, the Modification would therefore facilitate the improvement and enhancement of the existing supply chain by leveraging off the improvements to the existing NCIG facilities.

NCIG's unique stockpiling capacity arrangement helps to alleviate congestion and improve efficiency on the rail network, as rail movements can be spread more evenly (i.e. rail movements are not determined by the timing of ships arriving at the Port).

The Modification therefore provides flexibility and efficiency not only for NCIG's customers, but also across the supply chain.



4 Statutory Context

4.1 ENVIRONMENTAL PLANNING AND ASSESSMENT ACT, 1979

The EP&A Act and *NSW Environmental Planning and Assessment Regulation, 2000* set the framework for planning and environmental assessment in NSW.

The construction and operation of the NCIG CET was approved under Part 3A of the EP&A Act by the NSW Minister for Planning in April 2007 (Project Approval 06_0009 [Attachment 1]).

As a result of amendments made to the EP&A Act which took effect on 1 March 2018, it is no longer possible for the Project Approval to be modified under the former section 75W of the EP&A Act.

The NCIG CET was declared a State Significant Development (SSD) under clause 6 of Schedule 2 to the *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation, 2017* via Government Gazette on 11 October 2019.

Given that the NCIG CET is now considered to be a SSD, approval for the proposed Modification has been sought under section 4.55(2) of the EP&A Act as it is substantially the same development to the existing operations for which consent was originally granted for the NCIG CET (Project Approval [06_0009]), as last modified under section 75W of the EP&A Act (refer description below), as described in Section 1.

NCIG has identified and implemented, to date, a number of on-site control system and operational process improvements that improve the efficiency of the operation of the existing CET, using existing CET infrastructure, within the existing CET boundary and at a low capital cost. The effect of these improvements is that it is technically feasible for the existing throughput capacity of the NCIG CET to exceed 66 Mtpa. The annual capacity of the existing NCIG CET, when optimised, is approximately 79 Mtpa.

NCIG currently operates within the existing approved throughput capacity limit of 66 Mtpa. However, it has identified a need for this throughput capacity limit to be increased to 79 Mtpa, to match the technical feasibility of the terminal to operate at 79 Mtpa as a result of optimisation improvements.

NCIG is, therefore, seeking approval of the Modification to increase the permitted maximum throughput of the existing CET from 66 Mtpa to 79 Mtpa.

Section 4.55(2) of the EP&A Act relevantly states:

4.55 Modifications of consents - generally

...

(2) Other modifications

A consent authority may, on application being made by the applicant or any other person entitled to act on a consent granted by the consent authority and subject to and in accordance with the regulations, modify the consent if:

- (a) *it is satisfied that the development to which the consent as modified relates is substantially the same development as the development for which consent was originally granted and before that consent as originally granted was modified (if at all), and*
- (b) *it has consulted with the relevant Minister, public authority or approval body (within the meaning of Division 4.8) in respect of a condition imposed as a requirement of a concurrence to the consent or in accordance with the general terms of an approval proposed to be granted by the approval body and that Minister, authority or body has not, within 21 days after being consulted, objected to the modification of that consent, and*
- (c) *it has notified the application in accordance with:*
 - (i) *the regulations, if the regulations so require, or*
 - (ii) *a development control plan, if the consent authority is a council that has made a development control plan that requires the notification or advertising of applications for modification of a development consent, and*
- (d) *it has considered any submissions made concerning the proposed modification within the period prescribed by the regulations or provided by the development control plan, as the case may be.*

...

Clause 3BA(6) of Schedule 2 of the *Environmental Planning and Assessment (Savings, Transitional and Other Provisions) Regulation, 2017* relevantly provides:

3BA Winding-up of transitional Part 3A modification provisions on cut-off date of 1 March 2018 and other provisions relating to modifications

...

(6) *In the application of section 4.55 (1A) or (2) or 4.56 (1) of the Act to the following development, the consent authority need only be satisfied that the development to which the consent as modified relates is substantially the same development as the development authorised by the consent (as last modified under section 75W):*

(a) *development that was previously a transitional Part 3A project and whose approval was modified under section 75W,*

...

The consent authority is, therefore, required to satisfy itself that any consent as modified would result in the NCIG CET remaining substantially the same development as was last modified under section 75W of the EP&A Act (i.e. MOD 2), inclusive of consideration of the changes arising from previously approved modifications.

This Modification Report is a Statement of Environmental Effects that has been prepared in support of the application to modify Project Approval (06_0009).

4.1.1 EP&A Act Objects

Section 1.3 of the EP&A Act describes the objects of the EP&A Act as follows:

- (a) *to promote the social and economic welfare of the community and a better environment by the proper management, development and conservation of the State's natural and other resources,*
- (b) *to facilitate ecologically sustainable development by integrating relevant economic, environmental and social considerations in decision-making about environmental planning and assessment,*
- (c) *to promote the orderly and economic use and development of land,*

- (d) *to promote the delivery and maintenance of affordable housing,*
- (e) *to protect the environment, including the conservation of threatened and other species of native animals and plants, ecological communities and their habitats,*
- (f) *to promote the sustainable management of built and cultural heritage (including Aboriginal cultural heritage),*
- (g) *to promote good design and amenity of the built environment,*
- (h) *to promote the proper construction and maintenance of buildings, including the protection of the health and safety of their occupants,*
- (i) *to promote the sharing of the responsibility for environmental planning and assessment between the different levels of government in the State,*
- (j) *to provide increased opportunity for community participation in environmental planning and assessment.*

The Modification and implementation of optimisation initiatives is considered to be generally consistent with the objects of the EP&A Act, as it:

- promotes orderly and economic use and development of land as it realises latent capacity of existing infrastructure;
- would facilitate Ecologically Sustainable Development, as economic efficiencies can be achieved with no increase in currently accepted environmental performance measures, and no increase in the duration of existing impacts of the NCIG CET;
- would not involve additional surface disturbance outside of the existing disturbance footprint, therefore, potential impacts on biodiversity and cultural heritage items as a result of the Modification are not expected; and
- would be developed in a manner that incorporates community engagement, with a wide range of stakeholders consulted through the preparation of the Modification Report (Section 5).

4.2 ENVIRONMENTAL PLANNING INSTRUMENTS

The following State Environmental Planning Policies are considered relevant to the proposed Modification and are discussed further below:

- *State Environmental Planning Policy (Three Ports) 2013* (Three Ports SEPP);
- *State Environmental Planning Policy (Coastal Management) 2018* (Coastal Management SEPP);
- *State Environmental Planning Policy No. 33 (Hazardous and Offensive Development)* (SEPP 33); and
- *State Environmental Planning Policy No. 55 (Remediation of Land)* (SEPP 55).

The NCIG CET site is not included in the Land Application Map for the Newcastle Local Environmental Plan 2012 (Newcastle LEP). Instead, the NCIG CET site is located on land that is subject to the Three Ports SEPP. As a result of the NCIG CET site being located on land that is subject to the Three Ports SEPP, the Newcastle LEP does not apply to the NCIG CET or the Modification.

4.2.1 State Environmental Planning Policy (Three Ports) 2013

The Three Ports SEPP applies to the three privatised ports in NSW – Port Botany, Port Kembla and Port of Newcastle. It commenced on 31 May 2013 for Port Botany and Port Kembla, and 31 May 2014 for Port of Newcastle. The Three Ports SEPP provides a rationalised planning regime to allow the efficient development, redevelopment and protection of land within the Port Botany, Port Kembla and Port of Newcastle areas. The NCIG CET site is wholly located on land zoned as Zone SP1 (Special Activities) under the Three Ports SEPP.

Clause 3 of the Three Ports SEPP outlines the aims of the Three Ports SEPP relevant to the Modification:

- (a) *to provide a consistent planning regime for the development and delivery of infrastructure on land in Port Botany, Port Kembla and the Port of Newcastle,*
- (b) *to allow the efficient development, re development and protection of land at Port Botany, Port Kembla and the Port of Newcastle for port purposes,*

- (c) *to identify certain development within the Lease Area as exempt development or complying development,*
- (d) *to specify matters to be considered in determining whether to grant consent to development adjacent to development for port purposes,*
- ...
- (f) *to identify certain development as State significant development or State significant infrastructure,*
- (g) *to ensure that land around the Lease Area is maintained for port-related and industrial uses, including heavy industry on land around Port Kembla.*

The proposed Modification is consistent with the aims of the Three Ports SEPP as it:

- would maintain the industrial use of the land around the Port of Newcastle through the continued operation of the NCIG CET as one of three existing Port of Newcastle coal export terminals;
- has been developed to improve the efficiency and productivity of the existing operations, which has involved the progressive implementation of innovative process improvements of the existing CET infrastructure; and
- would continue to facilitate the use of the Port of Newcastle and associated industrial uses by providing a long-term stockpiling arrangement for NCIG’s customers, which would de-link the rail and ship loading stages of the export process.



Part 2 of the Three Ports SEPP contains the land use zone provisions that are relevant in determining whether the Modification (or any part of the Modification) is prohibited by the Three Ports SEPP. The objective of lands zoned as Zone SP1 (Special Activities) under the Three Ports SEPP are as follows:

- *To provide for special land uses that are not provided for in other zones.*
- *To provide for sites with special natural characteristics that are not provided for in other zones.*
- *To facilitate development that is in keeping with the special characteristics of the site or its existing or intended special use, and that minimises any adverse impacts on surrounding land.*
- *To maximise the use of waterfront areas to accommodate port facilities and industrial, maritime industrial, freight and bulk storage premises that benefit from being located close to port facilities.*
- *To enable the efficient movement and operation of commercial shipping and to provide for the efficient handling and distribution of freight from port areas through the provision of transport infrastructure.*
- *To provide for port related facilities and development that support the operations of Port Botany, Port Kembla and the Port of Newcastle.*
- *To facilitate development that by its nature or scale requires separation from residential areas and other sensitive land uses.*
- *To encourage employment opportunities.*

Port facilities are defined in the Three Ports SEPP as:

port facilities means facilities on land in the Lease Area used in connection with the carrying of freight and persons by water from one port to another for business or commercial purposes, and includes any of the following:

...

- (b) *facilities for the loading or unloading of freight onto or from vessels and freight receipt, processing, land transport and storage facilities,*

...

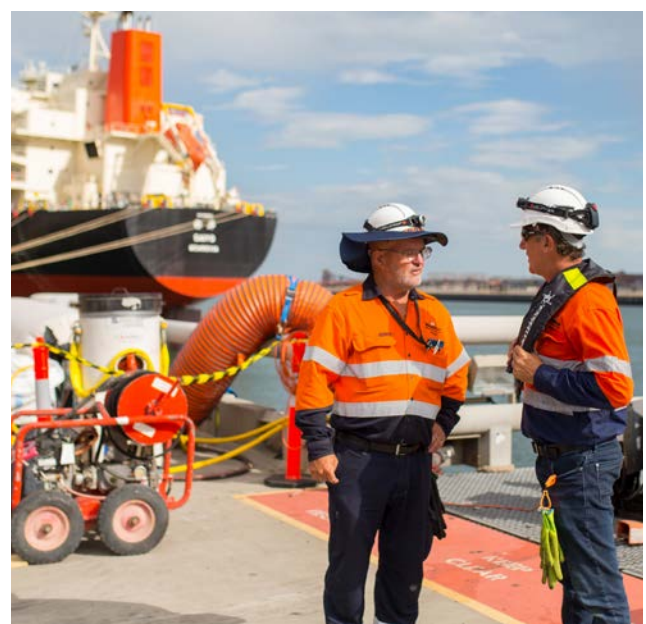
- (d) *refuelling, launching, berthing, mooring, storage or maintenance facilities for any vessel,*
- (e) *sea walls or training walls,*
- (f) *administration and port operations buildings and facilities,*
- (g) *communication, security and safety facilities,*
- (h) *utilities and services, road and rail infrastructure, pipelines and car parks.*

The NCIG CET, incorporating the Modification, would support the operations of the Port of Newcastle, improve the efficiency of the operation of the existing NCIG CET and would be consistent with the land use objectives of Zone SP1.

Port facilities are permissible with consent within land zoned as Zone SP1 (Special Activities). The NCIG CET, incorporating the Modification would fall within the definition of “port facilities” and would be located within the Lease Area defined in the Three Ports SEPP.

Maintenance and repair works as part of the ongoing operation of the NCIG CET, incorporating the Modification, would continue to be undertaken as exempt development in accordance with the Three Ports SEPP.

Accordingly, the consent authority can be satisfied as to these matters.



4.2.2 State Environmental Planning Policy (Coastal Management) 2018

The Coastal Management SEPP aims to promote an integrated and coordinated approach to land use planning in the coastal zone by managing development and protecting its environmental assets. The Coastal Management SEPP applies to land within the coastal zone.

However, clause 7 of the Coastal Management SEPP relevantly states the following:

7 Relationship with other environmental planning instruments

...

- (2) *This Policy does not apply to land within the Lease Area within the meaning of the State Environmental Planning Policy (Three Ports) 2013.*

The NCIG CET, incorporating the Modification, would be located within the Lease Area defined in the Three Ports SEPP.

As such, the provisions of the Coastal Management SEPP do not apply to the proposed Modification.

4.2.3 State Environmental Planning Policy No. 33 (Hazardous and Offensive Development)

Clause 13 of SEPP 33 requires that in determining an application to carry out development for the purposes of a potentially hazardous industry, the consent authority must consider:

...

- (c) *in the case of development for the purpose of a potentially hazardous industry—a preliminary hazard analysis prepared by or on behalf of the applicant, and*
- (d) *any feasible alternatives to the carrying out of the development and the reasons for choosing the development the subject of the application (including any feasible alternatives for the location of the development and the reasons for choosing the location the subject of the application), and*
- (e) *any likely future use of the land surrounding the development.*

As part of the NCIG CET EA (2006a), a Preliminary Hazard Analysis was conducted in accordance with SEPP 33.

The NCIG CET operates in accordance with the environmental management plans and management procedures required by the existing Project Approval (06_0009). These plans and procedures have been developed to minimise the environmental risks associated with construction and operation of the CET.

Although the Modification would increase the throughput of the NCIG CET, the implemented Optimisation Project initiatives would not materially change the operational activities at the CET and would not significantly alter the consequences or likelihood of a hazardous event occurring at the NCIG CET.

Notwithstanding, environmental management plans and procedures would be updated to include the increased approved throughput of 79 Mtpa and the optimisation initiatives, where relevant.

Accordingly, the consent authority can be satisfied as to these matters.

4.2.4 State Environmental Planning Policy No. 55 (Remediation of Land)

SEPP 55 aims to provide a State-wide planning approach to the remediation of contaminated land. Under SEPP 55, planning authorities are required to consider the potential for contamination to adversely affect the suitability of the site for its proposed use.

Clause 7(1) of SEPP 55 provides that a consent authority must not consent to the carrying out of any development on land unless:

- (a) *it has considered whether the land is contaminated, and*
- (b) *if the land is contaminated, it is satisfied that the land is suitable in its contaminated state (or will be suitable, after remediation) for the purpose for which the development is proposed to be carried out, and*
- (c) *if the land requires remediation to be made suitable for the purpose for which the development is proposed to be carried out, it is satisfied that the land will be remediated before the land is used for that purpose.*

Furthermore, under clause 7(2), before determining an application for consent to carry out development that would involve a change of use of land, the consent authority must consider a report specifying the findings of a preliminary investigation of the land concerned, carried out in accordance with the contaminated land planning guidelines.

The Modification would involve an increase in throughput of the NCIG CET, but would not involve a change of use of land. Control system and operational process improvements would be implemented within the existing disturbance footprint, with no additional footprint expansion works involved.

A Land Contamination and Groundwater Assessment (RCA Australia, 2006) (satisfying the requirements for a preliminary investigation under clause 7[2]) was conducted as part of the NCIG CET EA (2006a) in accordance with *Managing Land Contamination – Planning Guidelines SEPP 55 – Remediation of Land* (NSW Department of Urban Affairs and Planning and Environment Protection Authority, 1998). A Baseline Contamination Assessment was also undertaken in 2008 which identified any areas of concern.

Based on the assessments undertaken in these reports, the Modification would not result in the disturbance of any contaminated lands.

Accordingly, the consent authority can be satisfied as to these matters.

4.3 COMMONWEALTH LEGISLATION

4.3.1 Environment Protection and Biodiversity Conservation Act 1999

The Environmental Protection and Biodiversity Conservation Act, 1999 (EPBC Act) defines proposals that are likely to have a significant impact on a matter of national environmental significance as a “controlled action”. A proposal that is, or may be, a controlled action is required to be referred to the Commonwealth Minister for the Environment for a determination as to whether or not the action is a controlled action.

The NCIG CET was referred to the Commonwealth Minister in August 2006, and was determined on 11 October 2006 by a delegate of the Commonwealth Minister to not be a controlled action, therefore not requiring approval under the EPBC Act. The construction and operation of the NCIG CET is carried out in accordance with EPBC Particular Manner Decision 2006/2987 (Attachment 4).

The NCIG CET has been operating within its existing maximum throughput capacity limit of 66 Mtpa since 2013. Operation of the NCIG CET continues to be carried out in accordance with EPBC Particular Manner Decision 2006/2897, including:

- in accordance with Condition 7 of EPBC Particular Manner Decision 2006/2987, management of migratory shorebirds through the placement of screens, comprising shade cloth fences or similar structures, at intervals along the rail infrastructure to minimise lighting impacts from trains and rail corridor lighting;
- management and monitoring of Green and Golden Bell Frogs undertaken in accordance with the existing approved *Green and Golden Bell Frog Management Plan* (now part of the *Ecological and Land Management Plan* [NCIG, 2013]), cognisant of the other relevant conditions (1, 2, 5 and 6) of EPBC Particular Manner Decision 2006/2987; and
- management of surface water through the surface water monitoring program included in the *Construction Surface Water Management Plan* (part of the *Construction Environmental Management Plan* [NCIG, 2012]).

Given there would be no additional disturbance beyond the existing disturbance footprint, and with the continued implementation of management and monitoring described above, it is concluded that the Modification would not have a significant impact on any matters of national environmental significance under the EPBC Act.

The Modification has, therefore, not been referred to the Commonwealth Minister for the Environment for consideration under the EPBC Act, as the ‘Action’ would continue to be conducted in a manner consistent with that described in the NCIG Kooragang Island Coal Export Terminal Referral (NCIG, 2006b) and in accordance with the conditions of EPBC Particular Manner Decision 2006/2987.



4.3.2 National Greenhouse and Energy Reporting Act, 2007

The *National Greenhouse and Energy Reporting Act, 2007* (NGER Act) introduced a single national reporting framework for the reporting and dissemination of corporations' greenhouse gas emissions and energy use. The NGER Act makes registration and reporting mandatory for corporations whose energy production, energy use or greenhouse gas emissions meet specified thresholds.

NCIG Holdings Pty Ltd triggers the NGER Act reporting threshold and, accordingly, reports energy use and greenhouse gas emissions from its activities annually, which would continue for the modified CET.

4.4 RELEVANT NSW LEGISLATION

4.4.1 Protection of the Environment Operations Act, 1997

The *NSW Protection of the Environment Operations Act, 1997* and the *NSW Protection of the Environment Operations (General) Regulation, 2009* set out the general obligations for environmental protection for development in NSW, which is regulated by the NSW Environment Protection Authority (EPA).

Construction and operations at the NCIG CET site are currently undertaken in accordance with an existing Environment Protection Licence (EPL) 12693 issued under the *Protection of the Environment Operations Act, 1997* (Attachment 5).

If required, any variations to existing EPL 12693 to incorporate the optimisation initiatives and the Modification would be undertaken in consultation with the EPA.



4.5 OTHER APPROVALS

A number of environmental management plans and programs for the NCIG CET are required to be approved and implemented under Project Approval (06_0009), consistent with the relevant conditions of EPBC Particular Manner Decision 2006/2987 and EPL 12693.

The existing management plans and programs are described in Section 1.1.2. The existing environmental management plans would be updated where relevant to incorporate the Modification (Section 6).

5 Engagement

5.1 CONSULTATION

NCIG consults with relevant State Government agencies on a regular basis in regard to the approved NCIG CET.

NCIG has developed and continues to implement a consultation program for the operation of the approved NCIG CET as well as the Optimisation Project initiatives and the proposed Modification.

The key objectives of the program are to:

- inform government and public stakeholders of the nature and status of the proposed Modification;
- present information to stakeholders to facilitate a clear understanding of the Optimisation Project and the proposed Modification;
- identify issues of concern to stakeholders for consideration; and
- establish dialogue between NCIG and government and community stakeholders that would be ongoing.

Consultation for the Modification has been conducted with key State and Commonwealth Government agencies, local council, asset owners, landowners and the local community during the preparation of this Modification Report.

A summary of consultation undertaken with key stakeholders follows. Consultation will continue during both the public exhibition of this Modification Report and the assessment of the Modification application.



5.1.1 Department of Planning, Industry and Environment

Briefings with the DPIE were conducted in July and August 2019 to provide an overview of the proposed Modification, Optimisation Project initiatives, approvals pathway and proposed scope of environmental assessment.

Following this correspondence, the DPIE wrote to NCIG on 3 December 2019 confirming the scope of assessment for the Modification as per this Modification Report.

5.1.2 Regulatory Agencies and Local Council

NCIG consulted with the following regulatory authorities, providing an overview description of the Modification, Optimisation Project initiatives and proposed scope of environmental assessment associated with the increase in approved throughput to 79 Mtpa:

- NSW EPA;
- Transport for NSW (formerly NSW Roads and Maritime Services);
- DPIE – Biodiversity and Conservation Division (formerly Office of Environment and Heritage);
- National Parks and Wildlife Services; and
- City of Newcastle.

5.1.3 Other Key Stakeholders

Infrastructure Owners and Businesses

NCIG notified infrastructure owners and business groups of the proposed Modification, including:

- ARTC;
- HVCCC;
- Port of Newcastle;
- PWCS;
- Hunter Business Chamber;
- NSW Minerals Council; and
- Port Authority of NSW.

Following provision of briefing letters, NCIG met with a number of key industry stakeholders to discuss the Modification and Optimisation Project initiatives in further detail, including HVCCC, NSW Minerals Council, Port of Newcastle and PWCS.

Neighbouring Coal Terminals

The NCIG CET is one of three existing Port of Newcastle terminals, in addition to the PWCS Carrington Coal Terminal and PWCS Kooragang Coal Terminal.

There would be no increased interaction between the NCIG terminal and the other terminals as a result of the incremental increase in approved throughput to 79 Mtpa.

The interaction of the NCIG terminal with other major developments within the Port of Newcastle and in the region as a result of the incremental increase in approved throughput to 79 Mtpa is limited.

Potential cumulative impacts with the PWCS Carrington Coal Terminal and PWCS Kooragang Coal Terminal have been considered where relevant in this Modification Report.

Notwithstanding, NCIG consulted with PWCS to provide an overview of the Modification and optimisation initiatives.

5.1.4 Public Consultation

NCIG's website (www.ncig.com.au) provides regular updates on the NCIG CET and provides access to relevant environment and community information, including Environmental Assessment (EA) documents, compliance reports and approval documents.

A newsletter is also delivered to residents in suburbs neighbouring the NCIG terminal to provide an update on NCIG milestones and activities. These newsletters are provided 3 to 4 times per year.

A community enquiry phone line (**02 4920 3900**) and email (enquiries@ncig.com.au) allow members of the public to contact NCIG with enquiries or complaints.

A copy of this Statement of Environmental Effects will be made available on the NCIG website.

Community Engagement Group

NCIG has an established Community Engagement Group (CEG), which affords a forum to provide the local community with information regarding NCIG's operations and give a voice to the community in matters such as operational activities, environmental performance and community investment initiatives.

At the CEG meetings held in September 2019 and January 2020, NCIG provided an overview of the proposed Modification and the scope and outcomes of environmental assessments to the community representatives.

NCIG would continue to provide updates on the status of the Modification at future CEG meetings.

A community enquiry phone line (**1800 016 304**) and email (communitysupport@ncig.com.au) allow members of the public to contact NCIG with enquiries in regard to the CEG.

Sponsorships and Community Funding

The NCIG Community Support Program was established in 2010 to provide community groups within the Newcastle area with sponsorship support to help meet their objectives. The Community Support Program is operated via the following:

- the Community Support Program has an allocation of funding which is reviewed on an annual basis;
- a committee consisting of community and NCIG representatives assess applications and provide advice on the allocation of funds;
- the committee meets twice a year to consider applications from community organisations for financial assistance; and
- submissions are called for in March and September of each year.

NCIG has also established the NCIG Community Partnership Program, which aims to provide more significant, and longer-term sponsorship support (over a 3-year period) to assist with more significant community projects within the Newcastle area. Submissions for the program are called for in September of each year.

5.2 KEY COMMENTS AND CONCERNS

A limited number of comments/concerns were raised by stakeholders during consultation for the Modification. A summary of these comments is provided in Table 5-1, along with a description of where in the Modification Report these issues have been addressed, and a brief response demonstrating how the concern has been considered and addressed.

Table 5-1 Summary of Comments Raised by Stakeholders

Summary of Comment	Relevant Section of the Modification Report	Response Summary
Community members and other infrastructure owners provided positive feedback regarding the efficient use of existing NCIG infrastructure to achieve increased throughput.	Sections 3 and 7.	The Modification would realise the investment made by NCIG in innovative projects to improve the efficiency of the existing NCIG CET infrastructure.
Community members and other infrastructure owners queried whether the Modification would require additional disturbance or new infrastructure requirements.	Sections 2 and 3.	The Modification would not require capital development or footprint expansion works, nor construction activities or material changes to the operational activities at the NCIG CET.
Community members and other infrastructure owners requested clarification of how increased throughput would be achieved through optimisation of existing infrastructure.	Sections 1.1.3 and 2.	The increase in throughput capacity to 79 Mtpa would be achieved through the progressive implementation of innovative control system and operational process improvement works (e.g. efficiencies in the management of train movements and ship loading).
The EPA raised that there is potential for incremental increases in noise and dust emissions, and consideration of additional controls.	Sections 6.1 and 6.2 and Appendices A and B.	<p>The NCIG CET incorporating the Modification would continue to comply with all relevant air quality assessment criteria at all residential receptors and the lower air quality limits in the Approved Methods. Potential noise emissions would remain within the current approval limits.</p> <p>NCIG would continue to implement the AQMP and ONMP and applicable existing air quality and noise controls and management measures, respectively.</p>
Community members requested consideration of greenhouse gas emissions.	Section 6.3 and Appendix A.	<p>The Modification would not involve additional emissions sources at the existing NCIG CET.</p> <p>Potential incremental increases of greenhouse gas emissions as a result of the Modification have been considered in this Modification Report.</p>
Community members queried the justification for the Modification in the context of global demand for coal.	Section 2.	The initiatives of the Modification are not linked to any specific increase in total export through the Port of Newcastle. Rather, the Modification would allow for more efficient management of already approved output from mining developments owned by NCIG's customers through the implementation of the innovative control system and operational process improvement works.
Community members queried whether there would be increased train and ship movements.	Sections 2.1, 2.2, 6.1 and 6.2 and Appendices A and B.	<p>The Modification does not involve any changes to the NCIG CET rail spur, rail sidings or rail loop. Similarly, no changes to the number of berths, wharf structure, number of shiploaders or peak capacity of the shiploaders would be required.</p> <p>The Modification would increase the average number of trains from 26 unloaded per day to 28 unloaded per day. There would be no change to the maximum approved limit of 40 trains unloaded in any one day.</p> <p>The current average number of ships loaded at NCIG CET is 12 ships per week. The Modification would increase the average number of ships loaded to 16 ships per week. While train and ship movements have been considered where relevant in the context of cumulative assessment, they do not form part of the existing NCIG CET or the Modification (i.e. train and ship movements are not regulated by Project Approval 06_0009).</p>

6 Assessment of Impacts

The Modification scoping process identified that the increased throughput to 79 Mtpa could potentially change noise and air emissions, and therefore, reviews of previous assessments have been undertaken.

As the increase in approved throughput to 79 Mtpa involves no change to the other aspects of the NCIG CET (e.g. construction activities, disturbance limits, vehicle movements and water management), no other assessments were required to support the Modification Report.

The sections below provide a summary of the outcomes of the noise and air quality studies.

6.1 NOISE

6.1.1 Methodology

A Noise Impact Assessment Review for the Modification has been undertaken by SLR Consulting Australia (SLR) (2019) and is presented in Appendix A.

The Noise Impact Assessment Review includes consideration of the following components:

- operational noise from existing/approved activities associated with the NCIG CET that would continue for the increased throughput; and
- off-site transport noise (rail transportation).

The Noise Impact Assessment Review was conducted in accordance with the *NSW Noise Policy for Industry* (NPfI) (EPA, 2017a) and *Rail Infrastructure Noise Guideline* (RING) (EPA, 2013).

As there would be no change to employees, or deliveries/visitors to the site, no assessment of road traffic noise is required.

6.1.2 Background

Setting

The NCIG CET is an existing industrial facility that has been operating within the Port of Newcastle since 2010.

The Port of Newcastle is a heavily industrialised area, and therefore, residential receivers are in some cases located proximal to infrastructure associated with the existing industrial facilities in the area. The closest residential receivers to the NCIG CET are located approximately 1 kilometre away to the west of the NCIG CET rail spur (Figure 6-1).

The Modification would involve the continued use of the existing NCIG CET infrastructure, inclusive of the implementation of a number of on-site control system and operational process improvements identified by NCIG.



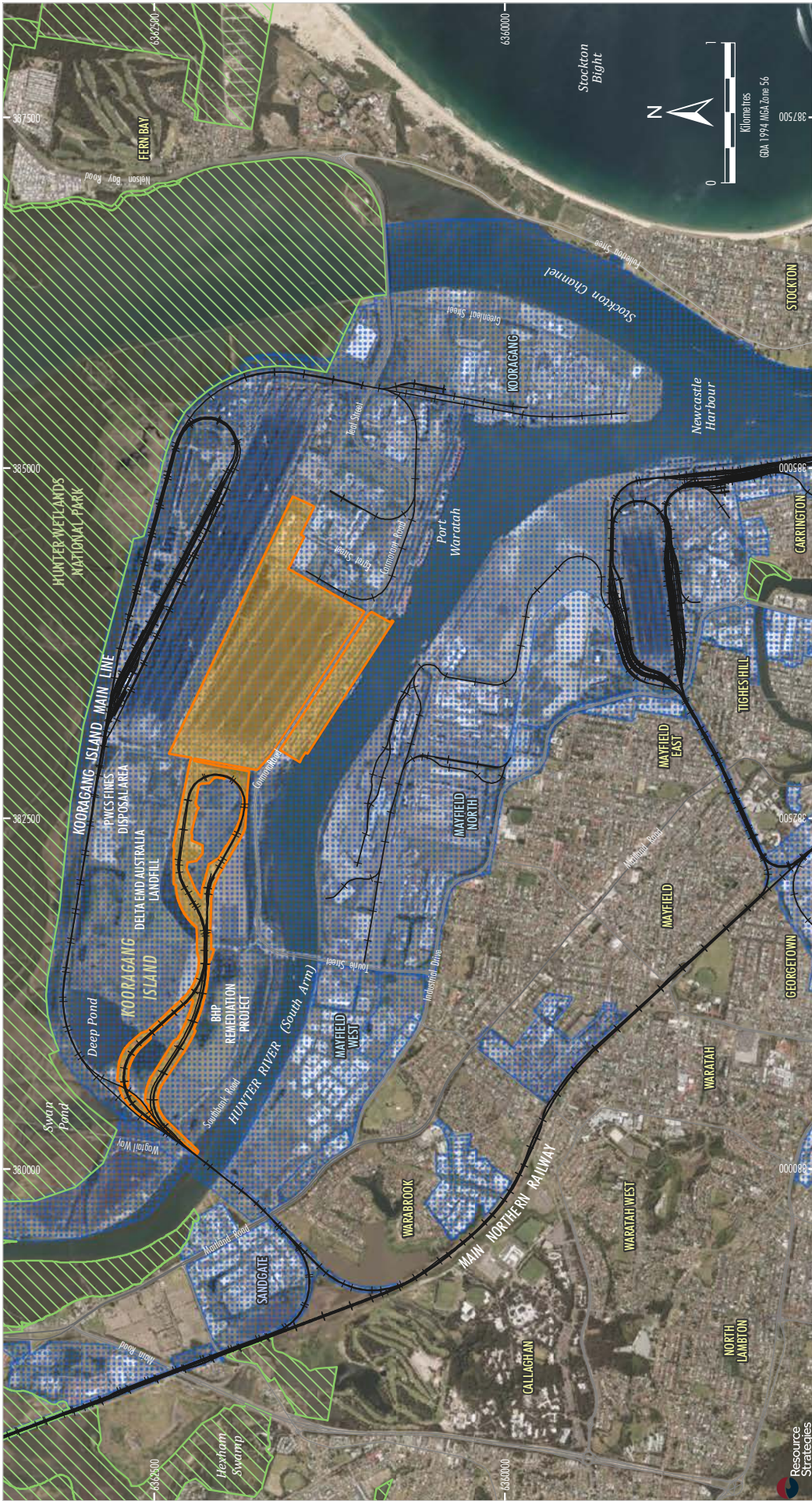


Figure 6-1

Source: NSW Spatial Services (2019)
Ortophotos: NSW Spatial Services (2019)

Derivation of Previous Operational Noise Criteria

Previous noise assessments undertaken for the NCIG CET EA (Heggies Australia, 2006) and subsequent modifications were prepared in accordance with the methodology provided in the *Industrial Noise Policy* (INP).

The INP was superseded in October 2017 by the introduction of the NPfl, which is now used for the regulation and management of noise emissions from industry (EPA, 2017a).

The NPfl was introduced to provide a more balanced approach to the assessment of daytime industrial noise and to allow a clearer process for the setting of achievable statutory noise limits for industry (EPA, 2017a).

While NCIG has existing Project Approval 06_0009 (and EPL 12693) noise limits derived consistent with the INP, operational noise criteria for the Modification have been derived in accordance with the methodology provided in the NPfl.

For a number of potential receivers proximal to the NCIG CET, the noise criteria derived under the NPfl for the Modification differ somewhat (i.e. higher or lower criteria) to those derived under the previous INP assessment methodology and specified in Project Approval 06_0009.

Predicted noise levels for the Modification have therefore been assessed against both the existing Project Approval 06_0009 noise limits and the revised criteria derived under the NPfl.

Noise Management and Monitoring Regime

Noise management at the NCIG CET is undertaken in accordance with the ONMP and the OEMP, which includes:

- monitoring objectives and NCIG's roles and responsibilities;
- noise mitigation measures and controls; and
- noise monitoring and reporting procedures.

NCIG's environmental management plans and reporting documentation can be found on NCIG's website: www.ncig.com.au.

Compliance and Complaints

Off-site noise monitoring undertaken in accordance with the ONMP to date shows the NCIG CET operates in compliance with the relevant Project Approval 06_0009 noise limits.

Noise audits have been conducted at the NCIG CET at the completion of Stage 1, Stage 2AA, Stage 2F and MOD 2 to confirm noise performance in accordance with Project Approval 06_0009. The most recent audit for MOD 2 concluded that noise emissions from the NCIG CET complied in full with all noise-related conditions set out in Project Approval 06_0009.

In addition, annual independent environmental audits have been conducted in accordance with Project Approval 06_0009. During the most recent reporting period from 1 October 2015 to 1 October 2018, NCIG reported compliance with relevant noise limits at all receivers and that no noise related complaints were received from members of the public (pitt&sherry, 2019).

For the most recent compliance tracking program report for the reporting period 1 April 2018 to 31 March 2019, one noise related complaint was received from a member of the public, however, subsequent investigation confirmed the noise was not in relation to NCIG operations.

6.1.3 Applicable Criteria

Operational Noise

The NPfl recommends two noise assessment criteria, "intrusiveness" and "amenity", both of which are relevant for the assessment of both operational and cumulative noise from the Modification (Appendix A).

A comparison of the existing Project Approval 06_0009 noise limits and the revised criteria derived under the NPfl for the Modification (i.e. Project Specific Trigger Levels [PSTLs]) are presented in Table 6-1.

Cumulative noise impacts are assessed against the recommended NPfl amenity criteria, with cumulative assessment including all industrial noise rather than noise from the incremental increase in throughput only. The cumulative noise amenity criteria are presented in Table 6-2.

Table 6-1 Comparison of Project Approval 06_0009 Noise Limits and NPfl PSTLs

Location	Noise Amenity Area	Project Approval (06_0009) Noise Limits, LAeq(15 minute) (dBA)	NPfl PSTL, LAeq(15 minute) (dBA)		
			Day/Evening/Night	Day	Evening
Fern Bay West	Urban	41	55	47	43
Fern Bay East		39	45	45	43
Stockton West		41	47	47	43
Stockton East		38	46	46	43
Mayfield West		45	50	48	43
Mayfield		44	51	48	43
Carrington		36	47	46	42
Any		School	N/A	43 when in use	
Any	Hospital	N/A	48 when in use		
Any	Church, Cemetery	N/A	48 when in use		
Any	Active Recreation	N/A	53 when in use		
Any	Passive Recreation	N/A	48 when in use		
Any	Commercial	N/A	63 when in use		
Any	Industrial	N/A	68 when in use		

Source: Appendix A

Table 6-2 NPfl Recommended Amenity Criteria

Location	Noise Amenity Area	Recommended Amenity Noise Level, LAeq(period) (dBA)		
		Day	Evening	Night
Fern Bay West	Urban	60	50	45
Fern Bay East		60	50	45
Stockton West		60	50	45
Stockton East		60	50	45
Mayfield West		60	50	45
Mayfield		60	50	45
Carrington		60	50	45
Any		School	45 when in use	
Any	Hospital	50 when in use		
Any	Church, Cemetery	50 when in use		
Any	Active Recreation	55 when in use		
Any	Passive Recreation	50 when in use		
Any	Commercial	65 when in use		
Any	Industrial	70 when in use		

Source: Appendix A

6.1.4 Impact Assessment Review

Operational Noise

Modelling Methodology

As part of the NCIG CET EA, a Noise Impact Assessment was undertaken by Heggies Australia (2006) including the development of an acoustic model. The Noise Impact Assessment considered operations up to the maximum approved capacity of 66 Mtpa.

The acoustic model was refined with 'as-built' plant and equipment presented in a Noise Assessment Review for the Rail Flyover Modification EA (SLR, 2012).

SLR has updated the acoustic model to reflect the latest sound power level measurement data for the NCIG CET from 2019 and to incorporate the increase in approved throughput to 79 Mtpa (Appendix A).

The noise model was not required to include any new items of plant and equipment for the Modification, as the increase in capacity would be achieved through existing on-site control system and operational process improvements that improve the efficiency of the operation.

The increase in approved throughput to 79 Mtpa would increase conveyor inloading rates from 8,500 tph (at throughput of 66 Mtpa) to 10,000 tph, which would result in an increase to the existing total site sound power level (SWL) of the existing NCIG CET (127.8 A-weighted decibels [dBA]) by a negligible amount of less than 0.1 decibels (dB) (Appendix A) (Table 6-3).

However, the total SWL for the approved NCIG CET (as measured in June 2019) and for the NCIG CET incorporating the Modification (i.e. increased throughput to 79 Mtpa) would be less than the total SWL for the approved NCIG CET incorporating MOD 2 (Table 6-3).

Table 6-3 Comparison of NCIG CET Sound Power Levels

Stage		Capacity	Total Site SWL (dBA re 1pW)
Previously Assessed and Approved	Stage 1	30 Mtpa	125.0
	Stage 2AA	53 Mtpa	127.7
	Stage 2F (inclusive of MOD 2)	66 Mtpa	128.4
Existing (as measured)	NCIG CET (66 Mtpa) (June 2019)	66 Mtpa	127.8
Modification	Following Optimisation Project	79 Mtpa	127.8
Increment		13 Mtpa	<0.1

Source: Appendix A. Note: Includes the contribution of locomotives.

The noise sources included in the noise model as well as locations of key modelled receivers are outlined in Appendix A.

Assessment of Meteorological Conditions

The NPfI generally directs the use of two approaches for the assessment of noise impacts through the use of default meteorological parameters or site-specific parameters.

SLR has adopted the more detailed approach using site specific meteorological data obtained from the NCIG automatic weather station located on Kooragang Island to define assessable meteorological conditions

Operational Noise Level Predictions

The operational noise assessment indicated that noise emissions of the NCIG CET would remain within the current approval limits following the Modification.

SLR (Appendix A) concluded the NCIG CET incorporating the Modification would:

- comply with the existing Project Approval 06_0009 noise limits during the daytime, evening and night time (Table 6-1);
- comply with the existing Project Approval 06_0009 night time amenity noise limits;
- comply with the existing Project Approval 06_0009 sleep disturbance noise limits as well as the sleep disturbance criteria derived in accordance with the NPfI;
- comply with the PSTLs for residential and non residential receivers derived in accordance with the NPfI; and
- comply with sleep disturbance noise levels derived in accordance with the NPfI.

SLR recommends, therefore, that NCIG continue to implement the ONMP and applicable existing noise control and management measures.

Cumulative Noise

Potential cumulative noise impacts resulting from the concurrent operation of the NCIG CET at an increased approved throughput of 79 Mtpa and a number of proximal industrial facilities and projects, including the PWCS Terminal 4 Project, Incitec Pivot Ammonium Nitrate Facility and the Kooragang Island Recycling Facility Expansion were assessed against the NPfI recommended amenity criteria (Table 6-2) (note that the proposed Newcastle Gas Terminal would be located on the same site as the approved Terminal 4 Project and, therefore, has not also been included in cumulative assessment as it could not operate concurrently with the modelled operation of Terminal 4). Industrial facilities located proximal to the NCIG CET are shown on Figure 6-2.

The assessment indicated that cumulative industrial noise levels from the existing facilities excluding NCIG are predicted to be above the recommended night time noise amenity level at all receiver locations, with the exception of the Warabrook and Sandgate receiver areas (Appendix A).

The incremental increase in cumulative noise levels due to the NCIG CET at an increased approved throughput of 79 Mtpa would be less than 0.1 dBA and not discernible at receivers (Appendix A).

Rail Transportation Noise

The increase in approved throughput to 79 Mtpa would not change the maximum number of trains per day (i.e. up to 40 trains on any one day) (Table 2-1) arriving at the NCIG CET.

As there would be no change to the peak number of trains per day arriving at the NCIG CET, there would be no change in peak noise along the Main Northern Railway when assessed against the RING $L_{Aeq(periode)}$ criteria for the daytime/evening and night-time periods.

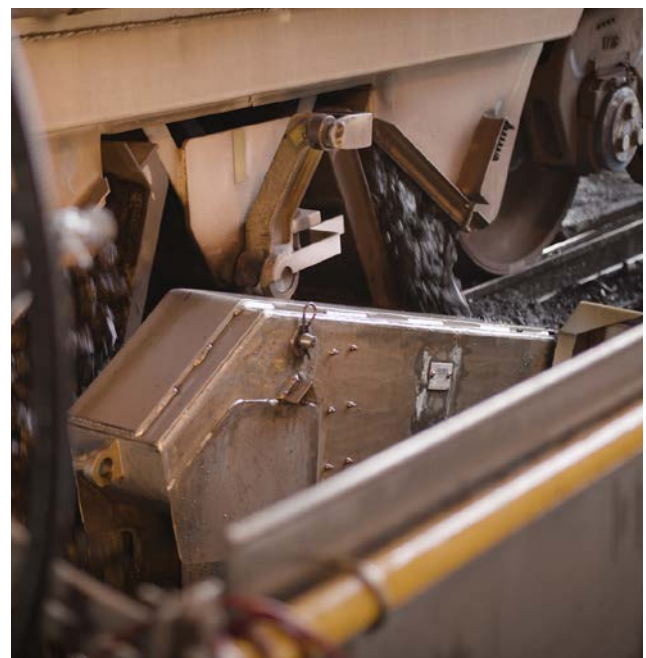
Similarly, there would be no change in the maximum train pass-by noise as a result of the Modification when assessed against the RING maximum pass by criteria (L_{Amax}).

The increase in approved throughput to 79 Mtpa would increase the average number of trains arriving at the NCIG CET from approximately 26 trains to approximately 28 trains per day (Table 2-1).

There would, however, be an increase in average train movements as a result of the Modification, predicted to result in an increase of 0.8 dB for the daytime/evening $L_{Aeq(15hour)}$ and night-time $L_{Aeq(9hour)}$ when compared to the noise from the existing average train movements.

This change in average train noise levels would be indiscernible, and would remain within approved peak noise levels.

It is noted that locomotives on the NCIG CET rail loop have been considered in the operational noise modelling for the Modification as described above.



Continued Compliance

The NCIG CET including the Modification would continue to operate within approved noise limits



Newcastle Coal
INFRASTRUCTURE GROUP

MODIFICATION REPORT

Major Developments
Proximal to the NCG CET

- INDUSTRIAL FACILITIES**
- 1 PWCS Kooragang Coal Terminal
 - 2 Kooragang Island Resource Recovery Facility
 - 3 Boral Cement
 - 4 Cargill Oilseed Processing Facility
 - 5 Insteel Pivot
 - 6 Park Fuels Bulk Facility
 - 7 Orico Ammonium Nitrate Facility
 - 8 PWCS Carrington Coal Terminal
 - 9 Stollhaven Fuel Storage Terminal
 - 10 One Steel
 - 11 Steel River
 - 12 PWCS Terminal 4

LEGEND

- Railway
- National Park/Conservation Area
- Approximate Extent of Approved NCG CET
- Industrial Facility

Source: NSW Spatial Services (2019)
Orthophoto: NSW Spatial Services (2019)

Figure 6-2

6.2 AIR QUALITY

6.2.1 Methodology

An Air Quality and Greenhouse Gas Assessment Review for the Modification has been undertaken by Todoroski Air Sciences (TAS) (2019) and is presented in Appendix B.

The assessment was conducted in accordance with the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (Approved Methods) (EPA, 2017b).

The greenhouse gas emissions associated with the Modification are described in Section 6.3.

6.2.2 Background

Air Quality Management and Monitoring Regime

The ongoing management of air quality emissions at the NCIG CET is undertaken in accordance with the AQMP and the OEMP, which includes:

- monitoring objectives and NCIG's roles and responsibilities;
- dust and air quality mitigation measures and controls; and
- procedures for the management of exceedances and complaints.

NCIG undertakes air quality and dust monitoring in accordance with the current NCIG ambient air quality monitoring program at on-site and local monitoring locations as follows (Figure 6-3):

- dust emission data collected from eight dust deposition gauge locations located proximal to the NCIG CET (e.g. Stockton, Carrington and Mayfield);
- Total Suspended Particles (TSP) and PM₁₀ concentration data collected on a six daily basis from monitoring sites located at Steel River, Mayfield, Stockton and Fern Bay;
- NSW OEH PM₁₀ and PM_{2.5} particulate monitoring sites (as part of the Newcastle Local Air Quality Monitoring Network); and
- TSP monitoring sites located at the NCIG CET.

As a component of the Air Quality and Greenhouse Gas Assessment, background air quality data collected from the current NCIG ambient air quality monitoring program was reviewed. TAS noted the background air quality concentrations would already include the existing dust and particulate contributions of the operation of the NCIG CET.

NCIG's environmental management plans and reporting documentation can be found on NCIG's website: www.ncig.com.au.

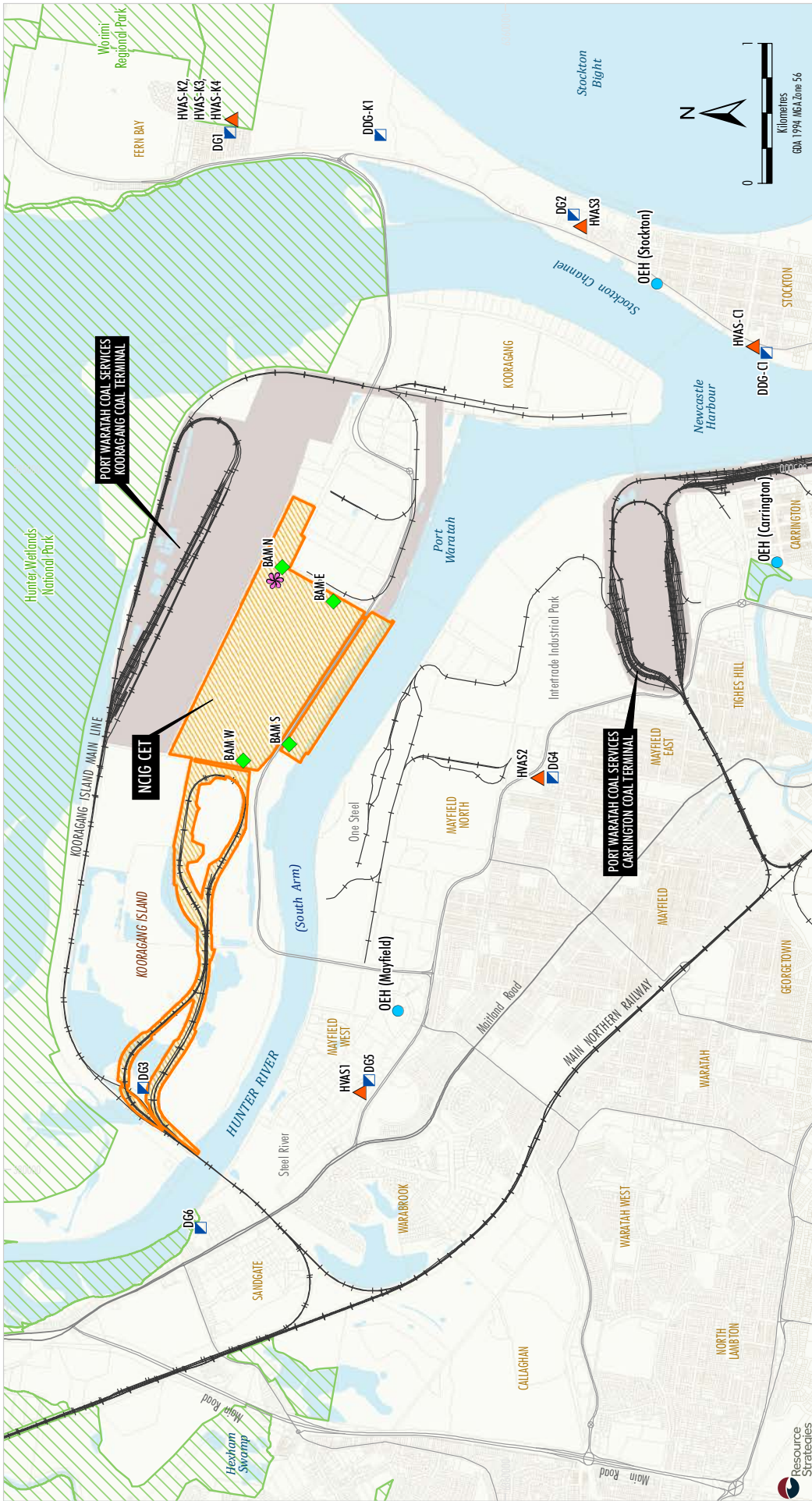
Compliance and Complaints

Air quality and dust monitoring undertaken in accordance with the AQMP to date shows the NCIG CET operates in compliance with the relevant air quality criteria as outlined in the Approved Methods (EPA, 2017b).

Annual independent environmental audits have been conducted in accordance with Project Approval 06_0009. During the most recent reporting period for the period 1 October 2015 to 1 October 2018, NCIG reported compliance with relevant air quality criteria at all receivers, and that no air quality related complaints were received from members of the public (pitt&sherry, 2019).

This finding (that air quality at the NCIG complies with relevant criteria) is consistent with the relevant findings of the *Lower Hunter Particle Characterisation Study, Final Report* (Commonwealth Scientific and Industrial Research Organisation, Australian Nuclear Science and Technology Organisation & OEH, 2016), which determined that coal particles contributed only a small portion of the total background PM_{2.5-10} emissions in areas proximal to the Port of Newcastle.

In addition, for the most recent compliance tracking program report for the reporting period 1 April 2018 to 31 March 2019, two air quality related complaints from members of the public were received, however, subsequent investigation confirmed that only one of these complaints was in relation to NCIG operations.



Source: NSW Spatial Services (2019), NCIG (2019)

- LEGEND**
- Railway
 - National Park/Conservation Area
 - Approximate Extent of Approved NCIG CET
 - Monitoring Sites**
 - Dust Gauge
 - Environmental Beta Attenuation Monitor
 - High Volume Air Sampler
 - Meteorological Station
 - OEH Monitoring Site

Resource Strategies

Figure 6-3

Applicable Criteria

The Approved Methods generally specify criteria levels developed to protect human health and amenity (i.e. the criteria are set at levels to reduce the risk of adverse health effects).

The Approved Methods includes particle assessment criteria that are consistent with the revised *National Environment Protection (Ambient Air Quality) Measure* national reporting standards (National Environment Protection Council [NEPC], 1998; NEPC, 2015).

Particulate matter also has the potential to cause nuisance (amenity) effects when it is deposited on surfaces. Therefore, TAS has considered criteria for the maximum increase in dust deposition and maximum total dust deposition, as specified by the Approved Methods (EPA, 2017b) (Appendix B).

A summary of the relevant criteria considered by TAS (Appendix B) is provided in Table 6-4.

Existing Dust Controls

As part of the NCIG CET EA, an Air Quality Impact Assessment was undertaken by Holmes Air Sciences (2006). The NCIG CET EA Air Quality Impact Assessment considered operations and up to the maximum approved capacity of 66 Mtpa.

The modelling and assessment by Holmes Air Sciences (2006) was conservatively based on uncontrolled emissions (i.e. with no implementation of dust controls).

Operational and physical mitigation measures have been implemented at the NCIG CET as part of the AQMP to control dust generation.

NCIG has implemented an integrated dust suppression control system, which includes real time monitoring of coal moisture and meteorological conditions and integration with automated misting and water addition sprays on conveyors and coal stockpiles.

Physical mitigation measures include wind shielding on coal transfer conveyors, full enclosure of elevated conveyors and utilisation of 'soft flow' technology for chutes to ensure that separation of coal flow is minimised (Appendix B).

Table 6-4 Relevant Air Quality Assessment Criteria

Pollutant	Averaging Period	Approved Methods Criteria
TSP	Annual	90 µg/m ³
PM ₁₀	Annual	25 µg/m ³
	24-hour	50 µg/m ³
PM _{2.5}	Annual	8 µg/m ³
	24-hour	25 µg/m ³
Dust Deposition	Annual – Maximum Increment	2 g/m ² /month
	Annual – Maximum Total	4 g/m ² /month

Source: Appendix B.

TSP – Total suspended particulate matter, which refers to all suspended particles in the air and are typically less than 30 to 50 micrometres (µm) in aerodynamic diameter.

PM₁₀ – Particulate matter with an equivalent aerodynamic diameter of 10 µm or less (a subset of TSP).

PM_{2.5} – Particulate matter with an equivalent aerodynamic diameter of 2.5 µm or less (a subset of TSP and PM10). Often referred to as the fine particles.

µg/m³ – micrograms per cubic metre.

g/m²/month – grams per square metre per month.

6.2.3 Impact Assessment Review

Particulate Matter Concentrations and Dust Deposition

The increase in coal throughput from 66 Mtpa to 79 Mtpa for the Modification has the potential to generate more dust emissions associated with coal handling and transfer activities (e.g. unloading and reclaiming).

As the Modification would not change the size of coal stockpiles at the NCIG CET, wind erosion emissions from stockpiles would not change (as this emission source is area dependant).

TAS (Appendix B) has undertaken revised air dispersion modelling of the existing approved NCIG CET and the NCIG CET with an increase in approved throughput to 79 Mtpa.

The modelling by TAS has incorporated the measures to control dust currently implemented by NCIG for the existing NCIG CET.

Based on the inclusion of the current dust control measures implemented at the NCIG CET, the total TSP emissions from operational activities at the NCIG CET, incorporating the Modification, are approximately 52% less than the emissions estimated in Holmes Air Sciences (2006), upon which the NCIG CET was approved.

The modelling demonstrates that the incremental change as a result of the increase in approved throughput to 79 Mtpa when compared to the existing NCIG CET would be negligible at residential receivers.

In addition, TAS considered the cumulative impacts of the NCIG CET by considering existing measured background levels and additional proposed projects (including the PWCS Terminal 4 Project, Incitec Pivot Ammonium Nitrate Facility Project and Kooragang Island Resource Recovery Facility Expansion) (note that the proposed Newcastle Gas Terminal would be located on the same site as the approved Terminal 4 Project and, therefore, has not also been included in cumulative assessment as it could not operate concurrently with the modelled operation of Terminal 4) (Appendix B).

TAS concluded the NCIG CET incorporating the Modification would not result in any exceedances of the applicable cumulative assessment criteria at all sensitive receivers in the surrounding environment (Appendix B).

TAS concluded, therefore, that the NCIG CET incorporating the Modification would continue to comply with all relevant air quality assessment criteria (Table 6-4) at all residential receptors (Appendix B).

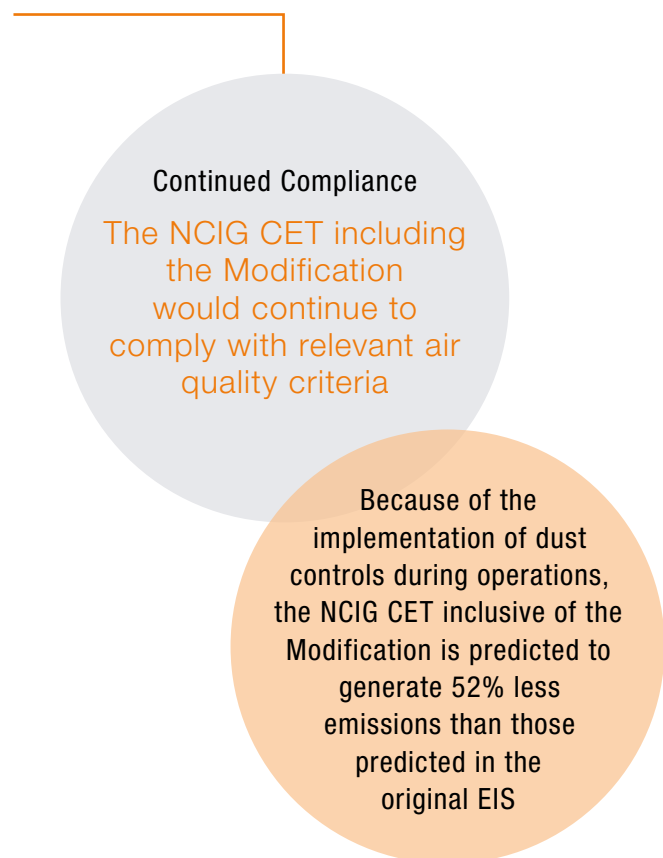
TAS recommends that NCIG continues to implement the AQMP and applicable existing air quality control and management measures.

Rail Transportation

The Modification would not change the maximum number of trains per day (i.e. up to 40 trains on any one day) arriving at the NCIG CET, and the Modification would continue to comply with all relevant air quality assessment criteria at all residential receptors (Appendix B).

Ships

Ship movements have not been considered as part of the Modification, however, have been considered for the purposes of cumulative air quality assessment, which concluded the increase in approved throughput to 79 Mtpa would not result in any exceedances of the applicable cumulative assessment criteria at all sensitive receivers (Appendix B).



6.3 GREENHOUSE GAS EMISSIONS

The Air Quality and Greenhouse Gas Assessment Review prepared by TAS (Appendix B) considered the greenhouse gas emissions of the NCIG CET incorporating the Modification.

Consideration of greenhouse gas emissions from the Modification in the context of Ecologically Sustainable Development is provided in Section 4.

Three “Scopes” of emissions (Scope 1, Scope 2 and Scope 3) are defined for greenhouse gas accounting and reporting purposes.

Scope 1 emissions encompass the direct greenhouse gas emissions resulting from sources within the boundary of a project, such as the generation of on-site electricity and the transportation of materials on-site (i.e. resulting in the combustion of fuels).

Scope 2 emissions are off-site indirect greenhouse gas emissions from the generation of purchased electricity consumed by a project.

Scope 3 emissions encompass indirect emissions that arise from indirect sources not owned or controlled by a project. In the context of NCIG, the downstream use of coal handled at the NCIG CET (such as combustion of coal) has been considered as Scope 3 emissions. However, these emissions are also considered as Scope 3 emissions of the mines approved to produce the coal, as well as Scope 1 emissions for the businesses that burn the coal, and Scope 2 emissions for the businesses that use electricity (if the coal is used to produce electricity).

This means that greenhouse gas emissions are conservatively double-counted when:

- the same sources of emissions are considered as Scope 3 for both the approved mines and the NCIG CET;
- the same sources of emissions are considered as Scope 3 for other coal handling / transport developments in the coal supply chain (e.g. rail and shipping providers); and

- the same sources of emissions are considered as Scope 3 for the NCIG CET and Scope 1 emissions of the country in which the coal is used.

6.3.1 Assessment of Potential Greenhouse Gas Emissions

Scope 1 and Scope 2 Emissions

The increase in approved throughput to 79 Mtpa would not involve additional sources of emissions at the existing NCIG CET, as the increase in throughput capacity would be achieved through the increased efficiency and utilisation of existing infrastructure.

TAS (Appendix B) has estimated the Scope 1 and Scope 2 emissions from the NCIG CET incorporating the Modification to account for the proposed increase in throughput capacity. A comparison of the estimated emissions between the existing NCIG CET and the NCIG CET incorporating the Modification is provided in Table 6-5.

In the context of Australia’s annual emissions, the increase of Scope 1 and Scope 2 greenhouse gas emissions from the NCIG CET incorporating the Modification would be 0.003% of Australia’s greenhouse gas emissions reported for the year to December 2018 (Appendix B). The contribution to global emissions would be an order of magnitude smaller.

The potential externalities (indirect costs) arising from the predicted Scope 1 and Scope 2 emissions as a result of the increase in approved throughput to 79 Mtpa have been estimated taking into consideration the latest carbon price resulting from the most recent (July 2019) auction, undertaken by the Clean Energy Regulator under the Emissions Reduction Fund (Australian Government, 2019). The results of this auction yielded an average carbon price of \$14.17 per tonne of carbon dioxide abated (t CO₂-e) (Australian Government, 2019).

Table 6-5 Comparison of Estimated Scope 1 and Scope 2 Emissions

	Capacity	Scope 1 (t CO ₂ -e/year)	Scope 2 (t CO ₂ -e/year)	Total Scope 1 & 2 (t CO ₂ -e/year)
Existing/Approved NCIG CET	66 Mtpa	397	86,645	87,041
NCIG CET including the Modification	79 Mtpa	475	103,711	104,186
Increment	13 Mtpa	78	17,066	17,144

Source: Appendix B. t CO₂-e/year – tonnes of carbon dioxide equivalent per year.

Based on sensitivity analysis of this carbon price (i.e. using a price range of \$15 to \$30/t CO_{2-e}), the externalities arising from the estimated increase in NCIG CET Scope 1 and Scope 2 emissions is approximately \$0.24 to \$0.51 million/year (in 2019 dollars).

When apportioned to the NSW population (approximately 0.1% of the global population [Australian Bureau of Statistics, 2019; United Nations, 2019]), externalities of Scope 1 and Scope 2 incremental emissions would be approximately \$238 to \$504/year per capita (in 2019 dollars).

Scope 3

The Scope 3 (indirect) emissions from the combustion (i.e. downstream end use) of the proposed additional throughput of coal exported by the NCIG CET (i.e. 13 Mtpa) is estimated to be 31.7 million tonnes of carbon dioxide equivalent (Mt CO_{2-e}) on an annual basis, with a revised total of 192.5 Mt CO_{2-e} per annum for the total throughput of 79 Mtpa for the NCIG CET incorporating the Modification.

The NCIG CET operates as an individual node, storing coal received from upstream mining operations for a limited period before it is shipped for export, and therefore, does not produce nor consume coal but facilitates coal transportation. The Modification does not involve or seek approval for the combustion of coal.

Scope 3 emissions from coal handled at the NCIG CET would inherently occur overseas (as other entities' Scope 1 and Scope 2 emissions), and the mitigation and management of these emissions from coal handled at the NCIG CET would have already been considered by these entities during their respective approvals processes.

These Scope 3 emissions, which are double-counted Scope 3 emissions from the approved mines producing the coal as well as the NCIG CET (and would be accounted for as Scope 1 and Scope 2 emissions of end use entities), would occur regardless of the increase in approved throughput to 79 Mtpa.

6.3.2 International, National and State Policies and Programs Regarding Greenhouse Gas Emissions

While clause 14(2) of the *State Environmental Planning Policy (Mining, Petroleum Production and Extractive Industries) 2007* currently requires the consent authority to consider downstream emissions of development for the purposes of mining, petroleum production or extractive industry, having regard to any applicable State or national policies, programs or guidelines, there is no such requirement in a planning instrument that applies to the Modification.

Nevertheless, a description of State and national policies and programs (as well as the international regime) is provided below in order to consider the context of Scope 3 emissions of the Modification.

The importance of avoiding double counting of greenhouse gas emissions is well recognised under international and Australian frameworks addressing climate change and greenhouse gas emissions.

At an international level, the *Paris Agreement* under the United Nations Framework Convention on Climate Change requires parties to ensure the avoidance of double counting emissions in respect of the overarching obligations of the *Paris Agreement*. Emissions accounting guidance adopted under the *Paris Agreement* requires parties to avoid double counting emissions when preparing their national inventories of greenhouse gas emissions.

The Intergovernmental Panel on Climate Change's Guidelines for National Greenhouse Gas Inventories do not require data to be collected or reported, or estimates to be made, of Scope 3 emissions.

At a national level the *National Greenhouse and Energy Reporting Act, 2007* (Cth) also dissuades double counting by imposing reporting obligations upon companies only in respect of Scope 1 and Scope 2 emissions. There is no requirement or obligation imposed on companies under Australian law to report on Scope 3 emissions. The exclusion of Scope 3 emissions from the reporting requirements under Australian law effectively avoids double counting of Scope 3 emissions since the end-user who is responsible for a project's Scope 3 emissions will ultimately account for them as Scope 1 emissions.

Australian Greenhouse Gas Reduction Targets

The potential impacts of greenhouse gas emissions from all Australian sources is collectively managed at a national level, through initiatives implemented by the Commonwealth Government.

The Commonwealth Government has committed to a number of greenhouse gas emission reduction targets, including:

- reducing emissions levels by 5% below 2000 levels by 2020, consistent with Australia’s commitments under the Kyoto Protocol (Commonwealth of Australia, 2014); and
- reducing greenhouse gas emissions by 26 to 28% below 2005 levels by 2030, as part of the *Paris Agreement*.

A range of policies including the Emissions Reduction Fund, the Safeguard Mechanism, the Renewable Energy Target and the National Energy Productivity Plan have been implemented to help Australia meet its greenhouse gas commitments (Commonwealth of Australia, 2017).

The Emissions Reduction Fund is a \$2.55 billion fund which purchases least cost emission reductions and abatement through a Commonwealth Government procurement process, which includes reverse auctions.

The Safeguard Mechanism aims to ensure that emission reductions purchased by the Government under the Emissions Reduction Fund are not undermined by increases in emissions in other areas of the economy. In this regard, the Safeguard Mechanism requires all facilities that emit over 100,000 t CO_{2-e}/year to offset emissions that exceed a facility-specific emissions baseline.

In addition, the NSW Government has released the *NSW Climate Change Policy Framework* (OEH, 2016), which commits NSW to the “aspirational long-term objective” of achieving net-zero emissions by 2050.

Scope 1 and Scope 2 emissions from the NCIG CET incorporating the Modification are not expected to affect the ability of NSW or Australia to meet its emissions reduction targets.

Scope 3 emissions, which would occur overseas regardless of the NCIG CET, would be accounted for in any emission targets in the countries in which the coal is used, consistent with the international legal framework under the *United Nations Framework Convention on Climate Change* and the *Paris Agreement*.

6.3.3 NCIG Greenhouse Gas Mitigation Measures

Greenhouse gas management at the NCIG CET is currently undertaken in accordance with the AQMP. The AQMP describes a number of greenhouse gas abatement and efficiency improvements, including:

- regular servicing of vehicles and equipment; and
- ongoing operational improvements to increase the efficiency of the plant and reduce power demand.

In addition, NCIG would continue to account for and report greenhouse gas and energy data in accordance with the *National Greenhouse and Energy Reporting Act, 2007* (Cth).



7 Evaluation of Merits

The NCIG CET was granted Project Approval (06_0009) on 13 April 2007.

The Modification seeks to increase the existing approved throughput capacity from 66 Mtpa to 79 Mtpa. This increase can be achieved via control system and operational process improvements that NCIG has identified and progressively implemented within the existing CET boundary and using existing CET infrastructure.

Proposed changes to the approved NCIG CET as a result of the increase in approved throughput to 79 Mtpa are related to the following:

- an increase in the average daily train movements;
- an increase in the number of ships loaded per week/year; and
- potential increase in water demand (no change is proposed to the water use for ongoing dust suppression on the coal storage area), which would continue to be met through existing sources.

The increase in approved throughput to 79 Mtpa does not involve any change to the NCIG CET for the following development components:

- extent of NCIG CET disturbance;
- rail spur, rail sidings or rail loops;
- approved coal stockpile heights or coal storage area extent;
- total coal storage capacity;
- peak train movements;
- number of stackers/reclaimers;
- number or location of coal conveyors, transfer points or buffer bins;
- number of berths, wharf structure, number of shiploaders or peak shiploader capacity;
- peak workforce numbers;
- project life; or
- hours of operation.

7.1 STAKEHOLDER ENGAGEMENT OVERVIEW

NCIG has consulted with a number of stakeholders during the Modification process, including:

- DPIE;
- regulatory agencies;
- local councils;
- neighbouring export terminals and infrastructure owners; and
- local communities.

The outcomes of engagement with members of the public and key regulatory agencies has informed NCIG's preparation of the Modification Report for the Modification (Section 5).

Key feedback received was in relation to the likely benefit of the efficient use of infrastructure as well as potential Modification-related air quality and noise emissions. These matters have been addressed in this Modification Report accordingly.

7.2 CONSOLIDATED SUMMARY OF ASSESSMENT OF IMPACTS

NCIG operates in accordance with its existing environmental management plans, procedures and environmental monitoring programs.

NCIG has had a strong track record of environmental performance in its 10 years of operation, with zero major non-compliances and one complaint related to NCIG operations received since October 2015 from members of the public.

Given the scope of the Modification, potential environmental impacts are associated with noise, air quality, and greenhouse gas emissions.

NCIG has identified potential impacts of the increase in approved throughput to 79 Mtpa on these environmental aspects as well as proposed mitigation and management measures.

In summary:

- It is predicted the NCIG CET incorporating the Modification would continue to comply with current Project Approval 06_0009 noise limits and all relevant air quality assessment criteria at all privately-owned residences.
- NCIG would continue to implement the ONMP and AQMP, including applicable existing noise and air quality control and management measures. Monitoring would continue to be used to demonstrate ongoing compliance with air and noise limits.
- The increase in approved throughput to 79 Mtpa would not involve any additional Scope 1 and Scope 2 emissions sources at the existing NCIG CET. Increases in annual Scope 1 and Scope 2 emissions are expected to be proportionate to the proposed increase in throughput.
- Scope 3 emissions associated with the increase in approved throughput to 79 Mtpa would have already been considered by the upstream and/or downstream entities during their respective approvals processes.

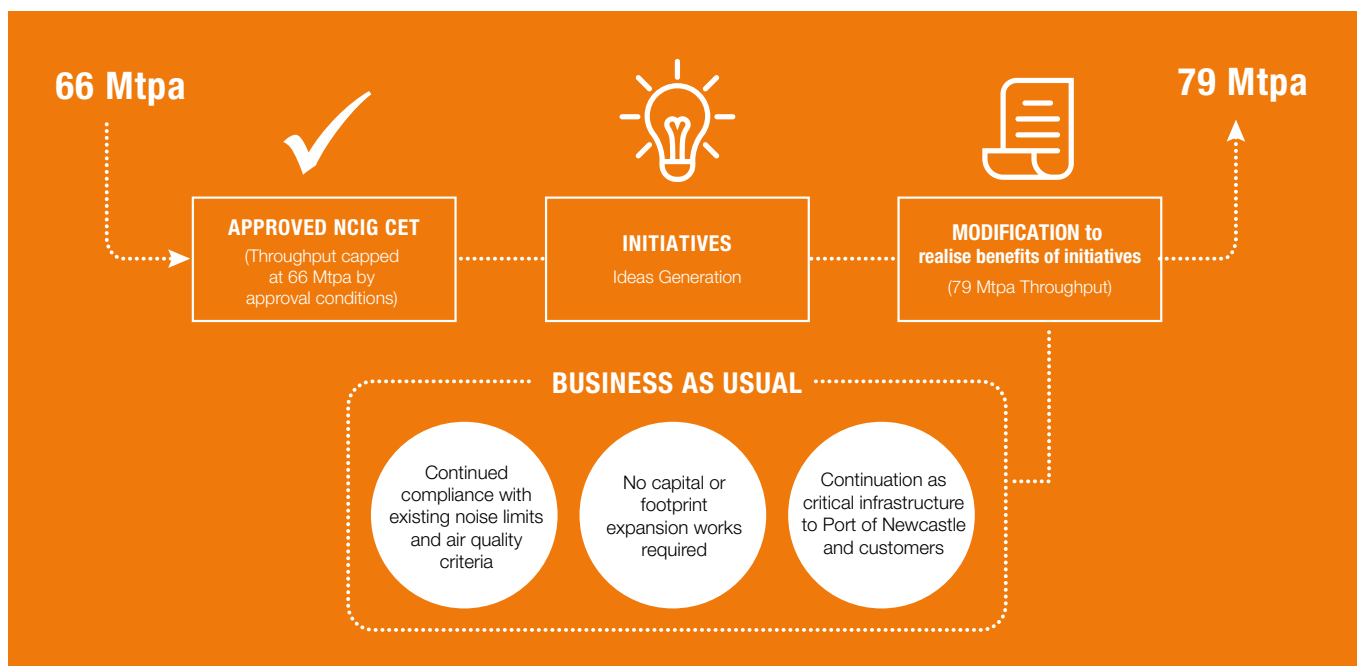
7.3 JUSTIFICATION FOR THE MODIFICATION

Approval of the Modification is considered to be justified given:

- The Modification would realise the investment made by NCIG in innovative projects to improve the efficiency of the existing NCIG CET.
- The Modification would be achieved by utilising existing NCIG CET infrastructure, with no additional surface disturbance required.
- The Modification would provide flexibility for NCIG’s customers to gain further access to NCIG’s unique stockpiling capacity arrangements.
- The Modification would further de-link rail transport and ship loading, helping to alleviate congestion and improve efficiency on the Hunter Valley rail network.
- The Modification can be implemented in a manner that achieves compliance with existing environmental performance limits, including for noise and air quality and within NCIG’s existing environmental monitoring and management framework.

7.4 CONCLUSION

In weighing up the main environmental impacts (costs and benefits) associated with the proposal, as assessed and described in this Modification Report, the Modification, on balance, is considered to have merit.



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9 Abbreviations, Acronyms & Glossary

9.1 ABBREVIATIONS & ACRONYMS

%	per cent	Mt CO_{2-e}	mega tonnes of carbon dioxide per annum
µg/m³	micrograms per cubic metre.	Mtpa	Mega tonnes per annum
AQMP	Operation Dust and Air Quality Management Plan	NCIG	Newcastle Coal Infrastructure Group
ARTC	Australian Rail Track Corporation	NEPC	National Environment Protection Council
CEG	Community Engagement Group	NGER Act	<i>National Greenhouse and Energy Reporting Act, 2007</i>
CEMP	Construction Environmental Management Plan	NPfi	<i>NSW Noise Policy for Industry (EPA, 2017)</i>
CET	Coal Export Terminal	NSW	New South Wales
CO_{2-e}	Carbon dioxide equivalent	OEH	Office of Environment and Heritage
DA	Development Application	OEMP	Operational Environmental Management Plan
dBA	decibels	ONMP	Operational Noise Management Plan
DPIE	Department of Planning, Industry and Environment	PSTLs	Project Specific Trigger Levels
EA	Environmental Assessment	PWCS	Port Waratah Coal Services
EPA	Environment Protection Authority	RING	<i>Rail Infrastructure Noise Guideline (EPA, 2013)</i>
EPBC Act	<i>Environmental Protection and Biodiversity Conservation Act, 1999</i>	SEPPs	State Environmental Protection Policy
EPL	Environment Protection Licence	SLR	SLR Consulting Australia
g/m²/month	grams per square metre per month	SSD	State Significant Development
HVCCC	Hunter Valley Coal Chain Coordinator	SWL	Sound Power Level
INP	Industrial Noise Policy	t	tonnes
L_{Aeq}	equivalent continuous noise level	TAS	Todoroski Air Sciences
LEP	Local Environmental Plan	TfNSW	Transport for NSW
m	metres	TSP	Total Suspended Particles
m³	cubic metres		
mm	millimetres		
Mt	million tonnes		

9.2 GLOSSARY

Background

The condition (e.g. noise levels) already present in an area before the commencement of a specific activity.

dBA

Decibels (A-weighted scale); unit used for most measurements of environmental noise; the scale is based upon typical responses of the human ear to sounds of different frequencies.

Emission

The discharge of a substance (e.g. dust) into the environment.

Greenhouse gases

Gases with potential to cause climate change (e.g. methane, carbon dioxide and non-methane volatile organic compounds). Usually expressed in terms of carbon dioxide equivalent.

Infrastructure

The supporting installations and services that supply the needs of the Modification.

L_{Aeq}

The equivalent continuous noise level – the level of noise equivalent to the energy-average of noise levels occurring over a measurement period.

Mitigation

Measures undertaken to limit the adverse impact of natural hazards, environmental degradation and technological hazards.

MOD 1

Approved modification to the NCIG CET for subdivision of land.

MOD 2

Approved modification to the NCIG CET for grade separation of the northern rail spur.

PM₁₀

Particulate matter less than 10 µm in aerodynamic equivalent diameter.

PM_{2.5}

Particulate matter less than 2.5 µm in aerodynamic equivalent diameter.

Stakeholder

Any individual, group or organisation that can affect, be affected by, or perceive itself to be affected by the behaviour of a company or an organisation.

Total suspended particulates (TSP)

Particulate matter suspended in solution of air.

10 Attachments & Appendices

ATTACHMENT 1-6

APPENDIX A-B

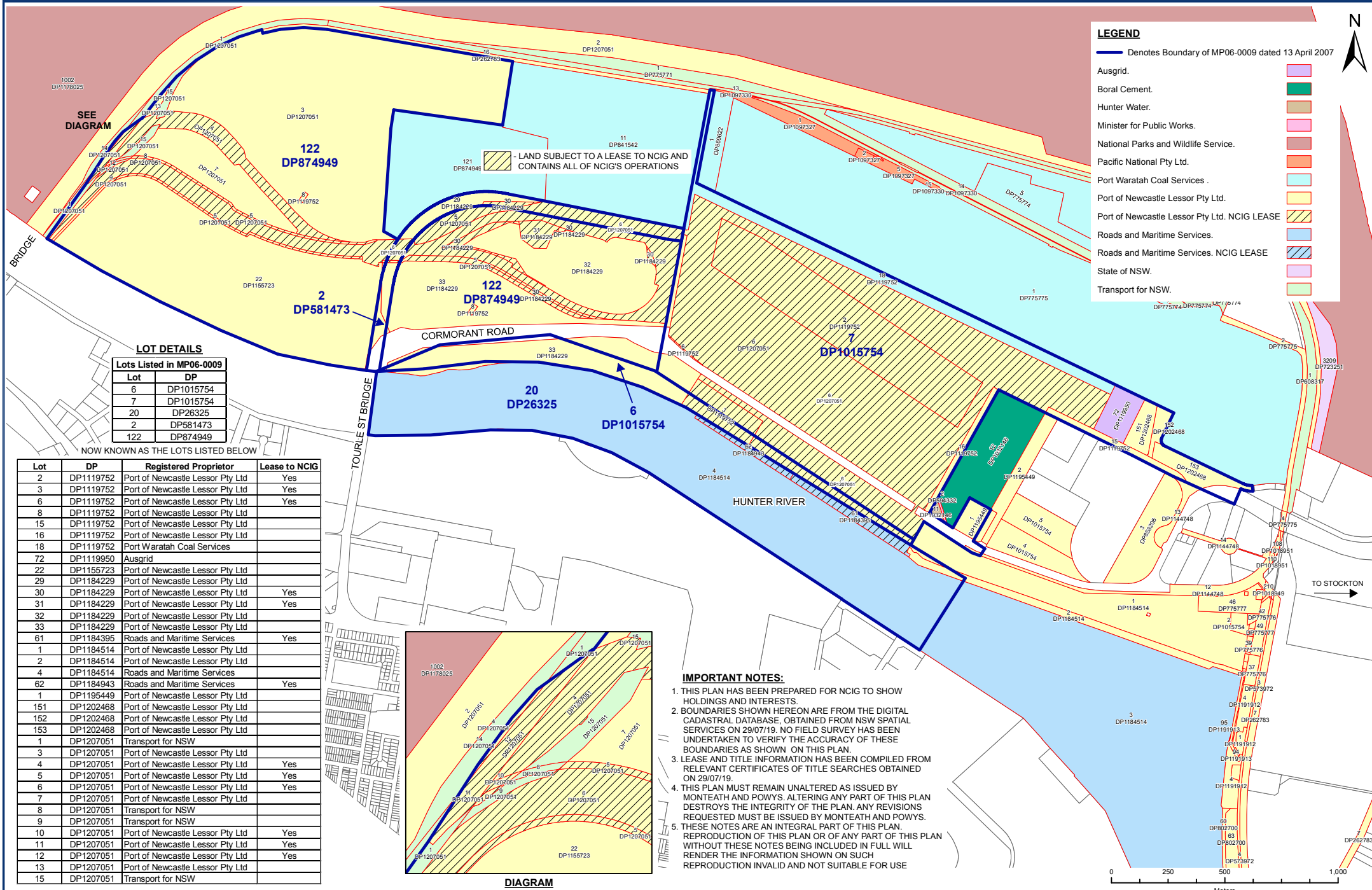
Documents can be found online at the NCIG website
www.ncig.com.au

ATTACHMENT 1
NCIG CET DEVELOPMENT APPLICATION AREA
AND REAL PROPERTY DESCRIPTIONS



LEGEND

- Denotes Boundary of MP06-0009 dated 13 April 2007
- Ausgrid.
- Boral Cement.
- Hunter Water.
- Minister for Public Works.
- National Parks and Wildlife Service.
- Pacific National Pty Ltd.
- Port Waratah Coal Services.
- Port of Newcastle Lessor Pty Ltd.
- Port of Newcastle Lessor Pty Ltd. NCIG LEASE
- Roads and Maritime Services.
- Roads and Maritime Services. NCIG LEASE
- State of NSW.
- Transport for NSW.



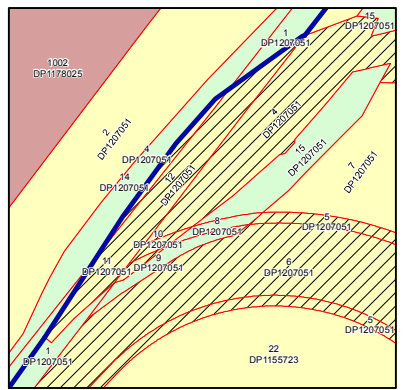
LAND SUBJECT TO A LEASE TO NCIG AND CONTAINS ALL OF NCIG'S OPERATIONS

LOT DETAILS

Lots Listed in MP06-0009	
Lot	DP
6	DP1015754
7	DP1015754
20	DP26325
2	DP581473
122	DP874949

NOW KNOWN AS THE LOTS LISTED BELOW

Lot	DP	Registered Proprietor	Lease to NCIG
2	DP1119752	Port of Newcastle Lessor Pty Ltd	Yes
3	DP1119752	Port of Newcastle Lessor Pty Ltd	Yes
6	DP1119752	Port of Newcastle Lessor Pty Ltd	Yes
8	DP1119752	Port of Newcastle Lessor Pty Ltd	
15	DP1119752	Port of Newcastle Lessor Pty Ltd	
16	DP1119752	Port of Newcastle Lessor Pty Ltd	
18	DP1119752	Port Waratah Coal Services	
72	DP1119950	Ausgrid	
22	DP1155723	Port of Newcastle Lessor Pty Ltd	
29	DP1184229	Port of Newcastle Lessor Pty Ltd	
30	DP1184229	Port of Newcastle Lessor Pty Ltd	Yes
31	DP1184229	Port of Newcastle Lessor Pty Ltd	Yes
32	DP1184229	Port of Newcastle Lessor Pty Ltd	
33	DP1184229	Port of Newcastle Lessor Pty Ltd	
61	DP1184395	Roads and Maritime Services	Yes
1	DP1184514	Port of Newcastle Lessor Pty Ltd	
2	DP1184514	Port of Newcastle Lessor Pty Ltd	
4	DP1184514	Roads and Maritime Services	
62	DP1184943	Roads and Maritime Services	Yes
1	DP1195449	Port of Newcastle Lessor Pty Ltd	
151	DP1202468	Port of Newcastle Lessor Pty Ltd	
152	DP1202468	Port of Newcastle Lessor Pty Ltd	
153	DP1202468	Port of Newcastle Lessor Pty Ltd	
1	DP1207051	Transport for NSW	
3	DP1207051	Port of Newcastle Lessor Pty Ltd	
4	DP1207051	Port of Newcastle Lessor Pty Ltd	Yes
5	DP1207051	Port of Newcastle Lessor Pty Ltd	Yes
6	DP1207051	Port of Newcastle Lessor Pty Ltd	Yes
7	DP1207051	Port of Newcastle Lessor Pty Ltd	
8	DP1207051	Transport for NSW	
9	DP1207051	Transport for NSW	
10	DP1207051	Port of Newcastle Lessor Pty Ltd	Yes
11	DP1207051	Port of Newcastle Lessor Pty Ltd	Yes
12	DP1207051	Port of Newcastle Lessor Pty Ltd	Yes
13	DP1207051	Port of Newcastle Lessor Pty Ltd	
15	DP1207051	Transport for NSW	



DIAGRAM

IMPORTANT NOTES:

- THIS PLAN HAS BEEN PREPARED FOR NCIG TO SHOW HOLDINGS AND INTERESTS.
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Sheet No. **1/1**
Revision **1**

Table 1
NCIG CET Schedule of Lands

Tenure Type	Lot Number	Deposited Plan Number
Freehold	2	DP1119752
Freehold	3	DP1119752
Freehold	6	DP1119752
Freehold	30	DP1184229
Freehold	31	DP1184229
Freehold	4	DP1207051
Freehold	5	DP1207051
Freehold	6	DP1207051
Freehold	10	DP1207051
Freehold	11	DP1207051
Freehold	12	DP1207051
Freehold	61	DP1184395
Freehold	62	DP1184943

Project Approval

Section 75J of the *Environmental Planning and Assessment Act 1979*

I, the Minister for Planning, approve the project referred to in Schedule 1, subject to the conditions in Schedule 2.

These conditions are required to:

- prevent, minimise, and/or offset adverse environmental impacts;
- set standards and performance measures for acceptable environmental performance;
- require regular monitoring and reporting; and
- provide for the ongoing environmental management of the project.

Frank Sartor MP
Minister for Planning

Sydney

2007

File No: S06/00617

SCHEDULE 1

Application No:	06_0009
Proponent:	Newcastle Coal Infrastructure Group
Approval Authority:	Minister for Planning
Land:	Part Lot 122 DP 874949, Part Lot 6 and Part Lot 7 DP 1015754, Part Lot 20 DP 262325, Part Lot 2 DP 581473.
Project:	Construction and operation of a coal export terminal with capacity of up to 66 million tonnes per annum, including: <ul style="list-style-type: none">• foundation preparation/capping of a rail corridor traversing the existing Kooragang Island Waste Emplacement Facility for the development of the rail spurs, rail sidings and rail loops;• construction of rail spurs, rail sidings and rail loops, rail overpass, train unloading stations and connecting conveyors;• reuse of dredged materials from the south arm of the Hunter River as preload and engineering fill for construction of the coal storage area, rail corridor and wharf facilities;• construction of a coal storage area including coal stockpiles, conveyors, transfer points and combined stacker/reclaimers;

- construction of wharf facilities, shiploaders, conveyors and buffer bins;
- development of water management infrastructure including Site drainage works, stormwater settlement ponds, primary and secondary settling ponds, Site water pond, water tanks and stockpile spray system;
- installation of electricity reticulation and control systems;
- development of access roads and internal roads; construction of administration and workshop buildings;
- other associated minor infrastructure, plant, equipment and activities; and
- operation of the coal export terminal up to a capacity of 66 million tonnes per annum of coal, including the unloading of coal trains, the stockpiling of coal, and the loading of coal to ships via the wharf facilities and shiploaders.

Major Project:

The proposal is DECclared a Major Project under section 75B(1)(a) of the *Environmental Planning and Assessment Act 1979*, because it is a development of a kind that is described in clause 22 of Schedule 1 to *State Environmental Planning Policy (Major Projects) 2005*.

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SCHEDULE 2

Act, the	<i>Environmental Planning and Assessment Act, 1979</i>
ARTC	Australian Rail Track Corporation
BCA, the	Building Code of Australia
Conditions of Approval	The Minister's conditions of approval for the project.
Council	Newcastle City Council
Day	the period from 7am to 6pm on Monday to Saturday, and 8am to 6pm on Sundays and Public Holidays
DECC	Department of Environment and Climate Change
Department, the	Department of Planning.
Director-General, the	Director-General of the Department of Planning (or delegate).
Director-General's Approval	A written approval from the Director-General (or delegate). Where the Director-General's Approval is required under a condition the Director-General will endeavour to provide a response within one month of receiving an approval request. The Director-General may ask for additional information if the approval request is considered incomplete. When further information is requested the time taken for the Proponent to respond in writing will be added to the one month period.
Director-General's Report	The report provided to the Minister by the Director-General of the Department under section 75I of the EP&A Act.
DNR	Department of Natural Resources
EA	<i>Environmental Assessment: Coal Export Terminal</i> (prepared by Resource Strategies on behalf of Newcastle Coal Infrastructure Group and dated July 2006).
EPA	Environment Protection Authority as part of the Department of Environment and Climate Change
EPL	Environment Protection Licence issued under the <i>Protection of the Environment Operations Act, 1997</i>
Evening	the period from 6pm to 10pm on any day
KIWEF	Kooragang Island Waste Emplacement Facility
Minister, the	Minister for Planning.
Mtpa	Million tonnes per annum
Night	the period from 10pm to 7am on Monday to Saturday, and 10pm to 8am on Sundays and Public Holidays
Proponent	Newcastle Coal Infrastructure Group, or any party acting under authorisation from and on behalf of the Newcastle Coal Infrastructure Group.
Publicly Available	Available for inspection by a member of the general public (for example available on an internet Site or at a display centre).
RTA, the	NSW Roads and Traffic Authority
Sensitive Receiver	Residence, education institution (e.g. school, TAFE college), health care facility (e.g. nursing home, hospital) or religious facility (e.g. church).
Site	Land to which Major Projects Application 06_0009 applies.

1. ADMINISTRATIVE CONDITIONS

Terms of Approval

- 1.1 The Proponent shall carry out the project generally in accordance with the:
- a) Major Projects Application 06_0009;
 - b) *Environmental Assessment: Newcastle Coal Infrastructure Group Coal Export Terminal*, prepared by Resource Strategies Pty Ltd and dated July 2006;
 - c) *Responses to Submissions*, prepared by Newcastle Coal Infrastructure Group and dated DECCember 2006; and
 - d) the conditions of this approval.
- 1.2 In the event of an inconsistency between:
- a) the conditions of this approval and any document listed from condition 1.1a) to 1.1c) inclusive, the conditions of this approval shall prevail to the extent of the inconsistency; and
 - b) any document listed from condition 1.1a) to 1.1c) inclusive, and any other document listed from condition 1.1a) to 1.1c) inclusive, the most recent document shall prevail to the extent of the inconsistency.
- 1.3 The Proponent shall comply with any reasonable requirement(s) of the Director-General arising from the Department's assessment of:
- a) any reports, plans or correspondence that are submitted in accordance with this approval; and
 - b) the implementation of any actions or measures contained in these reports, plans or correspondence.

Limits of Approval

- 1.4 This approval shall lapse five years after the date on which it is granted, unless the works the subject of this approval are physically and substantially commenced on or before that time.
- 1.5 The project shall be limited to a maximum export capacity of 66 million tonnes of coal per annum.
- 1.6 The Proponent may only proceed to construct the infrastructure marked as "High Capacity Optional Inlet Rail Spur and Rail Sidings" in Figure 2-1 of the document referred to under condition 1.1b) of this approval upon receipt of the Director-General's satisfaction that:
- a) the Compensatory Habitat and Ecological Monitoring Program required under condition 2.20 has been implemented to the extent agreed by the Director-General; and
 - b) the Proponent has complied with rail infrastructure review requirements required under condition 2.40 of this approval.

Statutory Requirements

- 1.7 The Proponent shall ensure that all licences, permits and approvals are obtained and maintained as required throughout the life of the project. No condition of this approval removes the obligation for the Proponent to obtain, renew or comply with such licences, permits or approvals. The Proponent shall ensure that a copy of this approval and all relevant environmental approvals are available on the Site at all times during the project.
- 1.8 The Proponent shall ensure that all practicable measures shall be taken to prevent and minimise harm to the environment as a result of the construction, operation, and where relevant, DECCommissioning of the development.
- 1.9 The Proponent shall ensure that all plant and equipment installed at the premises or used in conjunction with the project must be:
- a) Maintained in a proper and efficient condition; and
 - b) Operated in a proper and efficient manner.

- 1.10 With the approval of the Director-General, the Proponent may prepare and submit any management plan or monitoring program required by this approval on a progressive basis. Where a management plan and monitoring program is required before carrying out any development or stage of development, the plans/programs may be prepared and submitted in relation to either discrete components of the project or for a specified time period.

2. SPECIFIC ENVIRONMENTAL CONDITIONS

Air Quality Impacts

Odour

- 2.1 The Proponent shall not permit any offensive odour, as defined under section 129 of the *Protection of the Environment Operations Act 1997*, to be emitted beyond the boundary of the Site.

Dust Emissions

- 2.2 The Proponent shall design, construct, commission, operate and maintain the project in a manner that minimises or prevents the emission of dust from the Site including wind blown and traffic generated dust.
- 2.3 The Proponent shall take all practicable measures to ensure that all vehicles entering or leaving the Site, carrying a load that may generate dust, are covered at all times, except during loading and unloading. Any such vehicles shall be covered or enclosed in a manner that will prevent emissions of dust from the vehicle at all times, to the extent practicable.
- 2.4 All activities on the Site shall be undertaken with the objective of preventing visible emissions of dust beyond the boundary of the Site. Should such visible dust emissions occur at any time, the Proponent shall identify and implement all practicable dust mitigation measures, including cessation of relevant works, as appropriate.
- 2.5 The Proponent shall control dust emissions on all internal roads, trafficable areas and manoeuvring areas to minimise the potential for dust generation by sealing, or otherwise treating surfaces in a manner acceptable to the Director-General.
- 2.6 The Proponent shall design, construct, operate and maintain the project in a manner that minimises the potential generation of fugitive dust emissions from plant and equipment, including where relevant and practicable, design of the project to minimise the number of coal transfer points, minimise the drop height from stackers to stockpiles, full or partial enclosure of conveyors, installation of wind shields and belt cleaning systems to conveyors, and installation of dust control equipment to mobile plant.
- 2.7 As soon as practicable after the placement of fill/ preloading material on the Site, the Proponent shall cover, seal, grass or otherwise treat the Site in a manner acceptable to the Director-General to minimise the potential generation of wind-blown dust from the fill/ preload material. The Proponent shall maintain the cover, seal, grass or other treatment for the duration of relevant Site preparation and preloading activities, and following the addition of further fill/ preload materials that may occur from time to time during that period.

Meteorological Monitoring Station

- 2.8 The Proponent shall install, operate and maintain a meteorological monitoring station to monitor weather conditions representative of those on the Site, in accordance with:
- a) AM-1 Guide to Siting of Sampling Units (AS 2922-1987).
 - b) AM-2 Guide for Horizontal Measurement of Wind for Air Quality Applications (AS 2923-1987).
 - c) AM-4 On-Site Meteorological Monitoring Program Guidance for Regulatory Modelling Applications.

The meteorological monitoring station shall be installed at or near the Site and the Proponent shall use the meteorological monitoring station to undertake the monitoring required under condition 3.1 of this approval. This condition does not preclude the Proponent from reaching agreement with any other relevant party for the installation, operation and maintenance of a shared monitoring station, or shared use of an existing monitoring station representative of the Site, provided the outcomes of this condition are achieved.

Noise Impacts

2.9 The Proponent shall minimise noise emissions from plant and equipment operated on the Site in relation to the project according to the principles outlined in the NSW Government's *Industrial Noise Policy*.

Construction Noise

2.10 All Site preparation, filling/ preloading and construction works that may generate an audible noise at any residential receptor shall only be undertaken between 7:00 am and 6:00 pm. Audible noise is defined as "noise that can be heard at the receiver." This condition does not apply in the event of a direction from police or other relevant authority for safety or emergency reasons.

Note: 'safety or emergency reasons' refers to emergency works which may need to be undertaken to avoid loss of life, property loss and/or to prevent environmental harm.

2.11 Notwithstanding condition 2.10 of this approval, piling works shall not be conducted on Sundays or public holidays.

2.12 The Proponent may seek the Director-General's approval to conduct Site preparation, filling/ preloading and construction works outside the hours specified under condition 2.10 on a case-by-case basis. In seeking the Director-General's approval, the Proponent shall demonstrate a need for activities to be conducted during varied hours and how local acoustic amenity will be protected, as well as details of how the DECC's requirements with respect to the variation of hours have been addressed.

Operation Noise

2.13 The Proponent shall design, construct, operate and maintain the project to ensure that the noise contributions from the project do not exceed the maximum allowable noise contributions specified in Table 1 below, at those locations and during those periods indicated. The maximum allowable noise contributions apply under:

- a) meteorological condition of: wind speeds up to 3 ms^{-1} (measured at 10 metres above ground level); or
- b) temperature inversion conditions up to 3°C per 100 metres and wind speeds up to 2 ms^{-1} (measured at 10 metres above ground level).

Table 1 – Maximum Allowable Noise Contribution (dB(A))

Location	Day, Evening, Night At all times	Night 10:00pm to 7:00am Monday to Saturday 10.00pm to 8.00am on Sundays and Public Holidays	
	$L_{Aeq}(15 \text{ minute})$	$L_{Aeq}(\text{night})$	$L_{A1}(1 \text{ minute})$
Fern Bay West	41	37	57
Fern Bay East	39	36	55
Stockton West	41	37	57
Stockton East	38	35	56
Mayfield West	45	40	55
Mayfield	44	39	62
Carrington	36	33	52

- 2.14 For the purpose of assessment of noise contributions specified under condition 2.13 of this consent, noise from the project shall be:
- measured at the most affected point on or within the Site boundary at the most sensitive receiver to determine compliance with $L_{Aeq(15 \text{ minute})}$ night noise limits.
 - measured at one metre from the dwelling façade to determine compliance with $L_{A1(1 \text{ minute})}$ noise limits.
 - subject to the modification factors provided in Section 4 of the *New South Wales Industrial Noise Policy* (EPA, 2000), where applicable.

Notwithstanding, should direct measurement of noise from the development be impractical, the Proponent may employ an alternative noise assessment method deemed acceptable by the DECC (refer to Section 11 of the *New South Wales Industrial Noise Policy* (EPA, 2000)). Details of such an alternative noise assessment method accepted by the DECC shall be submitted to the Director-General prior to the implementation of the assessment method.

Train Noise Performance

- 2.15 The Proponent shall take necessary actions to ensure that trains operated on the Site meet the noise performance criteria established under condition 2.13.

Ecological Impacts

- 2.16 Prior to the commencement of construction, including Site preparation and fill/ preloading activities, the Proponent shall employ a qualified ecologist approved by the Director-General to undertake a pre-construction survey of all areas to be affected by construction works for the presence of *Litoria aurea*. Should members of this species be located within any area to be affected by the project, the Proponent shall notify the Director-General and prepare a management plan for the relocation of *Litoria aurea* individuals in consultation with the DECC and RLMC. The management plan shall include, but not be limited to, the identification of potential locations, management procedures and monitoring requirements for the relocation of *Litoria aurea* individuals prior to the commencement of works.
- 2.17 The Proponent shall design and construct relevant rail infrastructure associated with the project to include culverts, underpasses or other similar measures to permit the movement of *Litoria aurea* and other amphibian species under the rail infrastructure. The culverts, underpasses or other similar measures shall be installed to include suitable habitat for *Litoria aurea*, and to provide protection from predators.
- 2.18 All employees and contractors involved in construction or operation of components of the project in areas known or suspected of providing habitat for *Litoria aurea* and other amphibian species shall be trained in Site hygiene management in accordance with *Hygiene Protocol for the Control of Disease in Frogs* (NPWS, 2001) prior to the commencement of the relevant work.
- 2.19 The Proponent shall employ a qualified ecologist, approved by the Director-General, for the duration of construction works, including Site preparation and fill/ preloading activities, to advise on the mitigation and management of impacts to listed threatened species that may be affected by the relevant works.

Compensatory Habitat and Ecological Monitoring Program

- 2.20 The Proponent shall develop and submit for the approval of the Director-General, a **Compensatory Habitat and Ecological Monitoring Program** to detail how habitat and ecological values lost as a result of the project will be off-set, and how ecological monitoring will be undertaken to inform on-going ecological management. The Program shall be developed in consultation with the DECC, and shall include, but not necessarily be limited to:
- ecological surveys, following detailed design of the project, to identify and quantify the extent and types of habitat that would be lost or degraded as a result of the project;

- b) provision for establishment of compensatory habitat for each relevant component of the project as follows, unless otherwise agreed by the Director-General:
 - i) for *Litoria aurea* habitat lost as a result of the project, establishment of compensatory habitat in a location agreed by the Director-General, in consultation with DECC, to no less than twice the area of habitat identified under a), with commencement of compensatory habitat works within six months of the commencement of construction;
 - ii) for migratory shore bird habitat lost as a result of the filling in of parts of Deep Pond and the construction of the optional rail spur, establishment of compensatory habitat in a location agreed by the Director-General, in consultation with the DECC, equivalent to no less than twice the area of habitat identified under a), with commencement of compensatory habitat works prior to the commencement of construction of the optional rail spur.
- c) provision for on-going ecological studies and migratory bird monitoring in and around Deep Pond, to investigate bird behaviour and to inform the design process for components of the project affecting Deep Pond;
- d) provision for the funding of works required under this condition, to be managed by a board, trust or other mechanism that provides a sound and legally enforceable means of allocating resources for ongoing adaptive management and review of the performance of compensatory habitat works for the life of the project;
- e) provision for research into *Litoria aurea* in and around Kooragang Island and the Hunter Estuary, as may be identified by the Proponent in consultation with relevant ecological and research groups;
- f) provision for ameliorative works on land surrounding the project Site, as may be negotiated by the Proponent with the relevant adjacent land owners, to improve or restore natural hydrology and ecosystems, remove mangrove communities where relevant and restore locally-endemic Endangered Ecological Communities;
- g) consideration of coordinating compensatory and ameliorative works with similar requirements for other developments, including with respect to the development the subject of development consent DA-134-3-2003-i (dredging and remediation of the South Arm of the Hunter River);
- h) monitoring requirements for compensatory habitat works and other ecological amelioration proposed under the Program; and
- i) timing and responsibilities for the implementation of the provisions of the Program.

Traffic and Transport Impacts

General Road Infrastructure and Traffic Management

- 2.21 Prior to the commencement of construction of the project, including fill/preload activities, the Proponent shall develop and submit for the approval of the RTA and Council, construction traffic control measures to be implemented for the project. The construction traffic control measures shall include measures to ensure that project traffic does not adversely affect traffic movements on Cormorant Road during peak traffic times.
- 2.22 The Proponent shall design, install and maintain physical traffic control devices and signs for all prohibited traffic movements referred to in Appendix C of the document referred to under condition 1.1b) of this approval, during construction and operation of the project, as relevant. The Proponent shall submit design details of the traffic control devices and signs to the RTA and Council for approval prior to their installation. Traffic control devices and signs shall be installed prior to the commencement of construction and operation, as relevant, and at the expense of the Proponent.
- 2.23 The Proponent shall ensure that all access to the relevant Site areas shall be via the following routes:
- a) Main Site Area:
 - i) Pacific National access road;
 - ii) Temporary haulage road (construction phase only);
 - iii) Egret Street; and

- iv) Raven Street, Curlew Street.
- b) Wharf Area:
 - i) Temporary haulage road (construction phase only); and
 - ii) Wharf access road.
- c) Rail area:
 - i) Delta access road (construction phase only); and
 - ii) Pacific National access road.

Cormorant Road/Temporary Haul Road Intersection

- 2.24 The Proponent shall ensure that traffic control signals and associated civil works are designed and constructed at the intersection of Cormorant Road and the temporary haulage road, west of the existing Blue Circle railway level crossing, in accordance with the RTA's *Road Design Guide* and the relevant Austroads guidelines, to the satisfaction of the RTA including but not limited to, the following works:
- a) the traffic control signals shall be designed to restrict all movements at the intersection to through movements only;
 - b) the signals shall be co-ordinated with the adjacent Blue Circle railway level crossing signals; and
 - c) provision shall be made for on-road Nelson Bay Road cyclists at the intersection.
- 2.25 The Proponent shall ensure that the traffic control signals outlined in condition 2.24 at the intersection of Cormorant Road and the temporary haul road shall be removed to the satisfaction of the RTA and Council, at completion of the construction phase or after 12 months of operation of the signals. This shall include any rehabilitation work required to Cormorant Road as determined by the RTA and Council.
- 2.26 The Proponent shall ensure that the traffic control signals at the intersection of Cormorant Road and the temporary haul road shall not be utilised for traffic movements across Cormorant Road between 6.00 am to 9.00 am and 4.00 pm to 6.00 pm on weekdays.

Cormorant Road/Tourle Street/Delta Access Road

- 2.27 The Proponent shall ensure that the intersection of Cormorant Road/Tourle Street and the Delta access road to the west of the Site is designed and constructed in accordance with the RTA's *Road Design Guide* and the relevant Austroads guidelines to the satisfaction of the RTA. The Proponent shall ensure that the intersection include, as a minimum, the following:
- a) traffic movements shall be physically restricted to left in/left out only;
 - b) the left turn in would require a sealed left turn DECCeleration lane;
 - c) the left turn out should be constructed at right angles to Cormorant Road as a give way arrangement and sealed for an appropriate length to ensure that materials are not tracked onto Cormorant Road, The Proponent shall ensure that shaker grids are provided on-Site at the start of the seal;
 - d) a central median may be required on Cormorant Road at the exit of the Site to physically prevent right turn movements;
 - e) adjustments to the footpath and cycleways shall be undertaken to the satisfaction of the RTA and Council.

Cormorant Road/Pacific National Access

- 2.28 The Proponent shall ensure that the intersection of Cormorant Road/Pacific National access shall be designed and constructed in accordance with the RTA's *Road Design Guide* and the relevant Austroads guidelines, to the satisfaction of the RTA. The Proponent shall ensure that the intersection should include as a minimum:
- a) traffic movements shall be physically restricted to left in/left out/right in only;
 - b) the existing intersection shall be upgraded to include construction of concrete medians in Cormorant Road;
 - c) this intersection shall be integrated with the wind turbine access to the satisfaction of the RTA and Council.

- 2.29 The Proponent shall construct a u-turn facility at the Pacific National access road to the satisfaction of the RTA and Council. The Proponent shall ensure that the u-turn facility:
- a) is located a minimum distance of 100 metres from Cormorant Road to avoid any potential conflict with traffic at the intersection; and
 - b) is designed to cater for B-double movements.

Cormorant Road/Wharf area access

- 2.30 The Proponent shall ensure that the intersection of Cormorant Road and the Wharf access road to the south of the Site is designed and constructed in accordance with the RTA's *Road Design Guide* and the relevant Austroads guidelines to the satisfaction of the RTA. The Proponent shall ensure that the intersection includes the following minimum requirements:
- a) traffic movements shall be physically restricted to left in/left out/right in only;
 - b) the left turn in would require a DECCeleration lane; and
 - c) the left turn out should be constructed at right angles to Cormorant Road as a give way arrangement.

Cormorant Road/Egret Street

- 2.31 The Proponent shall ensure that the intersection of Cormorant Road/Egret Street is designed and constructed in accordance with the RTA's *Road Design Guide* and the relevant Austroads guidelines to the satisfaction of the RTA. The Proponent shall ensure that the intersection includes, as a minimum:
- a) traffic movements shall be physically restricted to left in/left out and right in only; and
 - b) the existing intersection shall be modified to include the construction of concrete medians in Cormorant Road.

Conveyor Bridge over Cormorant Road

- 2.32 The Proponent shall ensure that the bridge structure over Cormorant Road is designed and constructed to RTA requirements, including (but not limited to):
- a) allowance for future road widening/duplication of Cormorant Road;
 - b) a minimum 6.5 metre vertical height clearance be provided from the top of the Cormorant Road pavement to the underside of the bridge structure;
 - c) the bridge structure and its approaches to be designed to minimise impacts on maintenance activities required within the road reserve; and
 - d) any maintenance activities required for the bridge structure shall be carried out from within/on the bridge structure.
- 2.33 The Proponent shall enter into an agreement with the RTA for the ongoing maintenance and demolition of the bridge structure.
- 2.34 The Proponent shall submit for the approval of the RTA and Council, detailed designs for the road works referred to under condition 2.22 to condition 2.32 inclusive, prior to the commencement of construction of those works, and prior to the commencement of construction of the relevant components of the project. All road works shall be undertaken and completed to the satisfaction of the RTA and Council.
- 2.35 The project shall be designed, constructed, maintained and operated so as not to preclude any future expansion of Cormorant Road to accommodate four lanes of traffic. The Proponent shall consult with the RTA during detailed design of the project to ensure that the requirements of this condition are reflected in the final design of the project. In this regard, the Proponent will be required to enter into a Works Authorisation Deed with the RTA and submit detailed design plans and any additional relevant information, as may be required under the Deed, to the RTA for each specific change to the state road network for the RTA's assessment and approval.
- 2.36 The Proponent shall ensure that any property requirements including acquisition and/or road reserve dedication shall be in accordance with the requirements of the RTA and Council and at the full expense of the Proponent.

Internal Roads and Parking

- 2.37 The Proponent shall design, construct and maintain all internal road works, including the car park, to meet the following requirements:
- a) compliance with the provisions of relevant Australian Standards, RTA standards and guidelines, and Council codes;
 - b) installation of clear signage to demarcate all vehicle movements within the Site;
 - c) installation and maintenance of any landscaping on the Site so as not to affect driver sight distance for vehicles entering and exiting the Site; and
 - d) clear demarcation of all visitor, disabled, ambulance and service vehicle parking areas.

Rail Infrastructure and Management

- 2.38 Prior to the commencement of any works associated with the construction of rail infrastructure on land associated with the Kooragang Island Waste Emplacement Facility, the Proponent shall consult with RLMC to reach agreement on the detailed design and operational aspects of the rail infrastructure components of the project on land owned by RLMC. Design details shall include all measures outlined in the documents referred to in condition 1.1.
- 2.39 The Proponent shall consult with, and meet the requirements of ARTC with respect to those components on the project that directly affect the design and connection of rail infrastructure with ARTC's existing rail infrastructure assets.
- 2.40 Prior to the commencement of construction of the infrastructure marked as "High Capacity Optional Inlet Rail Spur and Rail Sidings" in Figure 2-1 of the document referred to under condition 1.1b) of this approval, the Proponent shall undertake, in consultation with ARTC and the owner/ operator of the existing Kooragang Coal Loader, a review of the need for that infrastructure. The purpose of this review shall be to confirm the need for the infrastructure in light of the circumstances and operational requirements existing at the time of implementing this component of the project. The Proponent shall notify the Director-General of the outcomes of the review as soon as practicable after its completion.

Soil and Water Quality Impacts

- 2.41 Except as may be expressly provided under the provision of an Environment Protection Licence for the project, the Proponent shall comply with section 120 of the *Protection of the Environment Operations Act 1997* which prohibits the pollution of waters.
- 2.42 Unless otherwise agreed by the Director-General, the Proponent shall design, construct, maintain and operate surface water and stormwater management infrastructure on the Site to accommodate a 1 in 100 ARI rainfall event, and shall not permit the discharge of any water from the Site to the Hunter River unless expressly provided under the provision of an Environment Protection Licence.

Construction Soil and Water Management

- 2.43 The Proponent shall take all reasonable measures to prevent soil erosion and the discharge of sediments and pollutants from the Site during construction of the project.
- 2.44 The Proponent shall install stormwater drains, stormwater ponds, settlement ponds and/or storage ponds and other erosion, sediment and pollution controls as may be appropriate to manage stormwater on the Site. The Proponent shall maintain all erosion, sediment and pollution control infrastructure at or above design capacity for the duration of construction of the project and until such time as all ground disturbed by the works has been stabilised and rehabilitated so that it no longer acts as a source of sediment.
- 2.45 All stockpiled construction materials shall be stabilised and covered where practicable to prevent erosion or dispersal of the materials. The Proponent shall manage any fill/ preload material brought to the Site in manner that prevents erosion and dispersal of those materials.

Fill/ Preload Material Specifications

- 2.46 Materials classified as Virgin Excavated Natural Materials (VENM) or those referred to under condition 2.47, shall be used as fill/ preload material for the project.
- 2.47 Unless otherwise agreed by the Director-General, the Proponent shall only source clean materials for use in fill/ preloading activities from the development the subject of development consent DA-134-3-2003-i (dredging and remediation of the South Arm of the Hunter River). Where the Proponent seeks the agreement of the Director-General to use fill/ preload materials from a different source, the Director-General may require submission of additional information to demonstrate how the impacts from heavy vehicle movements will be adequately and appropriately mitigated and managed.
- 2.48 Unless otherwise agreed by the Director-General, fill/ preload material sourced from the development the subject of development consent DA-134-3-2003-i shall be transported and managed consistently with an approved Dredged Material Transport Strategy under that development consent (condition B2.29).

Operation Soil and Water Management

- 2.49 All stormwater and surface water management infrastructure on the Site intended to manage actual or potentially contaminated water shall be lined with a low-permeability material to minimise potential leakage. Collected stormwater shall be reused on Site for beneficial purposes such as the wetting of coal to reduce dust emissions from the Site.
- 2.50 In the event that stormwater runoff collection cannot meet the water demand of the Site, treated wastewater, if available from the relevant water authority, shall be used preferentially over potable water for the purposes of dust control, unless otherwise agreed by the Director-General.
- 2.51 All machinery wash down waters and amenities wastewater shall be directed to sewer (subject to Hunter Water Corporation approval), or to an appropriately licensed liquid waste disposal facility.
- 2.52 The Proponent shall design, install, maintain and operate rainwater tanks for the collection of water for domestic and potable uses on the Site. Collected rainwater shall be used preferentially to external potable water supplies.

Contaminated Land Management

- 2.53 The Proponent shall engage an appropriately qualified person to audit construction of the rail infrastructure over land used as part of the KIWEF against the commitments contained in the documents referred to in condition 1.1. The auditor shall provide the Director-General and the DECC with quarterly reports on the disturbance and recapping of the waste emplacement area during construction. In the event of any deviation from the commitments made in the abovementioned documents, prior approval should be sought from the DECC, and any deviation from the commitments shall be described in detail and reasons for the change provided and fully justified.
- 2.54 The Proponent shall ensure that any contaminated materials removed from the Site be directed to a waste management facility lawfully permitted to accept the materials.
- 2.55 To avoid any doubt, nothing in this approval relieves the need to comply with the requirements of Environment Protection Licence No. 6437 as it relates to the on-going management of the KIWEF.

Waste Generation and Management

- 2.56 All waste materials removed from the Site shall only be directed to a waste management facility lawfully permitted to accept the materials.

2.57 Except as expressly permitted in an appropriate licence, waste shall not be received at the Site for storage, treatment, processing or reprocessing or disposal.

Visual Amenity Impacts

2.58 Within six months of the commencement of construction of the project, or as otherwise agreed by the Director-General, the Proponent shall install the bund along the southern side of the stockpile yard (northern side of Cormorant Road) to the satisfaction of the Director-General.

2.59 The Proponent shall ensure that all external lighting installed as part of the project is mounted, screened, and directed in such a manner so as not to create a nuisance to surrounding land uses. The lighting shall be the minimum level of illumination necessary, and be in general accordance with *AS 4282 – 1997 Control of the Obtrusive Effects of Outdoor Lighting*.

2.60 The Proponent shall plant and maintain local native vegetation species along the earthen bund referred to under condition 2.58. Vegetation shall be planted prior to the commencement of operation of the project, and shall aim to screen the project from visual receptors towards the south, to the greatest extent practicable.

2.61 Advertising and project identification signs shall not be installed along the Cormorant Road frontage of the Site.

3. ENVIRONMENTAL MONITORING AND AUDITING

Meteorological Monitoring

3.1 From the commencement of construction of the project, the Proponent shall continuously monitor, utilising the meteorological monitoring station referred to under condition 2.8 of this approval, each of the parameters listed in Table 2, utilising the sampling method indicated and applying a 15-minute average period to all results, and recording data in units specified in Table 2.

Table 2 – Meteorological Monitoring

Parameter	Units of Measure	Sampling Method
Temperature at two metres	°C	AM-4
Temperature at ten metres	°C	AM-4
Wind speed at ten metres	ms ⁻¹	AM-2 and AM-4
Wind direction at ten metres	°	AM-2 and AM-4
Sigma theta at ten metres	°	AM-2 and AM-4
Solar radiation	Wm ⁻²	AM-4

Ambient Dust Monitoring

3.2 Prior to the commencement of operation of the project, the Proponent shall develop and submit for the approval of the Director-General and the DECC, an **Ambient Dust Monitoring Program**, to outline how the ambient dust impacts of the project will be monitored. The Program shall include, but not necessarily be limited to:

- a) identification of an integrated air quality monitoring network, developed in consultation with the owner/ operator of the existing Kooragang Coal Loader;
- b) locations, frequencies and methods for monitoring total suspended particles, PM₁₀ and deposited particulate matter;
- c) provision for the use of at least four hi-volume air samplers (HVAS), four dust depositional gauges and a meteorological station capable of monitoring wind direction and speed in accordance with condition 2.8 and condition 3.1 of this approval;
- d) investigation of the use of Tapered Element Oscillating Microbalance Samplers (TEOMS) as part of the integrated air quality monitoring network. Should the Proponent consider TEOMS not to be required, the Proponent may seek approval from both the Director-General and the DECC to exclude this requirement. In seeking such

an exclusion, the Proponent's reasons for the exclusion shall be provided and be fully justified;

- e) provided that the use of TEOMS is proven to be justified (as outlined in d) above), the Proponent shall utilise real-time monitoring data to inform environmental management DECCisions associated with the project;
- f) a framework for identifying actual and potential dust impacts, and for applying proactive and reactive mitigation and management measures to address those impacts;
- g) provision for independent review and auditing of the Program; and
- h) mechanisms for updating the Program as may be required from time to time.

- 3.3 Following one full year of data collection in accordance with an approved Ambient Dust Monitoring Program (refer to condition 3.2), the Proponent shall undertake a model validation study to review TSP, PM₁₀ and dust deposition levels to assess compliance with the dust impact predictions made in the documents referred to under condition 1.1 and with applicable ambient air quality goals. The model validation study shall be undertaken in accordance with *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (DECC, 2005), and any specific requirements of the DECC.
- 3.4 Within 28 days of conducting the dust validation study referred to under condition 3.3 of this approval, the Proponent shall provide the Director-General and the DECC with a copy of the report. If the dust validation study identifies significant deviance from the predictions made in the documents referred to under condition 1.1 or any exceedance with ambient air quality goals, the Proponent shall detail what additional measures would be implemented to further mitigate dust impacts. The Proponent shall clearly indicate who would implement these measures, when these measures would be implemented, and how the effectiveness of these measures would be assessed and reported to the Director-General.
- 3.5 The requirements of conditions 3.3 and 3.4 shall be repeated once one year of dust monitoring data is available after the project exceeds an export rate of 33 million tonnes of coal per annum.

Noise Auditing

- 3.6 Within 90 days of the commencement of operation of the project, or as otherwise agreed by the Director-General, and during a period in which the project is operating under normal operating conditions, the Proponent shall undertake a program to confirm the noise performance of the project. The noise program shall include, but not necessarily be limited to:
- a) noise monitoring, consistent with the guidelines provided in the *New South Wales Industrial Noise Policy* (EPA, 2000), to assess compliance with condition 2.13 of this approval.
 - b) methodologies, locations and frequencies for noise monitoring;
 - c) identification of monitoring sites at which pre- and post-project noise levels can be ascertained;
 - d) details of any complaints and enquiries received in relation to noise generated by the project within the first 90 days of operation;
 - e) an assessment of night-time use of audible alarm systems;
 - f) a statement of whether the Site is in compliance with noise limits outlined in condition 2.13; and
 - g) any additional noise mitigation measures and timetables for implementation.
- 3.7 Within 28 days of conducting the noise monitoring referred to under condition 3.6 of this approval, the Proponent shall provide the Director-General and the DECC with a copy of the report. If the noise monitoring report identifies any non-compliance with the noise limits imposed under this approval (refer condition 2.13), the Proponent shall detail what additional measures would be implemented to ensure compliance, clearly indicating who would implement these measures, when these measures would be implemented, and how the effectiveness of these measures would be measured and reported to the Director-General.

- 3.8 The requirements of conditions 3.6 and 3.7 shall be repeated within 90 days of the project exceeding an export rate of 33 million tonnes of coal per annum.

4. COORDINATION OF PORT WORKS AND COAL EXPORT ACTIVITIES

Coordinated Environmental Monitoring and Management Protocol

- 4.1 Prior to the commencement of operation of the project, or within such period as otherwise agreed by the Director-General, the Proponent shall develop, in consultation with owner/operator of the existing Kooragang Coal Loader, a **Coordinated Environmental Monitoring and Management Protocol** to provide a framework for the coordinated and cooperative monitoring and management of environmental impacts from the developments. The Protocol shall include, but not necessarily be limited to:
- a) procedures for access to, and provision of, monitoring data from each development, particularly in relation to dust and noise emissions;
 - b) the respective remediation and redevelopment works;
 - c) arrangements for coordinated and cooperative monitoring of ambient environmental impacts, including agreements relating to sharing of monitoring networks/ infrastructure, coordinated interpretation of monitoring results and coordination dissemination of monitoring results to relevant parties;
 - d) measures to ensure a coordinated and cooperative approach to the management of common or cumulative environmental impacts from the developments;
 - e) arrangements for communication between the parties, including designated contact persons and contact details;
 - f) notification procedures in the event of an incident at either development that may impact on the other development, or generate a significant common or cumulative impact;
 - g) any agreement for participation in the development of any of the management plans or monitoring programs required under this approval;
 - h) mechanism for review of the Protocol from time to time; and
 - i) such other matters as parties may agree.

The Applicant shall provide a copy of the Protocol to the Director-General and the DECC as soon as practicable after agreement on the terms of the Protocol.

Coordinated Works Program

- 4.2 Prior to the commencement of construction of any component of the project, or within such period as otherwise agreed by the Director-General, the Proponent shall develop, in consultation with NSW Maritime, a **Coordinated Works Program** to ensure that the requirements of this approval, and the conditions imposed on the development the subject of development consent DA-134-3-2003-i (dredging and remediation of the South Arm of the Hunter River) are met and coordinated where the relevant works are interrelated. The Program shall specifically focus on requirements for coordination of works in and around the Hunter River foreshore, ecological monitoring and management, and scheduling of dredging and fill/ preloading activities.

Coordination of Cumulative Dust Studies

- 4.3 The Proponent shall participate in any cumulative dust study that may be commissioned by the Department, in consultation with DECC. Any such study shall be focused on cumulative dust impacts from major port and industrial sources in the Lower Hunter Estuary on potentially affected residential and sensitive receptors, with specific reference to receptors in Fern Bay, Stockton, Mayfield and Carrington. The extent of the Proponent's involvement in such a study shall be agreed with and to the satisfaction of the Director-General, and shall include, but not necessarily be limited to:
- a) provision of monitoring data associated with the environmental performance of the project;
 - b) provision of management and auditing documentation associated with the project and relevant to the study;

- c) access to the project and relevant technical and environmental experts associated with the project;
- d) arrangements for any financial contributions to cover the reasonable expenses associated with the study; and
- e) such other matters as the Proponent and the Director-General may agree.

5. COMPLIANCE MONITORING AND TRACKING

Compliance Tracking Program

- 5.1 The Proponent shall develop and implement a **Compliance Tracking Program** to track compliance with the requirements of this approval. The Program shall include, but not necessarily limited to:
- a) provisions for periodic review of the compliance status of the project against the requirements of this approval;
 - b) provisions for periodic reporting of compliance status to the Director-General;
 - c) a program for independent environmental auditing at least annually, or as otherwise agreed by the Director-General, in accordance with *ISO 19011:2002 - Guidelines for Quality and/ or Environmental Management Systems Auditing*; and
 - d) mechanisms for rectifying any non-compliance identified during environmental auditing or review of compliance.

6. COMMUNITY INFORMATION, CONSULTATION AND INVOLVEMENT

- 6.1 Subject to confidentiality, the Proponent shall make all documents required under this approval available for public inspection on request.

Complaints and Enquiries Procedure

- 6.2 Prior to the commencement of construction of the project, the Proponent shall ensure that the following are available for community complaints and enquiries for the life of the project (including construction and operation):
- a) a telephone number on which complaints and enquiries about construction and operational activities at the Site may be registered.
 - b) a postal address to which written complaints and enquires may be sent.
 - c) an email address to which electronic complaints and enquiries may be transmitted.

The telephone number, the postal address and the email address shall be displayed on a sign near the entrance to the Site, in a position that is clearly visible to the public, and which clearly indicates the purposes of the sign. This information is also to be provided on the Proponent's website.

- 6.3 The Proponent shall record details of all complaints received through the means listed under condition 6.2 of this approval in an up-to-date Complaints Register. The Register shall record, but not necessarily be limited to:
- a) the date and time, where relevant, of the complaint.
 - b) the means by which the complaint was made (telephone, mail or email).
 - c) any personal details of the complainant that were provided, or if no details were provided, a note to that effect.
 - d) the nature of the complaint.
 - e) record of operational and meteorological condition contributing to the complaint.
 - f) any action(s) taken by the Proponent in relation to the complaint, including any follow-up contact with the complainant.
 - g) if no action was taken by the Proponent in relation to the complaint, the reason(s) why no action was taken.

The Complaints Register shall be made available for inspection by the Director-General upon request.

Provision of Electronic Information

- 6.4 The Proponent shall establish and maintain a new website, or dedicated pages within its existing website for the provision of electronic information associated with the project. The Proponent shall publish and maintain up-to-date information on this website or dedicated pages including, but not necessarily limited to:
- a) a copy of the documents referred to under condition 1.1 of this approval, and any documentation supporting modifications to this approval that may be granted from time to time;
 - b) a copy of this approval and each relevant environmental approval, licence or permit required and obtained in relation to the project;
 - c) a copy of each strategy, plan and program required under this approval; and
 - d) the outcomes of compliance tracking in accordance with condition 5.1 of this approval.

7. ENVIRONMENTAL MANAGEMENT

Environmental Representative

- 7.1 Prior to the commencement of construction of the project, or otherwise agreed by the Director-General, the Proponent shall nominate a suitably qualified and experienced Environmental Representative(s) for the approval of the Director-General. The Proponent shall employ the Environmental Representative(s) on a full-time basis, or as otherwise agreed by the Director-General, during the operation of the project. The Environmental Representative(s) shall be:
- a) the principal contact point in relation to the environmental performance of the project;
 - b) responsible for all management plans and monitoring programs required under this approval;
 - c) responsible for considering and advising on matters specified in the conditions of this approval, and all other licences and approvals related to the environmental performance and impacts of the project;
 - d) responsible for receiving and responding to complaints in accordance with condition 6.2 of this approval; and
 - e) given the authority and independence to require reasonable steps be taken to avoid or minimise unintended or adverse environmental impacts, and failing the effectiveness of such steps, to direct that relevant actions be ceased immediately should an adverse impact on the environment be likely to occur.

Construction Environmental Management Plan

- 7.2 Prior to the commencement of construction of the project, the Proponent shall prepare and implement a **Construction Environmental Management Plan** to outline environmental management practices and procedures to be followed during construction of the project. The Plan shall be prepared in accordance with *Guideline for the Preparation of Environmental Management Plans* (DIPNR 2004) and shall include, but not necessarily be limited to:
- a) a description of all activities to be undertaken on the Site during construction including an indication of stages of construction, where relevant;
 - b) statutory and other obligations that the Proponent is required to fulfil during construction including all approvals, consultations and agreements required from authorities and other stakeholders, and key legislation and policies;
 - c) details of how the environmental performance of the construction works will be monitored, and what actions will be taken to address identified adverse environmental impacts. In particular, the following environmental performance issues shall be addressed in the Plan:
 - i) measures to monitor and manage dust emissions;
 - ii) measures to monitor and minimise soil erosion and the discharge of sediment and other pollutants to lands and/ or waters during construction activities;
 - iii) measures to monitor and control noise emissions during construction works;
 - d) a description of the roles and responsibilities for all relevant employees involved in the construction of the project;
 - e) the additional studies listed under condition 7.3 of this approval;
 - f) a traffic control plan to detail the various traffic control measures to be used for construction traffic access connections to the classified road network; and

- g) complaints handling procedures during construction.

The Plan shall be submitted for the approval of the Director-General no later than one month prior to the commencement of any construction works associated with the project, or within such period otherwise agreed by the Director-General. Construction works shall not commence until written approval has been received from the Director-General.

- 7.3 As part of the Construction Environmental Management Plan for the project required under condition 7.2 of this approval, the Proponent shall prepare and implement the following:
- a) where soil testing prior to the commencement of construction identifies the presence of acid sulfate soils, an **Acid Sulfate Soil Management Plan** prepared in accordance with guidance provided in *Acid Sulfate Soil Manual* (Acid Sulfate Soil Management Advisory Committee, 1998);
 - b) a **Construction Surface Water Management Plan** to detail how surface water and stormwater will be managed on the Site during construction. The Plan shall include use of appropriately-sized stormwater controls, in accordance with *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004). The Plan shall include specific measures to avoid sediment-laden stormwater from entering Deep Pond, wetland areas or the Hunter River, and a monitoring program for stormwater leaving the Site;
 - c) a **Construction Noise Management Plan** to detail how construction noise and vibration impacts would be minimised and managed, including, but not necessarily limited to:
 - i) details of construction activities and a schedule for construction works;
 - ii) identification of construction activities that have the potential to generate noise and/ or vibration impacts on surrounding land uses, particularly residential areas;
 - iii) a detailed description of what actions and measures would be implemented to ensure that these works would comply with the relevant noise and vibration criteria/ guidelines;
 - iv) procedures for notifying residents of construction activities that are likely to effect their noise and vibration amenity, as well as procedures for dealing with and responding to noise complaints; and
 - v) a description of how the effectiveness of these actions and measures would be monitored during the proposed works, clearly indicating how often this monitoring would be conducted, how the results of this monitoring would be recorded; and, if any non-compliance is detected.
 - d) a **Construction Traffic Management Protocol** to detail how heavy vehicle movements associated with the project will be managed during construction, including Site preparation and fill/ preloading activities. The Protocol shall specifically address the movement of oversize loads to and from the Site, the management of construction traffic, restrictions to the hours of heavy vehicle movements to avoid road use conflicts, and the transport of construction waste materials. In addition to approval from the Director-General, the Construction Traffic Management Protocol shall be submitted for the approval of the RTA and Council.

- 7.4 In the event that construction of the project is phased up to the maximum capacity specified under condition 1.5, the requirements of conditions 7.3 and 7.4 shall be repeated prior to the commencement of construction of each phase of the project.

Operation Environmental Management Plan

- 7.5 Prior to the commencement of operation of the project, the Proponent shall prepare and submit for the approval of the Director-General an **Operation Environmental Management Plan** (OEMP) to detail an environmental management framework, practices and procedures to be followed during the operation of the project. The Plan shall be consistent with the Department's *Guideline for the Preparation of Environmental Management Plans* (DIPNR 2004), and shall include, but not necessarily be limited to:
- a) a description of all activities to be undertaken on the Site during operation including an indication of stages of operation, where relevant;

- b) statutory and other obligations that the Proponent is required to fulfil during operation including all approvals, consultations and agreements required from authorities and other stakeholders, and key legislation and policies;
- c) details of how the environmental performance of the operations will be monitored, and what actions will be taken to address identified adverse environmental impacts. In particular, the following environmental performance issues shall be addressed in the Plan:
 - i) measures to monitor and manage dust emissions;
 - ii) measures to monitor and minimise soil erosion and the discharge of sediment and other pollutants to lands and/ or waters during operation;
 - iii) measures to monitor and control noise emissions during operation;
- d) a description of the roles and responsibilities for all relevant employees involved in the operation of the project;
- e) the additional studies listed under condition 7.6 of this approval; and
- f) complaints handling procedures during operation.

The Operation Environmental Management Plan shall be made available for inspection by the public upon request following its approval by the Director-General.

7.6 As part of the Operation Environmental Management Plan for the project required under condition 7.5 of this approval, the Proponent shall prepare and implement the following:

- a) a **Dust Management Plan** to outline measures to minimise and manage any impacts from the operation of the project on local air quality. The Plan shall include, but not necessarily be limited to:
 - i) identification of all major sources of dust emissions that may occur as result of the operation of the project;
 - ii) description of the procedures to manage the dust emissions from the sources identified;
 - iii) identification of the locations where monitoring of dust emissions is to be undertaken;
 - iv) procedures for monitoring dust emissions from the project, in accordance with the requirements of this approval and the Environment Protection Licence for the project;
 - v) protocols for regular maintenance of plant and equipment, to minimise the potential for fugitive dust emissions; and
 - vi) description of procedures to be undertaken if any non-compliance is detected.
- b) a **Noise Management Plan** to outline monitoring, management procedures and measures to minimise total operational noise emissions from the project. The Plan shall also include, but not necessarily be limited to:
 - i) identification of all relevant receivers and the applicable criteria at those receivers commensurate with the noise limits specified under this approval;
 - ii) identification of activities that will be carried out in relation to the project and the associated noise sources;
 - iii) assessment of project noise impacts at the relevant receivers against the noise limits specified under this approval;
 - iv) details of all management methods and procedures that will be implemented to control individual and overall noise emissions from the Site during the project;
 - v) details regarding the procurement process to guarantee that equipment levels meet the noise levels as provided in the documents listed in condition 1.1;
 - vi) development of reactive and pro-active strategies for dealing promptly with any noise complaints;
 - vii) noise monitoring and reporting procedures; and
 - viii) regular internal audits of compliance of all plant and equipment with acceptable design noise.
- c) a **Water Management Plan** to outline the water management system for the Site. The Plan shall include, but not necessarily be limited to:
 - i) predicted Site water balance including the water supply system;

- ii) details regarding water management structures such as settling ponds, water tanks and the water management system for dredge sea water;
 - iii) locations and design specifications for all water diversions from undisturbed runoff areas including channel design and stabilisation, sediment retention storages and other structures;
 - iv) details on the internal drainage system including bunding, drainage channels, dewatering sumps and any pipelines;
 - v) procedures for the management of groundwater encountered on Site and any temporary dewatering facilities; and
 - vi) procedures to be implemented to minimise potential surface water impacts.
- d) a **Spontaneous Combustion Management Protocol** to outline measures to minimise and manage the spontaneous combustion of the coal stockpiles. The Plan shall include, but not necessarily be limited to:
- i) coal stockpile management measures;
 - ii) monitoring of potential causes of spontaneous combustion events; and
 - iii) corrective action in the event of spontaneous combustion.

7.7 The Operation Environmental Management Plan required under conditions 7.5 and 7.6 shall periodically reviewed and maintained, to reflect any phasing of implementation of the project, and any operational changes that may be made from time to time.

8. ENVIRONMENTAL REPORTING

Incident Reporting

- 8.1 The Proponent shall notify the Director-General of any incident with actual or potential significant off-Site impacts on people or the biophysical environment as soon as practicable after the occurrence of the incident. The Proponent shall provide written details of the incident to the Director-General within seven days of the date on which the incident occurred.
- 8.2 The Proponent shall maintain a register of accidents, incidents and potential incidents with actual or potential significant off-Site impacts on people or the biophysical environment. The register shall be made available for inspection at any time by the independent qualified person or team conducting the Environmental Audit and/or the Director-General.
- 8.3 The Proponent shall meet the requirements of the Director-General to address the cause or impact of any incident, as it relates to this approval, reported in accordance with condition 8.1 of this consent, within such period as the Director-General may agree.
-

Modification of Minister's Approval

Section 75W of the *Environmental Planning and Assessment Act 1979*

I, the Executive Director, Major Project Assessments Division of the Department of Planning, in accordance with the Instrument of Delegation issued by the Minister for Planning, on 7 June 2007, pursuant to section 75W of the *Environmental Planning and Assessment Act 1979* determine to approve of the modification to the approval referred to in Schedule 1 in the manner set out in Schedule 2.



Executive Director, Major Project Assessments
As delegate for the Minister for Planning

Sydney,

27 November 2007

SCHEDULE 1

Project Approval:

granted by the Minister for Planning on 13 April 2007 (MP 06_0009).

For the following:

Construction and operation of a coal export terminal with capacity of up to 66 million tonnes per annum, including:

- foundation preparation/capping of a rail corridor traversing the existing Kooragang Island Waste Emplacement Facility for the development of the rail spurs, rail sidings and rail loops;
- construction of rail spurs, rail sidings and rail loops, rail overpass, train unloading stations and connecting conveyors;
- reuse of dredged materials from the south arm of the Hunter River as preload and engineering fill for construction of the coal storage area, rail corridor and wharf facilities;
- construction of a coal storage area including coal stockpiles, conveyors, transfer points and combined stacker/reclaimers;
- construction of wharf facilities, shiploaders, conveyors and buffer bins;
- development of water management infrastructure including Site drainage works, stormwater settlement ponds, primary and secondary settling ponds, Site water pond, water tanks and stockpile spray system;

- installation of electricity reticulation and control systems;
- development of access roads and internal roads;
- construction of administration and workshop buildings;
- other associated minor infrastructure, plant, equipment and activities; and
- operation of the coal export terminal up to a capacity of 66 million tonnes per annum of coal, including the unloading of coal trains, the stockpiling of coal, and the loading of coal to ships via the wharf facilities and shiploaders.

Modification:

The subdivision of land to facilitate the registration of leasehold over the land area by the State Property Authority to allow NCIG to lease the land for the construction and operation of the Coal Export Terminal, Kooragang Island, in the Newcastle local government area. Subdivision of Lot 122 DP 874949, Lot 2 DP 581473, Lot 6 DP 1015754, Lots 71 and 74 DP 1119950 and Lot 20 DP 262325.

SCHEDULE 2

The Approval is modified by:

1. Delete condition 1.1 and replace with the following:

1.1 The Proponent shall carry out the project generally in accordance with the:

- a) Major Projects Application 06_0009;
- b) *Environmental Assessment: Newcastle Coal Infrastructure Group Coal Export Terminal*, prepared by Resource Strategies Pty Ltd and dated July 2006;
- c) *Responses to Submissions*, prepared by Newcastle Coal Infrastructure Group and dated December 2006;
- d) Plan of subdivision titled *Stage 1 Proposed Subdivision of Lot 122 DP 874949, Lot 2 DP 581473, Lot 6 DP 1015754 and Lots 71 and 74 DP 1119950, Stages 2 and 3 Proposed Subdivision of Lot 20 DP 262325* (surveyors reference HW43.01.03.00) prepared by Paul John Stivano and undated; and plan of subdivision titled *Plan of Subdivision of Lot 122 DP 874949, Lot 2 DP 581473, Lot 6 DP 1015754 and Lots 71 and 74 DP 1119950* (surveyors reference HW43.01.03.00) prepared by Paul John Stivano and dated 2 November 2007; and
- e) the conditions of this approval.

2. Delete condition 1.2 and replace with the following:

1.2 In the event of an inconsistency between:

- a) the conditions of this approval and any document listed from condition 1.1a) to 1.1d) inclusive, the conditions of this approval shall prevail to the extent of the inconsistency; and
- b) any of the documents listed from condition 1.1a) to 1.1d) inclusive, the most recent document shall prevail to the extent of the inconsistency.

3. Insert the following condition after 1.7:

1.7(a) Prior to the issue of the Subdivision Certificate, the Proponent shall provide to the relevant certifying authority evidence that all easements and covenants required by this approval have been or will be registered for the subdivision.

Modification of Minister's Approval

Section 75W of the *Environmental Planning and Assessment Act 1979*

The Planning Assessment Commission of New South Wales (**the Commission**) as delegate of the Minister for Planning and Infrastructure under delegation enforced from 1 October 2011, approves the modification application referred to in Schedule 1, subject to the conditions specified in Schedule 2.



Mr Garry Payne AM
Member of the Commission



Mr Brian Gilligan
Member of the Commission

Sydney

13 May 2013

SCHEDULE 1

Project Approval:

MP 06_0009 granted by the then Minister for Planning on 13 April 2007.

For the following:

Construction and operation of a coal export terminal with capacity of up to 66 million tonnes per annum, including:

- foundation preparation/capping of a rail corridor traversing the existing Kooragang Island Waste Emplacement Facility for the development of the rail spurs, rail sidings and rail loops;
- construction of rail spurs, rail sidings and rail loops, rail overpass, train unloading stations and connecting conveyors;
- reuse of dredged materials from the south arm of the Hunter River as preload and engineering fill for construction of the coal storage area, rail corridor and wharf facilities;
- construction of a coal storage area including coal stockpiles, conveyors, transfer points and combined stacker/reclaimers;
- construction of wharf facilities, shiploaders, conveyors and buffer bins;
- development of water management infrastructure including Site drainage works, stormwater settlement ponds, primary and secondary settling ponds, Site water pond, water tanks and stockpile spray system;
- installation of electricity reticulation and control systems;
- development of access roads and internal roads;

- construction of administration and workshop buildings;
- other associated minor infrastructure, plant, equipment and activities; and
- operation of the coal export terminal up to a capacity of 66 million tonnes per annum of coal, including the unloading of coal trains, the stockpiling of coal, and the loading of coal to ships via the wharf facilities and shiploaders.

Modification:

(MP 06_0009 MOD 2): Modification to construct and operate a rail flyover which includes the following components:

- grade separation of the inbound track for the NCIG Northern Rail Spur (also referred to as the high capacity optional inlet rail spur and rail sidings);
- realignment of the inbound (western) track of the Kooragang Island Main Line;
- realignment and lowering of the outbound (eastern) track of the Kooragang Island Main Line; and
- associated ancillary infrastructure.

To update agency names throughout the approval.

SCHEDULE 2

1. In the listing of abbreviations and definitions in Schedule 2, delete references to and the definitions for “DEC”, “Department”, “Director-General”, “DNR”, “EPA”, “Minister”, “RTA” and insert in alphabetical order the following:

Department	Department of Planning and Infrastructure
Director-General	Director-General of the Department of Planning and Infrastructure, or nominee
EPA	Environment Protection Authority
Minister	Minister for Planning and Infrastructure, or nominee
RMS	Roads and Maritime Services

2. In the listing of abbreviations and definitions in Schedule 2, insert in alphabetical order the following:

Conservation Bond An irrevocable and unconditional undertaking by an Australian bank which is an eligible financial institution for the purposes of Treasury Circular NSW TC08/01 dated 21 February 2008 as amended, supplemented or substituted from time to time to pay the face value of that undertaking (being such amount as is determined in accordance with condition 2.20A) on demand.

High Capacity Optional Inlet Rail Spur and Rail Sidings

Rail infrastructure delineated on Figure 2-1 of the document referred to under condition 1.1b), as modified by condition 1.1e)

OEH Office of Environment and Heritage

Viable breeding population (in relation to *Litoria aurea*)

Success in the establishment of both a breeding population and a viable population.

Breeding population (in relation to *Litoria aurea*)

Evidence of natural breeding events occur in two seasons (September to March) and include the presence of eggs, tadpoles and/or metamorphs that were not released from captive breeding stock in at least one pond. The breeding events do not have to be recorded over two consecutive seasons.

Viable population (in relation to *Litoria aurea*)

Evidence of at least five reproductively mature individuals are identified within new aquatic and/or terrestrial habitat in each of the two seasons when breeding events occurred. Such evidence will include presence of calling males with nuptial pads and gravid females.

PWCS Port Waratah Coal Services

3. Delete references to DEC and replace with EPA in conditions 2.12, 2.14, 3.2, 3.3, 3.4, 3.7 and 4.3 (except in relation to document authors).
4. Delete reference to DEC and replace with OEH in condition 2.16 (except in relation to document authors).
5. Delete references to RTA and replace with RMS in conditions 2.21, 2.22, 2.24, 2.25, 2.27, 2.28, 2.29, 2.30, 2.31, 2.32, 2.33, 2.34, 2.35, 2.36, 2.37 and 7.3d) (except in relation to document authors).

6. Delete reference to DECC in condition 4.1 and replace with EPA and OEH.
7. Delete reference to NSW Maritime in condition 4.2 and replace with RMS.
8. Delete condition 1.1 and replace with the following:
 - 1.1 The Proponent shall carry out the project generally in accordance with the:
 - a) Major Projects Application 06_0009;
 - b) *Environmental Assessment: Newcastle Coal Infrastructure Group Coal Export Terminal*, prepared by Resource Strategies Pty Ltd and dated July 2006;
 - c) *Responses to Submissions*, prepared by Newcastle Coal Infrastructure Group and dated December 2006;
 - d) modification application MP 06_0009 MOD 1, related to the plan of subdivision titled *Stage 1 Proposed Subdivision of Lot 122 DP 874949, Lot 2 DP 581473, Lot 6 DP 1015754 and Lots 71 and 74 DP 1119950, Stages 2 and 3 Proposed Subdivision of Lot 20 DP 262325* (surveyors reference HW43.01.03.00) prepared by Paul John Stivano and undated; and plan of subdivision titled *Plan of Subdivision of Lot 122 DP 874949, Lot 2 DP 581473, Lot 6 DP 1015754 and Lots 71 and 74 DP 1119950* (surveyors reference HW43.01.03.00) prepared by Paul John Stivano and dated 2 November 2007;
 - e) modification application MP 06_0009 MOD 2 and supporting document titled *Newcastle Coal Infrastructure Group Coal (NCIG) Export Terminal Rail Flyover Modification Environmental Assessment* prepared by NCIG and dated June 2012, as modified by the Response to Submissions document prepared by NCIG and dated 6 December 2012; and
 - f) the conditions of this approval.
9. Delete condition 1.2 and replace with the following:
 - 1.2 In the event of an inconsistency between:
 - a) the conditions of this approval and any document listed from condition 1.1a) to 1.1e) inclusive, the conditions of this approval shall prevail to the extent of the inconsistency; and
 - b) any of the documents listed from condition 1.1a) to 1.1e) inclusive, the most recent document shall prevail to the extent of the inconsistency.
10. Delete condition 1.6 and replace with the following:
 - 1.6. The Proponent may only proceed to construct the High Capacity Optional Inlet Rail Spur and Rail Sidings upon receipt of the Director-General's satisfaction that:
 - a) the Compensatory Habitat and Ecological Monitoring Program required under condition 2.20 is being implemented according to the timeframes required, or to the extent agreed by the Director-General; and
 - b) the Proponent has complied with rail infrastructure design requirements referred to in condition 2.39 of this approval.
11. Delete condition 2.17 and replace with the following:
 - 2.17 The Proponent shall design and construct relevant rail infrastructure associated with the project to include culverts, underpasses or other similar measures to

permit the movement of *Litoria aurea* and other amphibian species under the rail infrastructure, and shall have consideration of existing and proposed frog habitat areas and movement corridors. The culverts, underpasses or other similar measures shall be installed to include suitable habitat for *Litoria aurea* and to provide protection from predators, and shall be designed in consultation with the OEH and PWCS.

12. Insert a new condition 2.19A, as follows:

2.19A The Proponent shall minimise clearing of native vegetation, edge effects and fragmentation to the greatest extent practicable and shall maintain retained native vegetation and habitat on Site. In relation to the clearing required for the High Capacity Optional Inlet Rail Spur and Rail Sidings, the amount of clearing to the west of the existing Kooragang Island Main Line shall be limited to a maximum of 2.6 hectares including 1.32 hectares of *Coastal Saltmarsh in the NSW North Coast, Sydney Basin and South East Corner Bioregions Endangered Ecological Community*, and 0.13 hectares of *Freshwater Wetlands on Coastal Floodplains of the NSW North Coast, Sydney Basin and South East Corner Bioregions Endangered Ecological Community*.

13. Delete condition 2.20 and replace with the following:

2.20 The Proponent shall develop and submit for the approval of the Director-General, a Compensatory Habitat and Ecological Monitoring Program to detail how habitat and ecological values lost as a result of the project will be offset, and how ecological monitoring will be undertaken to inform on-going ecological management. The Program shall be developed in consultation with the OEH, and shall include, but not necessarily be limited to:

- a) ecological surveys, following detailed design of the project, to identify and quantify the extent and types of habitat that would be lost or degraded as a result of the project;
- b) provision for establishment of compensatory habitat for each relevant component of the project as follows, unless otherwise agreed by the Director-General:
 - i) for *Litoria aurea* habitat lost as a result of the project, establishment of 75 hectares of compensatory habitat in a location agreed by the Director-General, in consultation with the OEH. The compensatory habitat shall include viable and sustainable populations of *Litoria aurea* within a mosaic of wetland, terrestrial and breeding habitat, which includes foraging, sheltering, and wintering habitat attributes and movement corridors, in order to maximise the potential reproductive output of the *Litoria aurea* population. This amount of compensatory habitat may be reduced if the Proponent can determine, using a scientific methodology agreed to the Department, in consultation with the OEH, that the population of *Litoria aurea* impacted by the project is less than 37.5 hectares. The reduced amount shall be agreed to by the Department, in consultation with the OEH, by 30 June 2015;
 - ii) for migratory shore bird habitat (including endangered ecological communities) lost as a result of the project, including filling in of parts of Deep Pond and Swan Pond from the construction of rail and associated infrastructure, the establishment of 8 hectares of compensatory habitat in a location agreed by the Director-General, in consultation with the OEH. The commencement of compensatory habitat works shall occur within six months of the commencement of

- construction of the High Capacity Optional Inlet Rail Spur and Rail Sidings, or as otherwise agreed by the Director-General;
- c) provision for on-going ecological studies and migratory bird monitoring in and around Deep Pond and Swan Pond, to investigate bird behaviour and to inform the design process for components of the project affecting these ponds;
 - d) provision for the funding of works required under this condition, to be managed by a mechanism that provides sound and legally enforceable means of allocating resources for ongoing adaptive management and review of the performance of compensatory habitat works for the life of the project;
 - e) provision for research into *Litoria aurea* in and around Kooragang Island and the Hunter Estuary, as may be identified by the Proponent in consultation with relevant ecological and research groups;
 - f) provision for ameliorative works on land surrounding the project Site, as may be negotiated by the Proponent with the relevant adjacent land owners, to improve or restore natural hydrology and ecosystems, remove mangrove communities where relevant and restore locally-endemic Endangered Ecological Communities;
 - g) consideration of coordinating compensatory and ameliorative works with similar requirements for other developments, including with respect to the development the subject of development consent DA-134-3-2003-i (dredging and remediation of the South Arm of the Hunter River);
 - h) monitoring requirements for compensatory habitat works and other ecological amelioration proposed under the Program; and
 - i) timing and responsibilities for the implementation of the provisions of the Program. The Proponent shall provide the following commitments in the Program, or as otherwise agreed by the Director-General:
 - i. before 31 December 2013, the Proponent shall secure compensatory habitat locations required under condition 2.20b);
 - ii. before 31 December 2014, the Proponent shall have completed the migratory shorebird compensatory habitat works required under condition 2.20b)ii);
 - iii. before 31 December 2016, the Proponent shall have completed the *Litoria aurea* compensatory habitat works required under condition 2.20b)i). If a viable breeding population of *Litoria aurea* has not been established as part of the implemented compensatory habitat works then the Proponent is required to purchase an equivalent area of land that is known to contain the species and manage this land for the enduring conservation of the species in perpetuity. Any land required to be purchased is required to be completed by 31 December 2019.

14. Insert a new condition 2.20A as follows:

2.20A Financial surety of the requirements specified in condition 2.20 will be provided by the Proponent to the Department in the form of a Conservation Bond. Within 3 months of the date of the approval of modification application MP 06_0009 MOD 2, referred to in condition 1.1e), the Proponent shall determine the sum of the Conservation Bond to the satisfaction of the Director-General, in consultation with OEH, based on the following:

- a) calculating the full cost of fulfilling its compensatory habitat obligations outlined in condition 2.20, in perpetuity, (including any land acquisition costs). These costs need to consider research, establishment of habitat, ongoing monitoring and management of the habitat.

- b) employing a suitably qualified quantity surveyor to verify the calculated costs.

The Conservation Bond is required to be lodged with the Department by 30 July 2013, or as otherwise agreed by the Director-General, to ensure that the biodiversity offsets outlined in condition 2.20 are implemented in accordance with the performance and timing commitments provided in the Compensatory Habitat and Ecological Monitoring Program. If the offset is completed in accordance with the performance and timing commitments in the Compensatory Habitat and Ecological Monitoring Program to the satisfaction of the Director-General, in consultation with the OEH, the Director-General will release the bond. If the offset is not completed in accordance with the performance and timing commitments in the Compensatory Habitat and Ecological Monitoring Program, the Director-General may, in consultation with OEH, call in all or part of the Conservation Bond, and arrange for the satisfactory completion of the relevant works.

The sum of the Conservation Bond may be reduced subject to the successful performance of the compensatory works. The reduction of the Conservation Bond would be at the agreement of the Director-General, in consultation with the OEH. In relation to *Litoria aurea*, successful performance works include the identification of a viable breeding population.

- 15. Insert a new condition 2.20B as follows:

2.20B In the event that the project is modified such that it results in impacts to biodiversity different to those assessed in the document referred to in condition 1.1b), the Proponent is required to submit for the approval of the Director-General, a revised Compensatory Habitat and Ecological Monitoring Program within three months of any approval.

- 16. Delete condition 2.21 and replace with the following:

2.21 Prior to the commencement of each stage of construction of the project, including fill/preload activities, the Proponent shall develop and submit for the approval of the RMS and Council, construction traffic control measures to be implemented for the project. The construction traffic control measures shall include measures to ensure that project traffic does not adversely affect traffic movements on Cormorant Road during peak traffic times.

- 17. Delete condition 2.39 and replace with the following:

2.39 The Proponent shall consult with PWCS and ARTC, and meet the reasonable requirements of ARTC with respect to the design of the project, including those components of the project that may affect the design, connection and operation of existing and proposed ARTC and PWCS rail infrastructure assets.

- 18. Delete condition 2.40, insert a new heading and condition 2.40 as follows:

UTILITIES AND SERVICES

2.40 Utilities, services and other infrastructure potentially affected by construction shall be identified prior to construction to determine requirements for access to, diversion, protection, and/or support. Consultation with the relevant owner

and/or provider of services that are likely to be affected by the project shall be undertaken to make suitable arrangements for access to, diversion, protection, and/or support of the affected infrastructure as required. The cost of any such arrangements shall be borne by the Proponent, unless otherwise agreed by the utility or service provider.

19. Insert a new heading and conditions 2.45A and 2.45B as follows:

Groundwater Monitoring and Management

2.45A Prior to the commencement of construction of the High Capacity Optional Inlet Rail Spur and Rail Sidings the Proponent shall sample and characterise the quality of the existing groundwater in and around the rail infrastructure corridor to determine groundwater quality trigger values.

2.45B Prior to the commencement of construction, the Proponent must develop a long-term groundwater monitoring program in and around the High Capacity Optional Inlet Rail Spur and Rail Sidings to identify changes in groundwater quality from pre-construction groundwater conditions. The groundwater monitoring program will include an action plan should groundwater quality trigger values be exceeded during the course of the monitoring program and the Proponent shall rectify any adverse impact on groundwater that may be detected. Groundwater monitoring must commence at least one month prior to the commencement of construction.

20. Delete condition 2.53 and replace with the following:

2.53 The Proponent shall engage an appropriately qualified person to audit construction of the rail infrastructure over land use as part of the KIWEF against the commitments contained in the documents referred to in condition 1.1, including the High Capacity Optional Inlet Rail Spur and Rail Sidings. The auditor shall provide the Director-General and the EPA with quarterly reports on the disturbance and recapping of the waste emplacement area during construction. In the event of any deviation from the commitments made in the abovementioned documents, prior approval should be sought from the EPA, and any deviation from the commitments shall be described in detail and reasons for the change provided and fully justified.

21. Delete condition 3.8 and replace with the following:

3.8 The requirements of conditions 3.6 and 3.7 shall be repeated within 90 days of the commencement of operation of each stage of the project, including the operation of the High Capacity Optional Inlet Rail Spur and Rail Sidings.

22. Insert a new condition 5.2 as follows:

5.2 The independent environmental audit referred to in condition 5.1c) shall:

- (a) be conducted by a suitably qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General;
- (b) include consultation with the relevant agencies;
- (c) assess the environmental performance of the project and assess whether it is complying with the requirements in this approval, and any other relevant approvals and relevant EPL/s;
- (d) review the adequacy of any approved strategy, plan or program required under the abovementioned approvals; and

- (e) recommend measures or actions to improve the environmental performance of the project, and/or any strategy, plan or program required under these approvals.

Note: This audit team must be led by a suitably qualified auditor, and include experts in biodiversity, air quality, noise, surface water and groundwater management and other fields as specified by the Director-General.

23. Add the following requirement 7.2 c) iv) and v) into condition 7.2, following requirement 7.2 c) iii) as follows:

- iv) measures to monitor and manage groundwater impacts, particularly in the vicinity of the High Capacity Optional Inlet Rail Spur and Rail Sidings, and
- v) measures to monitor and manage potential Aboriginal Heritage impacts.

24. Add the following requirement 7.2 e) into condition 7.2, following requirement 7.2 d) as follows:

- e) a **Construction Aboriginal Heritage Management Plan** to detail how construction impacts on Aboriginal heritage will be minimised and managed. The plan shall be developed in consultation with the local Aboriginal Community, and include, but not necessarily be limited to:
 - i. a commitment to provide opportunities for representatives of the local Aboriginal community to monitor any initial ground disturbance activities associated with previously undisturbed environments within the project area;
 - ii. procedures for dealing with previously unidentified Aboriginal objects (excluding human remains) including cessation of works in the vicinity, assessment of the significance of the item(s) and determination of appropriate mitigation measures including when works can re-commence by a suitably qualified archaeologist in consultation with the Department, OEH and the local Aboriginal community, and registering of the new site in the OEH's Aboriginal Heritage Information Management System (AHIMS) register;
 - iii. procedures for dealing with human remains, including cessation of works in the vicinity and notification of the Department, NSW Police, OEH and local Aboriginal community and not recommencing any works in the area unless authorised by the OEH and/ or the NSW Police; and
 - iv. heritage training and induction processes for construction personnel (including procedures for keeping records of inductions) and obligations under the conditions of this approval including site identification, protection and conservation of Aboriginal cultural heritage;

25. Delete condition 7.3b) and replace with the following:

- b) a Construction Surface Water Management Plan to detail how surface water and stormwater will be managed on the Site during construction. The Plan shall include use of appropriately sized stormwater controls, in accordance with *Managing Urban Stormwater: Soils and Construction* (Landcom, 2004). The Plan shall also include specific measures to avoid sediment laden stormwater from entering Deep and Swan Ponds, wetland areas or the Hunter River, and a monitoring program for stormwater leaving the Site;

26. Delete condition 7.4 and replace with the following:

7.4 In the event that construction of the project is staged or phased up to the maximum capacity specified under condition 1.5, the requirements of conditions 7.2 and 7.3 shall be repeated prior to the commencement of construction.

27. Add the following requirement 7.5 c) iv) into condition 7.5, following requirement 7.5 c) iii) as follows:

iv) measures to monitor and manage retained onsite native vegetation and habitat.

COMMONWEALTH OF AUSTRALIA
ENVIRONMENT PROTECTION AND BIODIVERSITY CONSERVATION ACT 1999

**DECISION THAT ACTION IS NOT A CONTROLLED ACTION
PROVIDED IT IS UNDERTAKEN IN A PARTICULAR MANNER**

I, ALEX RANKIN, Assistant Secretary, Environment Assessment Branch, Department of the Environment and Heritage, a delegate of the Minister for the Environment and Heritage for the purposes of section 75 of the *Environment Protection and Biodiversity Conservation Act 1999*, decide that the proposed action, set out in the Schedule, is not a controlled action. Provided that the proposed action is taken in the manner described in the Schedule, the provisions of Part 3 of the EPBC Act set out in the Schedule are not controlling provisions.

SCHEDULE

The proposed action to develop a Coal Export Terminal, including associated rail and coal handling infrastructure and wharf/shiploading facilities on the south arm of the Hunter River, Kooragang Island, Newcastle, NSW, and as described in the referral received under the Act on 9 August 2006 and additional information received 11 September and 3 October 2006 (EPBC 2006/2987).

Provisions of Part 3

The relevant provisions of Part 3 are:

- Sections 16 and 17B (Ramsar wetlands);
- Sections 18 and 18A (Listed threatened species); and
- Sections 20 and 20A (Migratory species).

Manner in which the proposed action is to be taken:

The following measures must be taken to ensure that significant impacts are avoided on populations of the listed vulnerable Green and Golden Bell Frog (*Litoria aurea*), listed migratory shorebirds that utilise Deep Pond, and the ecological character of the Hunter Estuary Wetlands Ramsar site.

Green and Golden Bell frog

1. Green and Golden Bell Frogs found on the project site during construction or operation will be removed from the direct disturbance area and placed in adjacent similar habitat within the Kooragang Nature Reserve, and in accordance with the NPWS *Hygiene Protocol for the Control of Disease in Frogs 2001*.
2. The following management measures, as a minimum, will be undertaken to minimise the further spread of amphibian chytrid fungus:
 - The training of all project personnel in site hygiene management in accordance with the NPWS *Hygiene Protocol for the Control of Disease in Frogs 2001*.
 - Procedures will be implemented to inspect mobile plant entering the proposal site during construction activities to ensure the plant is free of soil and/or organic matter and to disinfect tyres and wheels of vehicles entering the proposal site that have been exposed to mud.
3. Rail culverts, to act as frog underpasses, will be designed and constructed along the proposed rail loop and as described in the referral and on Drawing 3, NCIG Coal Export Terminal (NCIG 2006) attached to the referral.
4. The following measures will be undertaken to establish habitat for the Green and Golden Bell Frogs at the frog underpasses, including culverts placed within existing drainage channels that will be retained for use as frog underpasses:
 - Planting of vegetation preferred by the frog species, including Cumbungi (*Typha* sp), spikerushes (*Eleocharis* spp) or sedges (*Schoenoplectus* spp).
 - Placing piles of rocks at either end of, or within, frog underpasses.
 - Establishment of pond areas at either end of the frog underpasses.
5. Project personnel will be prohibited from entering Green and Golden Bell Frog habitat area located outside defined construction areas.

6. Annual monitoring during the breeding season of the Green and Golden Bell Frog will be undertaken on the Coal Export Terminal site until 2020. Thereafter, monitoring will be undertaken on a three yearly basis until 2030. If monitoring indicates declining populations attributable to the development, measures will be implemented, in consultation with the Department, to reverse any decline. Such measures may include control of *Gambusia* populations, further creation or enhancement of frog habitat and dispersal pathways, and establishment of new populations.

Shorebirds

7. Screens, comprising timber paling fences or similar structures, will be placed at intervals along the rail infrastructure to minimise lighting impacts on shorebird habitat along the southern shores of Deep Pond from trains and ground-level rail corridor lighting.
8. Annual monitoring of the Australasian Bittern and shorebird populations utilising Deep Pond will be undertaken during summer (eg peak waterbird usage period) until 2020. Thereafter, monitoring will be undertaken on a three yearly basis until 2030.
9. Monitoring results will be provided on an annual basis to the Department up to 2020 (by 31 March of each year). A summary and analysis of the results will also be provided each three years (by 31 March) addressing any changes in the utilisation patterns of listed migratory shorebirds at Deep Pond since the monitoring commenced. Measures will be implemented to enhance existing habitat, or provide additional habitat, in the event monitoring indicates a decline in listed shorebird usage attributable to construction and operation of the rail loop. Design and construction of any new habitat, or habitat enhancement measures, will be undertaken in consultation with a shorebird specialist.
10. The Department will be notified a minimum of 24 months prior to construction of the northern rail spur, if it proceeds. An assessment of potential impacts on listed shorebird habitat in Deep Pond will be provided at that time, together with a description of any design or other mitigation measures required to avoid significant impacts on listed birds. Such measures may include enhancement of existing habitat and creation of new habitat alongside the northern rail spur embankment. Design and construction of any new habitat, or habitat enhancement measures, will be undertaken in consultation with a shorebird specialist.

Hunter Estuary Ramsar Wetlands

11. A site water management plan, including a surface water monitoring program, will be developed in accordance with the measures outlined in the *Site Water Management Plan (SWMP) (Construction and Operation)* provided in Section 5 of the *Draft Statement of Commitments, Environmental Assessment* (Newcastle Coal Infrastructure Group, July 2006) and Sections 8 & 9 of the *Land Contamination and Groundwater Assessment, Newcastle Coal Infrastructure Group Coal Export Terminal, Kooragang Island, Appendix D* (RCA Australia, June 2006).

Dated this 11th day of October 2006


.....
**ASSISTANT SECRETARY
ENVIRONMENT ASSESSMENT BRANCH
DEPARTMENT OF THE ENVIRONMENT AND HERITAGE**

Environment Protection Licence

Licence - 12693

Licence Details	
Number:	12693
Anniversary Date:	26-October

Licensee
NEWCASTLE COAL INFRASTRUCTURE GROUP PTY LTD
LOCKED BAG 6003
HUNTER REGION MAIL CENTRE NSW 2310

Premises
NCIG COAL TERMINAL
CORMORANT ROAD
KOORAGANG NSW 2304

Scheduled Activity
Coal works
Shipping in bulk

Fee Based Activity	Scale
Coal works	> 5000000 T annual handling capacity
Shipping in bulk	> 500000 T of annual capacity to load and unload

Region
North - Hunter
Ground Floor, NSW Govt Offices, 117 Bull Street
NEWCASTLE WEST NSW 2302
Phone: (02) 4908 6800
Fax: (02) 4908 6810
PO Box 488G
NEWCASTLE NSW 2300

Environment Protection Licence



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Information about this licence

Dictionary

A definition of terms used in the licence can be found in the dictionary at the end of this licence.

Responsibilities of licensee

Separate to the requirements of this licence, general obligations of licensees are set out in the Protection of the Environment Operations Act 1997 ("the Act") and the Regulations made under the Act. These include obligations to:

- ensure persons associated with you comply with this licence, as set out in section 64 of the Act;
- control the pollution of waters and the pollution of air (see for example sections 120 - 132 of the Act);
- report incidents causing or threatening material environmental harm to the environment, as set out in Part 5.7 of the Act.

Variation of licence conditions

The licence holder can apply to vary the conditions of this licence. An application form for this purpose is available from the EPA.

The EPA may also vary the conditions of the licence at any time by written notice without an application being made.

Where a licence has been granted in relation to development which was assessed under the Environmental Planning and Assessment Act 1979 in accordance with the procedures applying to integrated development, the EPA may not impose conditions which are inconsistent with the development consent conditions until the licence is first reviewed under Part 3.6 of the Act.

Duration of licence

This licence will remain in force until the licence is surrendered by the licence holder or until it is suspended or revoked by the EPA or the Minister. A licence may only be surrendered with the written approval of the EPA.

Licence review

The Act requires that the EPA review your licence at least every 5 years after the issue of the licence, as set out in Part 3.6 and Schedule 5 of the Act. You will receive advance notice of the licence review.

Fees and annual return to be sent to the EPA

For each licence fee period you must pay:

- an administrative fee; and
- a load-based fee (if applicable).

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The EPA publication “A Guide to Licensing” contains information about how to calculate your licence fees. The licence requires that an Annual Return, comprising a Statement of Compliance and a summary of any monitoring required by the licence (including the recording of complaints), be submitted to the EPA. The Annual Return must be submitted within 60 days after the end of each reporting period. See condition R1 regarding the Annual Return reporting requirements.

Usually the licence fee period is the same as the reporting period.

Transfer of licence

The licence holder can apply to transfer the licence to another person. An application form for this purpose is available from the EPA.

Public register and access to monitoring data

Part 9.5 of the Act requires the EPA to keep a public register of details and decisions of the EPA in relation to, for example:

- licence applications;
- licence conditions and variations;
- statements of compliance;
- load based licensing information; and
- load reduction agreements.

Under s320 of the Act application can be made to the EPA for access to monitoring data which has been submitted to the EPA by licensees.

This licence is issued to:

NEWCASTLE COAL INFRASTRUCTURE GROUP PTY LTD
LOCKED BAG 6003
HUNTER REGION MAIL CENTRE NSW 2310

subject to the conditions which follow.

Environment Protection Licence

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1 Administrative Conditions

A1 What the licence authorises and regulates

A1.1 This licence authorises the carrying out of the scheduled activities listed below at the premises specified in A2. The activities are listed according to their scheduled activity classification, fee-based activity classification and the scale of the operation.

Unless otherwise further restricted by a condition of this licence, the scale at which the activity is carried out must not exceed the maximum scale specified in this condition.

Scheduled Activity	Fee Based Activity	Scale
Coal works	Coal works	> 5000000 T annual handing capacity
Shipping in bulk	Shipping in bulk	> 500000 T of annual capacity to load and unload

A2 Premises or plant to which this licence applies

A2.1 The licence applies to the following premises:

Premises Details
NCIG COAL TERMINAL
CORMORANT ROAD
KOORAGANG
NSW 2304
PREMISES MARKED AND SHOWN AS "DENOTES DRYLAND" AND "DENOTES WETLAND" BOUNDED BY "DENOTES BOUNDARY OF N.C.I.G. MANAGEMENT AND CONTROL" ON THE PLAN TITLED "PLAN FOR EPA SUBMISSION, NCIG COAL LOADING FACILITY, KOORAGANG ISLAND", PREPARED BY MONTEATH & POWYS PTY LTD, SHEET 1/2, REV. 3, DATED 08/12/2015 ("THE PREMISES PLAN") (EPA REF. DOC15/524237). THE PREMISES ALSO INCLUDES THE SHIP LOADERS MARKED AND SHOWN AS "DENOTES MOBILE SHIP LOADERS" ON THE PREMISES PLAN, WHICH ARE MOBILE PLANT THAT WORK ALONG THE KOORAGANG 8, 9 AND 10 BERTHS.

A3 Information supplied to the EPA

A3.1 Works and activities must be carried out in accordance with the proposal contained in the licence application, except as expressly provided by a condition of this licence.

In this condition the reference to "the licence application" includes a reference to:

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- a) the applications for any licences (including former pollution control approvals) which this licence replaces under the Protection of the Environment Operations (Savings and Transitional) Regulation 1998; and
- b) the licence information form provided by the licensee to the EPA to assist the EPA in connection with the issuing of this licence.

2 Discharges to Air and Water and Applications to Land

P1 Location of monitoring/discharge points and areas

P1.1 The following points referred to in the table below are identified in this licence for the purposes of monitoring and/or the setting of limits for the emission of pollutants to the air from the point.

Air

EPA identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
19	Meteorological monitoring		Meteorological Monitoring Station located on the premises, marked and shown as "EPA Monitoring Point 19 (Meteorological Station)" on the Monitoring Points Plan.

P1.2 The following utilisation areas referred to in the table below are identified in this licence for the purposes of the monitoring and/or the setting of limits for any application of solids or liquids to the utilisation area.

P1.3 The following points referred to in the table are identified in this licence for the purposes of the monitoring and/or the setting of limits for discharges of pollutants to water from the point.

Water and land

EPA Identification no.	Type of Monitoring Point	Type of Discharge Point	Location Description
1	Groundwater quality monitoring		Groundwater monitoring well, located to the northeast of the Rail Dump Station, marked and shown as "Point 1 (GW1)" on the Plan of Water Monitoring Locations.
20	Groundwater quality monitoring		Groundwater monitoring well, located to the east of the rail loop adjacent to Pacific National haul road, marked and shown as "Point 20 (K9/3N)" on the Plan of Water Monitoring Locations.

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21	Groundwater quality monitoring	Groundwater monitoring well, located to the east of the rail loop adjacent to Pacific National haul road, marked and shown as "Point 21 (K9/3S)" on the Plan of Water Monitoring Locations.
22	Groundwater quality monitoring	Groundwater monitoring well, located to the south of the rail loop between Cormorant Road and the South Arm of the Hunter River, marked and shown as "Point 22 (K11/1)" on the Plan of Water Monitoring Locations.
23	Groundwater quality monitoring	Groundwater monitoring well, located to the south of the rail loop between Cormorant Road and the South Arm of the Hunter River, marked and shown as "Point 23 (K11/1S)" on the Plan of Water Monitoring Locations.
24	Groundwater quality monitoring	Groundwater monitoring well, located down gradient of southern boundary of the premises (on the southern side of Cormorant Road, and east of Point 23), marked and shown as "Point 24 (K11/3E)" on the Plan of Water Monitoring Locations.
25	Groundwater quality monitoring	Groundwater monitoring well, located down gradient of southern boundary of the premises (on the southern side of Cormorant Road, and east of Point 23), marked and shown as "Point 25 (K11/3W)" on the Plan of Water Monitoring Locations.
26	Groundwater quality monitoring	Groundwater monitoring well, located down gradient of southern boundary of the premises (on the northern side of Cormorant Road, and west of Point 23), marked and shown as "Point 26 (K11/2W)" on the Plan of Water Monitoring Locations.
27	Groundwater quality monitoring	Groundwater monitoring well, located down gradient of southern boundary of the premises (on the northern side of Cormorant Road, and west of Point 23), marked and shown as "Point 27 (K11/2E)" on the Plan of Water Monitoring Locations.

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28	Groundwater quality monitoring	Groundwater monitoring well, located up gradient of northern boundary of the premises (west of Point 1), marked and shown as "Point 28 (K9/4W)" on the Plan of Water Monitoring Locations.
29	Groundwater quality monitoring	Groundwater monitoring well, located up gradient of northern boundary of the premises (west of Point 1), marked and shown as "Point 29 (K9/4E)" on the Plan of Water Monitoring Locations.
30	Groundwater quality monitoring	Groundwater monitoring well, located up gradient of northern boundary of the premises (east of Point 1), marked and shown as "Point 30 (K9/2W)" on the Plan of Water Monitoring Locations.
31	Groundwater quality monitoring	Groundwater monitoring well, located up gradient of northern boundary of the premises (east of Point 1), marked and shown as "Point 31 (K9/2E)" on the Plan of Water Monitoring Locations.
32	Groundwater quality monitoring	Groundwater monitoring well, located east of the rail loop, marked and shown as "Point 32 (K10/4W)" on the Plan of Water Monitoring Locations.
33	Groundwater quality monitoring	Groundwater monitoring well, located east of the rail loop, marked and shown as "Point 33 (DM10)" on the Plan of Water Monitoring Locations.
34	Discharge quality monitoring	Discharge from stormwater settling pond to stormwater drain, marked and shown as "Point 34 (SW1D)" on the Plan of Water Monitoring Locations.
35	Ambient water monitoring	South Arm of Hunter River upstream of the Kooragang No. 10 Berth, marked and shown as "Point 35 (SW5)" on the Plan of Water Monitoring Locations.
36	Groundwater quality monitoring	Groundwater monitoring well, beneath the rail flyover west of Deep Pond, marked and shown as "Point 36 (BH20S)" on the Plan of Water Monitoring Locations.
37	Groundwater quality monitoring	Groundwater monitoring well, beneath the rail flyover west of Deep Pond, marked and shown as "Point 37 (BH20D)" on the Plan of Water Monitoring Locations.

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38	Groundwater quality monitoring	Groundwater monitoring well, beneath the rail flyover east of Deep Pond, marked and shown as "Point 38 (BH21S)" on the Plan of Water Monitoring Locations.
39	Groundwater quality monitoring	Groundwater monitoring well, beneath the rail flyover east of Deep Pond, marked and shown as "Point 39 (BH21D)" on the Plan of Water Monitoring Locations.
40	Groundwater quality monitoring	Groundwater monitoring well, south of the rail flyover east of Deep Pond, marked and shown as "Point 40 (BH23S)" on the Plan of Water Monitoring Locations.
41	Groundwater quality monitoring	Groundwater monitoring well, south of the rail flyover east of Deep Pond, marked and shown as "Point 41 (BH23D)" on the Plan of Water Monitoring Locations.

Note: For the purpose of the tables above, the "Monitoring Points Plan" refers to the plan titled "Plan for EPA Submission, NCIG Coal Loading Facility, Kooragang Island", prepared by Monteath & Powys Pty Ltd, Sheet 2/2, Rev. 3, dated 8/12/2015, (EPA ref. DOC15/524237).

Note: For the purpose of the tables above, the "Plan of Water Monitoring Locations" refers to the plan titled "Plan of Water Monitoring Locations, NCIG Coal Loading Facility, Kooragang Island", prepared by Monteath & Powys Pty Ltd, Sheet 1, Rev. 3, dated 25/2/2016 (EPA ref. DOC17/112867).

3 Limit Conditions

L1 Pollution of waters

L1.1 Except as may be expressly provided in any other condition of this licence, the licensee must comply with section 120 of the Protection of the Environment Operations Act 1997.

L2 Waste

L2.1 The licensee must not cause, permit or allow any waste generated outside the premises to be received at the premises for storage, treatment, processing, reprocessing or disposal or any waste generated at the premises to be disposed of at the premises, except as expressly permitted by the licence.

L2.2 This condition only applies to the storage, treatment, processing, reprocessing or disposal of waste at the premises if those activities require an environment protection licence.

L3 Noise limits

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Note: 'safety or emergency reasons' refers to emergency works which may need to be undertaken to avoid loss of life, property loss and / or to prevent environmental harm.

L3.1 All site preparation, filling/preloading and construction works that may generate an audible noise at any residential receptor shall only be undertaken between 7.00 am and 6.00 pm.

This condition does not apply in the event of a direction from police or other emergency authority for safety or emergency reasons.

L3.2 Notwithstanding any other condition of this licence, piling works shall not be conducted on Sundays or public holidays.

L3.3 The licensee shall design, construct, operate and maintain the premises to ensure that the noise contributions from the premises do not exceed the maximum allowable noise contributions specified in the Table below, at those locations and during those periods indicated. The maximum allowable noise contributions apply under:

- a) wind speeds up to 3m/s (measured at 10 metres above ground level), or
- b) temperature inversion conditions up to 3°C per 100 metres and wind speeds up to 2m/s (measured at 10 metres above ground level).

NOTE: For the purposes of the Table, 'Night' is defined as being 10:00pm to 7:00am Monday to Saturday and 10:00pm-7:00am on Sundays and Public Holidays.

For the purpose of assessment of noise contributions specified in this licence, noise from the project shall be:

- a) measured at the most affected point on or within the site boundary at the most sensitive locations to determine compliance with LAeq(15 minute) noise limits.
- b) measured at one metre from the dwelling façade to determine compliance with LA1(1minute) noise limits.
- c) subject to the modification factors provided in Section 4 of the *New South Wales Industrial Noise Policy* (EPA 2000) where applicable.

Notwithstanding, should direct measurement of noise from the development be impractical, the licensee may employ an alternative noise assessment method deemed acceptable by the EPA (refer to Section 11 of the *New South Wales Industrial Noise Policy* (EPA 2000)). Details of such an alternative noise assessment method must be accepted by the EPA prior to the implementation of the assessment method.

Location	Day, Evening, Night at all times LAeq (15 minute)	Night - LAeq(night)	Night - LA1(1 minute)
Fern Bay West (1 Fullerton Street/Stockton Centre)	41	37	57
Fern Bay East (21 Braid Road/Fern Bay Primary School)	39	36	55

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Stockton West (284 Fullerton Street/Corner of Pembroke Street and Fullerton Street)	41	37	57
Stockton East (40 Eames Avenue/10 Pitt Street/Stockton Primary School)	38	35	56
Mayfield West (47 Stevenson Avenue/4 Groongal Street/Mayfield West Primary School)	45	40	55
Mayfield (68 Bull Street/45 Simpson Crescent/ 1 Arthur Street/52 Arthur Street/ 21 Crebert Street/Hunter Christian School/Mayfield East Primary School)	44	39	62
Carrington (Corner of Hargrave Street and Young Street)	36	33	52

L4 Potentially offensive odour

Note: Section 129 of the Protection of the Environment Operations Act 1997, provides that the licensee must not cause or permit the emission of any offensive odour from the premises but provides a defence if the emission is identified in the relevant environment protection licence as a potentially offensive odour and the odour was emitted in accordance with the conditions of a licence directed at minimising odour.

L4.1 No condition of this licence identifies a potentially offensive odour for the purposes of section 129 of the Protection of the Environment Operations Act 1997.

4 Operating Conditions

O1 Activities must be carried out in a competent manner

O1.1 Licensed activities must be carried out in a competent manner.

This includes:

- the processing, handling, movement and storage of materials and substances used to carry out the activity; and
- the treatment, storage, processing, reprocessing, transport and disposal of waste generated by the activity.

O2 Maintenance of plant and equipment

O2.1 All plant and equipment installed at the premises or used in connection with the licensed activity:

- must be maintained in a proper and efficient condition; and

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b) must be operated in a proper and efficient manner.

O3 Dust

- O3.1 The premises must be maintained in a condition which minimises or prevents the emission of dust from the premises.
- O3.2 All operations and activities occurring at the premises must be carried out in a manner that will minimise the emission of dust from the premises.
- O3.3 Trucks entering and leaving the premises that are carrying loads of dust generating materials must have their loads covered at all times, except during loading and unloading.
- O3.4 The licensee must operate, on an as needs basis, sprays to prevent and minimise the generation and emission of dust from coal, stored in the coal stockyard, from the premises. The operation of the sprays must give consideration to the following matters.
- (a) The types of coal received and handled at the premises and the respective potential to generate dust.
 - (b) Forecast meteorological conditions.
 - (c) Current weather conditions from a real-time meteorological station located at the premises.
 - (d) Ambient air quality from a real-time monitoring network located at the premises.

O4 Emergency response

- O4.1 The licensee must maintain, and implement as necessary, a current emergency response plan for the premises. The licensee must keep the emergency response plan on the premises at all times. The emergency response plan must document systems and procedures to deal with all types of incidents (e.g. spills, explosions or fire) that may occur at the premises or that may be associated with activities that occur at the premises and which are likely to cause harm to the environment. If a current emergency response plan does not exist at the date on which this condition is attached to the licence, the licensee must develop an emergency response plan within three months of that date.

O5 Processes and management

- O5.1 All above ground tanks containing material that is likely to cause environmental harm must be bunded or have an alternative spill containment system in place.
- O5.2 Bunds must:
- a) have walls and floors constructed of impervious materials;
 - b) be of sufficient capacity to contain 110% of the volume of the tank (or 110% volume of the largest tank where a group of tanks are installed);
 - c) have floors graded to a collection sump; and
 - d) not have a drain valve incorporated in the bund structure,

or be constructed and operated in a manner that achieves the same environmental outcome.

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O6 Waste management

- O6.1 The licensee must ensure that any liquid and/or non liquid waste generated and/or stored at the premises is assessed and classified in accordance with the EPA's Waste Classification Guidelines as in force from time to time.
- O6.2 The licensee must ensure that waste identified for recycling is stored separately from other waste.

O7 Other operating conditions

- O7.1 The licensee must ensure that activities are conducted in an environmentally satisfactory manner. So as to minimise and prevent the pollution of air and water the licensee must:
 - (a) Ensure that vehicles or containers prior to leaving the premises are clean and sealed in a manner that will not cause materials or wastes used in conducting the activities at the premises to be tracked, thrown from, blown, fall, or cast from any vehicle or container onto a public road.
 - (b) The licensee must have in place and implement procedures to ensure that vehicles and containers exiting the premises are in a condition to ensure that materials are not tracked, thrown, blown, fall or cast onto a public road.

5 Monitoring and Recording Conditions

M1 Monitoring records

- M1.1 The results of any monitoring required to be conducted by this licence or a load calculation protocol must be recorded and retained as set out in this condition.
- M1.2 All records required to be kept by this licence must be:
 - a) in a legible form, or in a form that can readily be reduced to a legible form;
 - b) kept for at least 4 years after the monitoring or event to which they relate took place; and
 - c) produced in a legible form to any authorised officer of the EPA who asks to see them.
- M1.3 The following records must be kept in respect of any samples required to be collected for the purposes of this licence:
 - a) the date(s) on which the sample was taken;
 - b) the time(s) at which the sample was collected;
 - c) the point at which the sample was taken; and
 - d) the name of the person who collected the sample.

M2 Requirement to monitor concentration of pollutants discharged

- M2.1 For each monitoring/discharge point or utilisation area specified below (by a point number), the licensee must monitor (by sampling and obtaining results by analysis) the concentration of each pollutant specified in Column 1. The licensee must use the sampling method, units of measure, and sample at the

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frequency, specified opposite in the other columns:

M2.2 Water and/ or Land Monitoring Requirements

POINT 1,38,39

Pollutant	Units of measure	Frequency	Sampling Method
Aluminium	milligrams per litre	Every 6 months	Grab sample
Arsenic	milligrams per litre	Every 6 months	Grab sample
Bromide	milligrams per litre	Every 6 months	Grab sample
Cadmium	milligrams per litre	Every 6 months	Grab sample
Conductivity	microsiemens per centimetre	Every 6 months	Grab sample
Copper	milligrams per litre	Every 6 months	Grab sample
Cyanide (free)	micrograms per litre	Every 6 months	Grab sample
Cyanide (total)	micrograms per litre	Every 6 months	Grab sample
Iron	milligrams per litre	Every 6 months	Grab sample
Manganese	milligrams per litre	Every 6 months	Grab sample
Nickel	milligrams per litre	Every 6 months	Grab sample
pH	pH	Every 6 months	Grab sample
Total PAHs	micrograms per litre	Every 6 months	Grab sample
TPH C10-C14 Fraction	micrograms per litre	Every 6 months	Grab sample
TPH C15-C28 Fraction	micrograms per litre	Every 6 months	Grab sample
TPH C29-C36 Fraction	micrograms per litre	Every 6 months	Grab sample
TPH C6-C9 Fraction	micrograms per litre	Every 6 months	Grab sample
Zinc	milligrams per litre	Every 6 months	Grab sample

POINT 20,21,22,23,36,37,40,41

Pollutant	Units of measure	Frequency	Sampling Method
Aluminium	milligrams per litre	Every 6 months	Grab sample
Arsenic	milligrams per litre	Every 6 months	Grab sample
Bromide	milligrams per litre	Every 6 months	Grab sample
Cadmium	milligrams per litre	Every 6 months	Grab sample
Conductivity	microsiemens per centimetre	Every 6 months	Grab sample
Copper	milligrams per litre	Every 6 months	Grab sample
Cyanide (free)	micrograms per litre	Every 6 months	Grab sample
Cyanide (total)	micrograms per litre	Every 6 months	Grab sample
Iron	milligrams per litre	Every 6 months	Grab sample
Manganese	milligrams per litre	Every 6 months	Grab sample
Nickel	milligrams per litre	Every 6 months	Grab sample

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pH	pH	Every 6 months	Grab sample
Total PAHs	micrograms per litre	Every 6 months	Grab sample
TPH C10-C14 Fraction	micrograms per litre	Every 6 months	Grab sample
TPH C15-C28 Fraction	micrograms per litre	Every 6 months	Grab sample
TPH C29-C36 Fraction	micrograms per litre	Every 6 months	Grab sample
TPH C6-C10 Fraction	micrograms per litre	Every 6 months	Grab sample
Zinc	milligrams per litre	Every 6 months	Grab sample

POINT 24,25,26,27,28,29,30,31,32,33

Pollutant	Units of measure	Frequency	Sampling Method
Aluminium	micrograms per litre	Special Frequency 1	Grab sample
Arsenic	milligrams per litre	Special Frequency 1	Grab sample
Bromide	milligrams per litre	Special Frequency 1	Grab sample
Cadmium	milligrams per litre	Special Frequency 1	Grab sample
Conductivity	microsiemens per centimetre	Special Frequency 1	Grab sample
Copper	micrograms per litre	Special Frequency 1	Grab sample
Cyanide (free)	micrograms per litre	Special Frequency 1	Grab sample
Cyanide (total)	micrograms per litre	Special Frequency 1	Grab sample
Iron	micrograms per litre	Special Frequency 1	Grab sample
Manganese	micrograms per litre	Special Frequency 1	Grab sample
Nickel	micrograms per litre	Special Frequency 1	Grab sample
pH	micrograms per litre	Special Frequency 1	Grab sample
Total PAHs	micrograms per litre	Special Frequency 1	Grab sample
TPH C10-C14 Fraction	micrograms per litre	Special Frequency 1	Grab sample
TPH C15-C28 Fraction	micrograms per litre	Special Frequency 1	Grab sample
TPH C29-C36 Fraction	micrograms per litre	Special Frequency 1	Grab sample
TPH C6-C10 Fraction	micrograms per litre	Special Frequency 1	Grab sample
Zinc	micrograms per litre	Special Frequency 1	Grab sample

POINT 34

Pollutant	Units of measure	Frequency	Sampling Method
Oil and Grease	milligrams per litre	Monthly during discharge	Grab sample
pH	pH	Monthly during discharge	Grab sample
Total suspended solids	milligrams per litre	Monthly during discharge	Grab sample

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POINT 35

Pollutant	Units of measure	Frequency	Sampling Method
Oil and Grease	milligrams per litre	Special Frequency 2	Grab sample
pH	pH	Special Frequency 2	Grab sample
Total suspended solids	milligrams per litre	Special Frequency 2	Grab sample

Note: For the purposes of the table(s) above Special Frequency 1 means the collection of samples on a six monthly basis if trigger conditions specified in condition E1.1 are exceeded.

Note: For the purposes of the table(s) above Special Frequency 2 means the collection of samples on an outgoing/ebb tide when monitoring is required at Point 34.

M3 Testing methods - concentration limits

M3.1 Subject to any express provision to the contrary in this licence, monitoring for the concentration of a pollutant discharged to waters or applied to a utilisation area must be done in accordance with the Approved Methods Publication unless another method has been approved by the EPA in writing before any tests are conducted.

M4 Weather monitoring

M4.1 The licensee must measure and electronically log the meteorological parameters and sampling methods listed below and applying a 15-minute average period to all results, record data in units specified below.

Parameter	Unit of Measure	Sampling Method
Siting of monitoring station	not applicable	AS2922-1987
Temperature at two metres	degrees celcius	AM-4
Temperature at ten metres	degrees celcius	AM-4
Wind speed at ten metres	metres per second	AM-2 and AM-4
Wind direction at ten metres	degrees	AM-2 and AM-4
Sigma theta at ten metres	degrees	AM-2 and AM-4
Solar radiation	Wm-2	AM-4

M5 Recording of pollution complaints

M5.1 The licensee must keep a legible record of all complaints made to the licensee or any employee or agent of the licensee in relation to pollution arising from any activity to which this licence applies.

M5.2 The record must include details of the following:

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- a) the date and time of the complaint;
- b) the method by which the complaint was made;
- c) any personal details of the complainant which were provided by the complainant or, if no such details were provided, a note to that effect;
- d) the nature of the complaint;
- e) the action taken by the licensee in relation to the complaint, including any follow-up contact with the complainant; and
- f) if no action was taken by the licensee, the reasons why no action was taken.

M5.3 The record of a complaint must be kept for at least 4 years after the complaint was made.

M5.4 The record must be produced to any authorised officer of the EPA who asks to see them.

M6 Telephone complaints line

- M6.1 The licensee must operate during its operating hours a telephone complaints line for the purpose of receiving any complaints from members of the public in relation to activities conducted at the premises or by the vehicle or mobile plant, unless otherwise specified in the licence.
- M6.2 The licensee must notify the public of the complaints line telephone number and the fact that it is a complaints line so that the impacted community knows how to make a complaint.
- M6.3 The preceding two conditions do not apply until 21 days after: the date of the issue of this licence.
- M6.4 The licensee must nominate to the EPA a single telephone number for the purpose of the EPA contacting the licensee to provide immediate assistance or response during emergencies or any other incidents at the premises. The telephone number must be current at all times.
The nomination must be provided to the EPA's Director - Hunter at PO Box 488G, Newcastle NSW 2300.
Note: This condition does not apply until two (2) weeks after the date of issue of the Notice adding this condition to the licence.

6 Reporting Conditions

R1 Annual return documents

- R1.1 The licensee must complete and supply to the EPA an Annual Return in the approved form comprising:
 - 1. a Statement of Compliance,
 - 2. a Monitoring and Complaints Summary,
 - 3. a Statement of Compliance - Licence Conditions,
 - 4. a Statement of Compliance - Load based Fee,
 - 5. a Statement of Compliance - Requirement to Prepare Pollution Incident Response Management Plan,
 - 6. a Statement of Compliance - Requirement to Publish Pollution Monitoring Data; and
 - 7. a Statement of Compliance - Environmental Management Systems and Practices.

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At the end of each reporting period, the EPA will provide to the licensee a copy of the form that must be completed and returned to the EPA.

R1.2 An Annual Return must be prepared in respect of each reporting period, except as provided below.

R1.3 Where this licence is transferred from the licensee to a new licensee:

- a) the transferring licensee must prepare an Annual Return for the period commencing on the first day of the reporting period and ending on the date the application for the transfer of the licence to the new licensee is granted; and
- b) the new licensee must prepare an Annual Return for the period commencing on the date the application for the transfer of the licence is granted and ending on the last day of the reporting period.

R1.4 Where this licence is surrendered by the licensee or revoked by the EPA or Minister, the licensee must prepare an Annual Return in respect of the period commencing on the first day of the reporting period and ending on:

- a) in relation to the surrender of a licence - the date when notice in writing of approval of the surrender is given; or
- b) in relation to the revocation of the licence - the date from which notice revoking the licence operates.

R1.5 The Annual Return for the reporting period must be supplied to the EPA via eConnect *EPA* or by registered post not later than 60 days after the end of each reporting period or in the case of a transferring licence not later than 60 days after the date the transfer was granted (the 'due date').

R1.6 The licensee must retain a copy of the Annual Return supplied to the EPA for a period of at least 4 years after the Annual Return was due to be supplied to the EPA.

R1.7 Within the Annual Return, the Statements of Compliance must be certified and the Monitoring and Complaints Summary must be signed by:

- a) the licence holder; or
- b) by a person approved in writing by the EPA to sign on behalf of the licence holder.

Note: The term "reporting period" is defined in the dictionary at the end of this licence. Do not complete the Annual Return until after the end of the reporting period.

Note: An application to transfer a licence must be made in the approved form for this purpose.

R2 Notification of environmental harm

R2.1 Notifications must be made by telephoning the Environment Line service on 131 555.

R2.2 The licensee must provide written details of the notification to the EPA within 7 days of the date on which the incident occurred.

Note: The licensee or its employees must notify all relevant authorities of incidents causing or threatening material harm to the environment immediately after the person becomes aware of the incident in accordance with the requirements of Part 5.7 of the Act.

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R3 Written report

- R3.1 Where an authorised officer of the EPA suspects on reasonable grounds that:
- a) where this licence applies to premises, an event has occurred at the premises; or
 - b) where this licence applies to vehicles or mobile plant, an event has occurred in connection with the carrying out of the activities authorised by this licence,
- and the event has caused, is causing or is likely to cause material harm to the environment (whether the harm occurs on or off premises to which the licence applies), the authorised officer may request a written report of the event.
- R3.2 The licensee must make all reasonable inquiries in relation to the event and supply the report to the EPA within such time as may be specified in the request.
- R3.3 The request may require a report which includes any or all of the following information:
- a) the cause, time and duration of the event;
 - b) the type, volume and concentration of every pollutant discharged as a result of the event;
 - c) the name, address and business hours telephone number of employees or agents of the licensee, or a specified class of them, who witnessed the event;
 - d) the name, address and business hours telephone number of every other person (of whom the licensee is aware) who witnessed the event, unless the licensee has been unable to obtain that information after making reasonable effort;
 - e) action taken by the licensee in relation to the event, including any follow-up contact with any complainants;
 - f) details of any measure taken or proposed to be taken to prevent or mitigate against a recurrence of such an event; and
 - g) any other relevant matters.
- R3.4 The EPA may make a written request for further details in relation to any of the above matters if it is not satisfied with the report provided by the licensee. The licensee must provide such further details to the EPA within the time specified in the request.

7 General Conditions

G1 Copy of licence kept at the premises or plant

- G1.1 A copy of this licence must be kept at the premises to which the licence applies.
- G1.2 The licence must be produced to any authorised officer of the EPA who asks to see it.
- G1.3 The licence must be available for inspection by any employee or agent of the licensee working at the premises.

G2 Other general conditions

G2.1 Completed Programs

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Program	Description	Completed Date
Groundwater Monitoring Program	Develop groundwater monitoring program to detect any mobilisation of contaminants around K26/32 on Kooragang Island. Early detection of contaminant mobilisation beyond premises boundary.	03-June-2010
Review Existing Groundwater Quality	Review existing groundwater quality to determine baseline on which future groundwater monitoring results will be compared to detect mobilisation of groundwater contaminants. Early detection of groundwater contaminant mobilisation.	30-August-2010
Kooragang Island - Rail Loop Groundwater Monitorin	Develop a Groundwater Contingency Plan that identified trigger values and associated actions to occur should values be exceeded during regular monitoring program. Prevent groundwater contamination movement offsite and entering the Hunter River.	11-March-2011
Wagon Monitoring and Reporting Environmental Improvement Program	Implement a program of monitoring and reporting on the condition of loaded wagons received at the premises. All trains entering the dump-station will be assessed against criteria relating to likelihood that coal may have been spilt within the rail corridor during the train's most recent journey.	01-September-2016
Train Condition Exception Reporting	The visual assessment of wagons to identify those that are consistently loaded in a manner that clearly is likely to contribute to spillage of coal in the rail corridor.	30-November-2017

8 Special Conditions

E1 Groundwater Monitoring - Triggers for Further Investigation

E1.1 The following Trigger and Contingency Response Program must be taken by the licensee, if groundwater monitoring required under the licence for Points 20, 21, 22, 23, 36, 37, 40 or 41 reveals concentrations whereby either of the following two Trigger Conditions are met.

Trigger Condition 1 - Where monitoring of the parameters required under the licence for Points 20, 21, 22, 23, 36, 37, 40 or 41 demonstrates a sudden increase in concentration compared to historical data, or sudden decrease in for pH is observed. A sudden increase or decrease is defined as a value that is greater than the mean plus twice the standard deviation for the historical data.

Trigger Condition 2 - Where the trend analysis of the concentration of the parameters required under the licence for Points 20, 21, 22, 23, 36, 37, 40 or 41 against time shows an increasing concentration over the most recent four monitoring events. Trend analysis tools such as Mann-Kendall may be adopted.

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Contingency Response Program

Step 1: In the event of either of the above two Trigger Conditions being met, the licensee must notify the EPA in writing within two (2) working days of initial results becoming available to the licensee. The notification must include details of the Point(s) and the concentration recorded.

Step 2: In the event of Step 1, the licensee must resample the Point(s) at which the Trigger Condition was met to confirm the elevated level.

Step 3: The licensee must notify the EPA in writing within two (2) working days of the results collected in Step 2 becoming available to the licensee. The notification must include details of the Point(s) and concentration recorded. The EPA must be notified regardless of whether the results are elevated or not.

Step 4: If the results collected in Step 2 confirm the elevated levels, the licensee must commence six monthly groundwater monitoring at Points 24 to 33 inclusive for the parameters as detailed in licence condition M2.2.

Step 5: A suitably qualified and experienced person must undertake an assessment of the cause of the elevated concentration(s) identified in Steps 1 and 2, as well as trends in the groundwater contaminant concentrations. The analysis must consider data collected at Point 1, and any other relevant groundwater data, both historical and current.

A report detailing the assessment and its findings must be prepared. The assessment report must provide advice of, and justification for, the trend identified and any actions to be taken by the licensee in response to the elevated concentration.

The assessment and report must be completed within eight (8) months of the results collected in Step 2 becoming available to the licensee; and, submitted to the EPA.

Step 6: If the assessment undertaken in Step 5 identifies an increasing or upward trend in contaminant levels, the licensee must undertake an assessment and prepare a report on the risks posed by the migration of the contaminated groundwater on the Hunter River.

The risk assessment report must include groundwater fate; transport modelling; and include justification for the conclusions reached as to whether the risk identified is acceptable or unacceptable and what actions are to be taken by the licensee.

Where the above risk assessment is required, the risk assessment and report must be completed within two (2) months of the submission of the report required under Step 5.

Step 7: If the risk identified in Step 6 is deemed 'unacceptable', the licensee must undertake a Remedial Options Study to identify and report on remediation options to be implemented to remediate the identified groundwater risk.

The Remedial Options Study must be undertaken by a suitably qualified and experienced person.

The Remedial Options Study must identify and provide justification for the remedial actions to be undertaken; criteria to validate/monitor the effectiveness of the remedial works; and, timeframes for the implementation of the proposed remedial works.

Where the above Remedial Options Study is required, the licensee must provide a report detailing

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the Remedial Options Study to the EPA within two (2) months of the submission of the report required under Step 6.

Note: The above notifications and reports must be provided to the EPA's Director - Hunter at PO Box 488G, Newcastle NSW 2300, or emailed to hunter.region@epa.nsw.gov.au.

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Dictionary

General Dictionary

3DGM [in relation to a concentration limit]	Means the three day geometric mean, which is calculated by multiplying the results of the analysis of three samples collected on consecutive days and then taking the cubed root of that amount. Where one or more of the samples is zero or below the detection limit for the analysis, then 1 or the detection limit respectively should be used in place of those samples
Act	Means the Protection of the Environment Operations Act 1997
activity	Means a scheduled or non-scheduled activity within the meaning of the Protection of the Environment Operations Act 1997
actual load	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
AM	Together with a number, means an ambient air monitoring method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .
AMG	Australian Map Grid
anniversary date	The anniversary date is the anniversary each year of the date of issue of the licence. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
annual return	Is defined in R1.1
Approved Methods Publication	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
assessable pollutants	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
BOD	Means biochemical oxygen demand
CEM	Together with a number, means a continuous emission monitoring method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .
COD	Means chemical oxygen demand
composite sample	Unless otherwise specifically approved in writing by the EPA, a sample consisting of 24 individual samples collected at hourly intervals and each having an equivalent volume.
cond.	Means conductivity
environment	Has the same meaning as in the Protection of the Environment Operations Act 1997
environment protection legislation	Has the same meaning as in the Protection of the Environment Administration Act 1991
EPA	Means Environment Protection Authority of New South Wales.
fee-based activity classification	Means the numbered short descriptions in Schedule 1 of the Protection of the Environment Operations (General) Regulation 2009.
general solid waste (non-putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997

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flow weighted composite sample	Means a sample whose composites are sized in proportion to the flow at each composites time of collection.
general solid waste (putrescible)	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
grab sample	Means a single sample taken at a point at a single time
hazardous waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
licensee	Means the licence holder described at the front of this licence
load calculation protocol	Has the same meaning as in the Protection of the Environment Operations (General) Regulation 2009
local authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
material harm	Has the same meaning as in section 147 Protection of the Environment Operations Act 1997
MBAS	Means methylene blue active substances
Minister	Means the Minister administering the Protection of the Environment Operations Act 1997
mobile plant	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
motor vehicle	Has the same meaning as in the Protection of the Environment Operations Act 1997
O&G	Means oil and grease
percentile [in relation to a concentration limit of a sample]	Means that percentage [eg.50%] of the number of samples taken that must meet the concentration limit specified in the licence for that pollutant over a specified period of time. In this licence, the specified period of time is the Reporting Period unless otherwise stated in this licence.
plant	Includes all plant within the meaning of the Protection of the Environment Operations Act 1997 as well as motor vehicles.
pollution of waters [or water pollution]	Has the same meaning as in the Protection of the Environment Operations Act 1997
premises	Means the premises described in condition A2.1
public authority	Has the same meaning as in the Protection of the Environment Operations Act 1997
regional office	Means the relevant EPA office referred to in the Contacting the EPA document accompanying this licence
reporting period	For the purposes of this licence, the reporting period means the period of 12 months after the issue of the licence, and each subsequent period of 12 months. In the case of a licence continued in force by the Protection of the Environment Operations Act 1997, the date of issue of the licence is the first anniversary of the date of issue or last renewal of the licence following the commencement of the Act.
restricted solid waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
scheduled activity	Means an activity listed in Schedule 1 of the Protection of the Environment Operations Act 1997
special waste	Has the same meaning as in Part 3 of Schedule 1 of the Protection of the Environment Operations Act 1997
TM	Together with a number, means a test method of that number prescribed by the <i>Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales</i> .

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TSP	Means total suspended particles
TSS	Means total suspended solids
Type 1 substance	Means the elements antimony, arsenic, cadmium, lead or mercury or any compound containing one or more of those elements
Type 2 substance	Means the elements beryllium, chromium, cobalt, manganese, nickel, selenium, tin or vanadium or any compound containing one or more of those elements
utilisation area	Means any area shown as a utilisation area on a map submitted with the application for this licence
waste	Has the same meaning as in the Protection of the Environment Operations Act 1997
waste type	Means liquid, restricted solid waste, general solid waste (putrescible), general solid waste (non - putrescible), special waste or hazardous waste

Mr Grahame Clarke

Environment Protection Authority

(By Delegation)

Date of this edition: 26-October-2007

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End Notes

- 1 Licence varied by notice 1084101, issued on 12-May-2008, which came into effect on 12-May-2008.
- 2 Licence varied by notice 1087326, issued on 29-May-2008, which came into effect on 29-May-2008.
- 3 Licence varied by notice 1088793, issued on 20-Jun-2008, which came into effect on 20-Jun-2008.
- 4 Condition A1.3 Not applicable varied by notice issued on <issue date> which came into effect on <effective date>
- 5 Licence varied by notice 1093735, issued on 18-Nov-2008, which came into effect on 18-Nov-2008.
- 6 Licence varied by notice 1095190, issued on 21-Nov-2008, which came into effect on 21-Nov-2008.
- 7 Licence varied by correction to DECC file number data, issued on 18-Dec-2008, which came into effect on 18-Dec-2008.
- 8 Licence varied by notice 1096151, issued on 23-Dec-2008, which came into effect on 23-Dec-2008.
- 9 Licence varied by change to DECCW file number, issued on 07-Oct-2009, which came into effect on 07-Oct-2009.
- 10 Licence varied by notice 1111313, issued on 08-Apr-2010, which came into effect on 08-Apr-2010.
- 11 Licence varied by notice 1120662, issued on 13-Jan-2011, which came into effect on 13-Jan-2011.
- 12 Licence varied by notice 1127205, issued on 15-Jun-2011, which came into effect on 15-Jun-2011.
- 13 Licence varied by notice 1500779 issued on 12-Aug-2011
- 14 Licence varied by notice 1502660 issued on 16-Nov-2011
- 15 Licence varied by notice 1503211 issued on 07-Dec-2011
- 16 Licence varied by notice 1507960 issued on 26-Sep-2012
- 17 Licence varied by notice 1514796 issued on 11-Jun-2013
- 18 Licence varied by notice 1536339 issued on 18-Dec-2015
- 19 Licence varied by notice 1537318 issued on 10-Mar-2016
- 20 Licence varied by notice 1545533 issued on 12-Oct-2016

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21	Licence varied by notice	1546676 issued on 08-Dec-2016
22	Licence varied by notice	1548281 issued on 25-Aug-2017
23	Licence varied by notice	1559513 issued on 11-Dec-2017
24	Licence varied by notice	1564299 issued on 03-Jan-2019

NCIG COAL EXPORT TERMINAL

Optimisation Project Noise Impact Assessment Review

Prepared for:

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BASIS OF REPORT

This report has been prepared by SLR Consulting Australia Pty Ltd (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Newcastle Coal Infrastructure Group (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

This report is for the exclusive use of the Client. No warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from SLR.

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DOCUMENT CONTROL

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1 Introduction

1.1 Background

The Newcastle Coal Infrastructure Group Ltd (NCIG) has approval to construct and operate the Coal Export Terminal (CET) on Kooragang Island in Newcastle NSW, with a throughput capacity of 66 million tonnes per annum (Mtpa). The CET existing and approved General Arrangement Plan is presented in **Appendix A**.

The NCIG CET infrastructure was constructed in three stages, with the first stage (Stage 1) designed to operate with a nominal capacity of 30 Mtpa was completed in May 2010 and the second stage (Stage 2AA), designed to increase the overall nominal capacity to 53 Mtpa, completed in June 2012. The final stage (Stage 2F) was completed in June 2013 and is designed to achieve the approved limit of capacity of the CET of 66 Mtpa.

The High Capacity Optional Inlet Rail Spur and Rail Siding (referred to as the NCIG CET Rail Flyover Modification) was approved on the 13 May 2013 with construction commencing in the third quarter of 2013. The Rail Flyover Modification commenced operations on 1 July 2015.

NCIG has undertaken a review of the operation of the CET to identify inherent unutilised capacity and opportunities to handle additional tonnes. The Optimisation Project incorporates a series of on-site control system and operational process improvements that have been implemented by NCIG within the existing NCIG CET boundary, utilising existing NCIG CET infrastructure and at a low capital cost. The Optimisation Project seeks to increase the maximum approved capacity to 79 Mtpa.

SLR Consulting Australia Pty Ltd (SLR) has been engaged by Resource Strategies Pty Ltd (Resource Strategies) on behalf of NCIG to evaluate and assess the potential noise impacts associated with the Optimisation Project. In preparing this assessment SLR has considered several documents including the following:

- NCIG Coal Export Terminal, Construction, Operation and Road Transport Noise Impact Assessment (CET NIA) (Heggies Australia, 2006);
- Major Project Assessment, NCIG Coal Export Terminal (CET Assessment Report) (NSW Department of Planning, 2007);
- PWCS Terminal 4 Project, Noise and Vibration Impact Assessment (T4 Project NIA) (SLR, 2012);
- Major Project Assessment, PWCS Terminal 4 Project, Kooragang Island (T4 Project Assessment Report) (NSW Department of Planning Industry and Environment [DPIE], 2014);
- NCIG Rail Flyover Modification, Noise Prediction and Assessment Review (Rail Flyover Modification NIA) (SLR, 2012);
- Newcastle Coal Export Terminal, Stage 2F Noise Audit Report (Stage 2F Audit Report) (SLR, 2013);
- Newcastle Coal Export Terminal, The High Capacity Optional Inlet Rail Spur and Rail Siding (Modification 2) Condition 3.6 Noise Audit Report (Rail Flyover Audit Report) (SLR, 2015);
- NCIG Coal Export Terminal, Independent Environmental Audit 2018 (Audit 2018) (pitt&sherry, 2019);
- NCIG 2019 Compliance Tracking Program - Project Approval 06_0009 (CTP 2019) (NCIG, 2019);
- 2019 Hunter Valley Corridor Capacity Strategy (HVCCS) (Australian Rail Track Corporation [ARTC], 2019); and
- NCIG Operation Noise Management Plan HSEC.MP.12.03 (ONMP) (NCIG, 2017).

1.2 Assessment Requirements

The noise impacts for the Optimisation Project have been guided by the assessment guidelines as presented in **Table 1**.

Table 1 Noise Impact Assessment Procedure Guidelines

Assessment Guideline	Criteria	Impact
Modification Maximum, Intrusive and Amenity Noise A quantitative assessment guided by the requirements of the Noise Policy for Industry (NPfI) (EPA ¹ , 2017) in relation to setting the project noise trigger levels (PNTLs) and sleep disturbance noise levels (SDNLs) and assessing any impacts.	Section 5	Section 7
Cumulative Amenity Noise A quantitative assessment guided by the requirements of the NPfI in relation to existing and successive industrial development by setting cumulative equivalent continuous noise amenity levels (LAeq [period]) for all industrial (i.e. non-transport related) noise in a receiver area.	Section 5	Section 8
Rail Traffic Noise A qualitative assessment guided by the requirements of the Rail Infrastructure Noise Guideline (RING) Appendix 2 (EPA, 2013) in relation to land-use developments (other than rail projects) likely to generate additional rail traffic on an existing rail network.	Section 9.1	Section 9.3

Note 1: The Environment Protection Authority (EPA) existed as a legal entity operating within the NSW Office of Environment and Heritage (OEH) which came into existence in 2011. The EPA became a separate statutory authority on 29 February 2012.

The CET NIA was prepared in accordance with the NSW Environment Protection Authority (EPA) Industrial Noise Policy (INP) (EPA, 2000), and the CET was subsequently approved in accordance with the INP (refer **Section 2.2**). The EPA has since withdrawn the INP and replaced the policy with the Noise Policy for Industry (NPfI) (EPA, 2017) which took immediate effect upon its release. Notwithstanding the relatively modest extent of the upgrades and improvements that have been implemented to date at the CET and are associated with the Optimisation Project, this noise assessment has been guided by the requirements of the NPfI.

It is noteworthy, however, that in some respects a noise impact assessment prepared (and approved) in accordance with the NPfI is potentially relatively more or less stringent by comparison with the INP and, also to the existing approved CET noise limits. For example, the assumed minimum rating background levels (RBLs) resulting from the application of the NPfI would likely give rise to a daytime noise limit at Fern Bay East, Stockton East and Carrington of 40 dBA, by comparison with the currently approved daytime noise limits of 39 dBA, 38 dBA and 36 dBA respectively arising from the INP based CET NIA.

In addition, the NSW Department of Planning Industry and Environment (DPIE) *Voluntary Land Acquisition and Mitigation Policy (VLAMP): For State Significant Mining, Petroleum and Extractive Industry Developments* (NSW Government, 2018) may also be considered when assessing operational noise impacts from the Optimisation Project.

2 Existing Coal Export Terminal

2.1 Receiver Area

The CET Local Area Plan attached as **Appendix B** identifies the nearest potentially affected residential, commercial and industrial receiver areas beyond the NCIG CET site boundary. Selected representative assessment locations for each receiver area are presented in **Table 2**, generally consistent with the CET NIA with additional locations (i.e. FN1, FN2, SE3, W4-W6, MV1, C2, SG2-SG4) extending the coverage of the noise assessment receiver areas.

Table 2 Nearest Potentially Affected Receiver Areas and Noise Assessment Locations

Receiver Area	ID/Location	NPfi Noise Amenity Area	LEP ⁴ Zone
Fern Bay North	FN1 ¹ Bayway Village Nelson Bay Road	Urban	R2 low density residential
	FN2 ¹ 2 Seaside Boulevard		
Fern Bay West	FW1 ² 1 Fullerton Lane	Urban	R2 low density residential
	FW2 ² Stockton Centre	Hospital	SP2 health services facility
Fern Bay East	FE1 ² 21 Braid Road	Urban	R2 low density residential
	FE2 ² Fern Bay Primary School	School	
Stockton West	SW1 ² 284 Fullerton Street	Urban	R2 low density residential
	SW2 ² Cnr Pembroke St & Fullerton St		
Stockton East	SE1 ² 40 Eames Avenue	Urban	R2 low density residential
	SE3 ^{2,3} 10 Pitt Street		
	SE2 ² Stockton Primary School	School	
Mayfield West	W1 ² 47 Stevenson Avenue	Urban	R2 low density residential
	W2 ² 4 Groongal Street		
	W3 ² Mayfield West Primary School	School	
Warabrook	W4 ¹ Cnr Decora Cr & Elata Way	Urban	R2 low density residential
	W5 ¹ Cnr Decora Cr & Mabellae Pl		
	W6 ¹ 14 O'Learia Crescent		
Mayfield	M1 ² 68 Bull Street	Urban	R2 low density residential
	M2 ² 45 Simpson Crescent		
	M3 ² 1 Arthur Street		
	M4 ² 52 Arthur Street		
	M5 ² 21 Crebert Street		
	M6 ² Hunter Christian School		
	M7 ² Mayfield East Primary School		
Maryville	MV1 ¹ George Street	Urban	R2 low density residential
Carrington	C1 ² Cnr Hargrave St & Young St	Urban	R2 low density residential
	C2 ¹ Cnr Harrison St & Northumberland St		

Receiver Area	ID/Location	NPfi Noise Amenity Area	LEP ⁴ Zone
Sandgate	SG1 4 Mangrove Road	Industrial	IN2 light industrial
	SG2 ¹ 117 Maitland Road	Urban	E3 environmental management
	SG3 ¹ 151 Maitland Road		
	SG4 ¹ Catholic Care Centre	Hospital	SP2 health services facility
Mayfield West	MW1 Steel River	Industrial	IN1 general industrial
Kooragang Island	KI1 Blue Circle Southern	Industrial	SP1 special activities
	KI2 Origin Energy		
	KI3 Boral Country Concrete		
	KI4 Port Waratah Coal Services		
	KI5 Cargill Australia		
	KI6 ERS Australia		
	KI7 Cleanaway		
	KI8 Port Hunter Commodities		
	KI9 BOC Gas		
	KI10 Sims Metal		
Mayfield North	MN1 OneSteel	Industrial	SP1 special activities

Note 1: Receiver location for consistency with T4 Project NIA.

Note 2: Receiver location consistent with the requirements of the NCIG EPL No 12693 (**Appendix C2**).

Note 3: Additional receiver SE3 added due to findings of Audit 2013.

Note 4: In accordance with relevant City of Newcastle Local Environment Plan 2012 and Port Stephens Council Local Environment Plan 2013.

The CET NIA considered that residential receivers, including in Fern Bay (East/West) and Stockton (East/West) were classified as the “urban” INP noise amenity zone. Subsequent to the CET NIA, the CET Assessment Report endorsed the conservative recommendation of the Independent Hearing and Assessment Panel for the CET that Fern Bay (East/West) and Stockton (East/West) be assessed as the “suburban” INP noise amenity zone. More recently however, the DPIE (then DP&E) in its T4 Project Assessment Report indicated that Fern Bay (East/West) and Stockton (East/West) could be considered as the “urban/industrial interface” INP noise amenity zone.

It is noted that industrial noise is a feature of the noise environment at the nearest residential areas to the NCIG CET, which are located proximal to the heavily industrialised port area.

For the Optimisation Project, as shown in **Table 2**, The City of Newcastle Local Environment Plan (LEP) 2012 and Port Stephens Council LEP 2013 currently identify the land zoning as predominately R2 (low density residential) for the majority of the nearest potentially affected receiver areas. In accordance with NPfi Table 2.3, the planning zones R2 (and E3) are associated with the “suburban” residential receiver category and described as an area that has local traffic with characteristically intermittent traffic flows or with some limited commerce or industry. This area often has the following characteristic: evening ambient noise levels defined by the natural environment and human activity.

However, the foregoing description does not accurately characterise the nearest residential areas, which more appropriately equate with the ‘urban’ residential receiver category consistent with the original CET NIA, and as described in the NPfi as an area with an acoustical environment that:

- is dominated by ‘urban hum’ or industrial source noise, where urban hum means the aggregate sound of many unidentifiable, mostly traffic and/or industrial related sound sources
- has through-traffic with characteristically heavy and continuous traffic flows during peak periods

- *is near commercial districts or industrial districts*
- *has any combination of the above.*

Applying the urban residential receiver category is further supported by the NPfI Table 2.3 that nominates 'typical existing background noise levels' in urban residential areas: as greater than 35 dBA during the night-time; greater than 40 dBA during the evening; and greater than 45 dBA during the daytime. **Table 7** presents the historical Rating Background Levels (RBLs) in the absence of NCIG CET for the nearest residential areas, and a review of these RBLs shows that the night-time RBL ranged from 37 dBA to 45 dBA, the evening RBL ranged from 41 dBA to 47 dBA, the daytime RBL ranged from 41 dBA to 50 dBA, and therefore very consistent with the urban residential receiver category thresholds as defined in the NPfI Table 2.3.

Based on the above, and in the absence of further discussion with the relevant planning, consent or regulatory authority, the receiver category of **urban** has been adopted throughout.

2.2 Project Approval

NCIG has approval to construct and operate the CET (with respect to noise emissions) in accordance with the Project Approval (PA) 06_0009 dated 13 April 2007 and two subsequent modifications, namely:

- NCIG CET Plan of Subdivision Modification (MOD 1) approved 27 November 2007; and
- NCIG CET Rail Flyover Modification (MOD 2) approved 13 May 2013.

The consolidated conditions of approval are referred to as the PA 06_0009 MOD2 in this report which include a range of noise criteria (i.e. intrusive, amenity and sleep disturbance) and associated meteorological constraints which are generally consistent with the noise assessment outcomes presented in the CET NIA. Relevant noise extracts from the PA 06_0009 MOD2 (Schedule 2, Noise Impacts and Noise Auditing) are attached as **Appendix C1**.

The residential noise criteria are summarised in **Table 3**.

Table 3 Project Approval - Residential Noise and Meteorological Criteria (dBA re 20 µPa)

Residential Areas	Construction Noise	Operating Noise ¹		
		LAeq(15minute) Daytime, Evening, Night ²	LAeq(night) Night ²	LA1(1minute) Night ²
Fem Bay West	The Proponent shall only undertake construction activities associated with the project that would generate an audible noise at any residential premises between 0700 hours and 1800 hours, seven days a week. Audible noise is defined as "noise that can be heard at the receiver".	41	37	57
Fern Bay East		39	36	55
Stockton West		41	37	57
Stockton East		38	35	56
Mayfield West		45	40	55
Mayfield		44	39	62
Carrington		36	33	52
Notes		<p>The maximum allowable noise contributions apply under:</p> <p>a) Meteorological conditions of: wind speeds up to 3 ms⁻¹ at 10 metres above ground level; or</p> <p>b) Temperature inversion conditions up to 3°C per 100 metres and wind speeds up to 2 ms⁻¹ at 10 metres above ground level.</p> <p>For the purpose of assessment of noise from the project shall be:</p> <p>c) Measured at the most affected point on or within the Site boundary at the most sensitive receiver to determine compliance with LAeq(15 minute) night noise limits;</p> <p>d) Measured at one metre from the dwelling facade to determine compliance with LA1(1minute) noise limits; and</p> <p>e) Subject to the modification factors provided in Section 4 of the NSW INP, where applicable.</p>		

Note 1: 7 days per week, 24 hours a day.

Note 2: Monday to Saturday 2200 hours to 0700 hours; Sundays and Public Holidays 2200 hours to 0800 hours.

2.3 Environment Protection Licence (EPL 12693)

NCIG is licensed to construct and operate the CET (with respect to noise emissions) in accordance with the NSW EPA Environment Protection Licence (EPL) No 12693 dated 3 January 2019. An extract from the EPL's *Noise Limits* conditions is attached as **Appendix C2** and these are very similar to the corresponding PA 06_0009 MOD2 conditions, nominating noise criteria (i.e. intrusive, amenity and sleep disturbance) and associated meteorological constraints.

2.4 Noise Management and Compliance

2.4.1 Operation Noise Management Plan

In accordance with PA 06_0009 MOD2 (Schedule 2, Condition 7.6(b)), the Operational Noise Management Plan (ONMP) outlines noise monitoring and management procedures to minimise noise emissions from NCIG CET operations and includes detailed descriptions of the following requirements:

- Monitoring objectives and NCIG's roles and responsibilities;
- Receiver areas and noise criteria;
- Project activities and noise sources;
- Project noise impacts;
- Management procedures and noise control;
- Procurement process and equipment levels;

- Community concerns and noise enquires;
- Noise monitoring and reporting procedures; and
- Noise audits and performance review.

2.4.2 Off-site Noise Monitoring

In accordance with the ONMP, off-site noise monitoring of NCIG CET operations is currently undertaken on a bi-annual basis. Prior to this, off-site noise monitoring of NCIG CET operations was undertaken on a quarterly basis from December 2010 to June 2016. The off-site intrusive $L_{Aeq}(15\text{minute})$ and $L_{A1}(1\text{minute})$ noise level monitoring results are summarised in **Appendices D1** and **D2** respectively together with the relevant PA 06_0009 MOD2 noise limits. Off-site noise monitoring locations are shown on the CET Local Area Plan (**Appendix B**).

In summary, the ongoing noise monitoring of the NCIG CET operating noise emissions has demonstrated that:

- NCIG CET noise emissions are generally not discernible from other industrial noise at the nearest residential receiver areas;
- NCIG CET noise emissions do not exhibit any discernible low frequency, intermittent or tonal characteristics at the nearest residential receiver areas;
- NCIG CET noise emissions are in compliance with the relevant PA 06_0009 MOD2 (and EPL No 12693) noise limits; and
- NCIG CET noise emissions are generally consistent with the outcomes anticipated in the CET NIA and Rail Flyover Modification NIA.

2.4.3 On-site SWL Monitoring and Noise Modelling

Regular on-site noise monitoring has been undertaken since the commissioning stage of Stage 1 operations and during ongoing bi-annual on-site noise monitoring surveys since December 2010. This has allowed an update of the SWL database and environmental noise modelling to be conducted and reported on a quarterly (now bi-annual) basis. The current NCIG CET SWL database (as of June 2019) is presented in **Appendix E**.

2.4.4 Stage Completion Noise Audits

NCIG CET noise audits have been conducted at the completion of Stage 1, Stage 2AA, Stage 2F and the Rail Flyover Modification to confirm the noise performance in accordance with PA 06_0009 MOD2 (Schedule 2, Condition 3.6 and 3.7). The Stage completion noise audits comprehensively report the findings of design validation and on-site noise measurements to confirm the noise performance of individual items of plant and equipment as well as off-site noise monitoring and modelling to confirm off-site environmental noise emissions.

The Rail Flyover Audit Report presents the cumulative Stage 1, Stage 2AA and Stage 2F noise performance including the Rail Flyover Modification against the relevant PA 06_0009 MOD2 requirements. The report concludes the following:

“On the basis of the information presented in this report, it is concluded that noise emissions from NCIG CET including the Rail Flyover Modification comply in full with all noise-related conditions set out in the Rail Flyover Modification PA.”

2.4.5 Annual Independent Environmental Audits

Annual independent environmental audits have been conducted in accordance with PA 06_0009 MOD2 (Schedule 2, Conditions 5.1 and 5.2). The most recent environmental audit (Audit 2018) for the reporting period 1 October 2015 to 1 October 2018 was prepared by pitt&sherry and a team of technical experts in noise, air quality, surface water/groundwater and biodiversity. As the lead auditor pitt&sherry concluded the following:

“...NCIG have minimise [sic] noise emissions from plant and equipment operated on the Project site in accordance with Condition 2.9 and the Operation Noise Management Plan.

The plant and equipment specification and conformance LAeq Sound Power Levels (SWLs) are consistent with the use of best available low noise technology.

No noise complaints have been received during the audit period. The Auditor undertook a detailed review of all noise monitoring undertaken during the audit period. The monitoring undertaken confirms compliance with this condition.

The Auditor observed the noise bunds and barriers installed near the rail loop path to manage noise emissions...”

2.4.6 Complaints History

The Stage 2F Audit Report and Audit 2013 noted that one (1) complaint was received by NCIG in relation to possible noise generated by the NCIG CET Stage 2F and, in accordance with the ONMP and Operation Environmental Management Plan (OEMP), a noise investigation was conducted. The findings of the investigation are presented in *630.04515.60000 NCIG Noise Enquiry, 64 Douglas Street, Stockton (SLR, 2013)*. The investigation found that the NCIG CET noise emissions are not discernible from the overall industrial noise levels and would likely remain below the relevant noise limits.

In addition, a noise complaint was received by NCIG in May 2014 from a resident in Stockton with regard to alarm noise emissions. This was investigated and the alarm noise of concern was found to be located on another Kooragang Island industrial site and not at the NCIG CET.

As described in **Section 2.4.5**, no noise related complaints were received during the in the most recent environmental audit (Audit 2018) for the reporting period 1 October 2015 to 1 October 2018. The most recent compliance tracking program report (CTP 2019) for the reporting period 1 April 2018 to 31 March 2019 notes one noise related enquiry/complaint was received but was not in relation to NCIG operations.

3 Proposed Optimisation Project

3.1 Hours of Operation

There would be no change in the approved operating hours of the NCIG CET due to the Optimisation Project as presented in **Table 4**.

Table 4 Approved NCIG CET and Optimisation Project Hours of Operation

Operation	Description	Currently Approved ¹	Optimisation Project
On-Site	Construction works	Generally daytime (0700 hours to 1800 hours, 7 days per week)	Unchanged
	Operation, maintenance and inaudible construction works	24 hours, 7 days per week	Unchanged
Off-Site	Train Traffic	24 hours, 7 days per week	Unchanged
	Road Traffic	24 hours, 7 days per week	Unchanged

Note 1: As per PA 06_0009 MOD2.

3.2 On-site Operation

NCIG has undertaken a review of the operation of the CET to identify areas to improve efficiency, inherent unutilised capacity and opportunities to handle additional tonnes. The review identified a series of on-site control process and operational process improvements that have been implemented by NCIG within the existing NCIG CET boundary, utilising existing NCIG CET infrastructure and at a low capital cost. These improvements form part of the proposed Optimisation Project.

A comparison of the currently approved NCIG CET and the NCIG CET incorporating the Optimisation Project is provided in **Appendix F**. The Optimisation Project would incorporate the following key efficiency improvements implemented to date which have increased the maximum capacity to 79 Mtpa:

- Streamlining train approach times to unloading stations through the use of automated processes;
- Decreasing time between unloading of trains carrying the same coal type, and process and network changes to promote sequencing of trains carrying the same coal type;
- Extending stockpiles to the eastern limit of the existing stockyard pads;
- Improved utilisation of the existing coal stockpiles up to the approved height of 25 metres (m);
- Optimising the operation of stacker/reclaimers to improve relocation times and reduce mode change times (i.e. change times between stack and reclaim modes);
- Increasing conveyor inloading rates from up to approximately 8,500 tonnes per hour (tph) to up to approximately 10,000 tph through a volumetric increase of coal on the belt;
- Minimisation of unproductive process delays;
- Increasing average reclaim rates through control system improvements (with no proposed change to the approved maximum rate of 10,500 tph);
- Better utilising existing buffer bin capacity and operation;
- Improving shiploader hatch changes; and

- Improving shipping vessel arrival and departure processes.

Transport efficiency gains by third parties have also allowed improvements to throughput capacity at the NCIG CET, including ongoing improvements to the rail network as part of the Hunter Valley Corridor Capacity Strategy.

3.3 On-site Construction

Improvements and upgrades as part of the existing approved NCIG CET will continue to be managed in accordance with PA 06_0009 MOD2 (as modified). The Optimisation Project would not involve any additional construction activities.

3.4 Off-site Road Traffic

3.4.1 Construction

The approved construction workforce at the NCIG CET (NCIG employees and contractors) is up to approximately 500 people. The existing NCIG CET operational workforce comprises approximately 230 operational personnel (around 100 NCIG employees and 130 contractors). The Optimisation Project does not involve any change to the construction workforce.

3.4.2 Operation

During the operation of the Optimisation Project, the main access point is via the entrance to the administration and workshop buildings located off the western end of Raven Street near the intersection of Egret Street and Raven Street remains unchanged. It is not anticipated that the Optimisation Project would change the peak full-time operational jobs. As the Optimisation Project does not require any appreciable change to the existing (and approved) NCIG operational workforce, the associated traffic movements are not considered in this assessment.

3.5 Off-site Rail Traffic

Coal trains enter NCIG CET from the Kooragang Island mainline (via the Rail Flyover) to the rail spurs, follow the rail loops and empty their wagons into a hopper at train unloading stations. The Optimisation Project does not involve any change to the NCIG CET rail spur, rail sidings or rail loop.

Based on a nominal 7,000 tonne (t) capacity train, an average of approximately 26 trains can be unloaded per day at the existing CET. Allowing for the time taken to manoeuvre trains and equipment, the approved NCIG CET has capacity to receive up to a maximum of 40 trains on any one day. The NCIG CET incorporating the Optimisation Project would unload an average of approximately 28 trains per day. There would be no change to the capacity to receive up to a maximum of 40 trains on any one day.

4 Existing Meteorological and Noise Environment

4.1 CET NIA Meteorological Conditions

An extensive assessment of the prevailing meteorological environment was carried out in preparation for the CET NIA. **Table 5** presents the meteorological conditions assessed in the CET NIA.

Table 5 CET NIA Meteorological Modelling Parameters

Period	Meteorological Parameter	Air Temp	Relative Humidity	Wind Direction and Speed	Temperature Gradient
Daytime	Calm	20°C	70%	0 m/s	0°C/100 m
Evening	Wind only	15°C	80%	ENE 3 m/s	0°C/100 m
Night-time	Wind only	10°C	90%	WNW 3 m/s	0°C/100 m
	Inversion only	10°C	90%	0 m/s	3°C/100 m
	Inversion and Drainage flow ¹	10°C	90%	WNW 2 m/s	3°C/100 m

Note 1: Inversion 3°C/100 m plus 2 m/s drainage flow towards Fern Bay East and West and Stockton East and West receivers.

4.2 Project Approval Meteorological Conditions

As described in **Table 3**, PA 06_0009 MOD2 (as modified) contains the following meteorological conditions:

The maximum allowable noise contributions apply under:

- a) *Meteorological conditions of: wind speeds up to 3 ms⁻¹ at 10 metres above ground level; or*
- b) *Temperature inversion conditions up to 3°C per 100 metres and wind speeds up to 2 ms⁻¹ at 10 metres above ground level.*

4.3 NPfl Meteorological Conditions

In general terms, NPfl Fact Sheet D sets out procedures for establishing noise enhancing weather conditions, where two options are available to consider meteorological effects, as follows:

1. *Adopt the noise-enhancing meteorological conditions for all assessment periods for noise impact assessment purposes without an assessment of how often these conditions occur - a conservative approach that considers source-to-receiver wind vectors for all receivers and F class temperature inversions with wind speeds up to 2 m/s at night.*

or

2. *Determine the significance of noise-enhancing conditions. This involves assessing the significance of temperature inversions (F and G class stability categories) for the night-time period and the significance of light winds up to and including 3 m/s for all assessment periods during stability categories other than E, F or G. Significance is based on a threshold of occurrence of 30% determined in accordance with the provisions in this policy. Where noise-enhancing meteorological conditions occur for less than 30% of the time, standard meteorological conditions may be adopted for the assessment.*

NPfl Fact Sheet D also contains several important notes, and in particular states:

Noise limits derived for consents and licences will apply under the meteorological conditions used in the environmental assessment process, that is, standard or noise-enhancing meteorological conditions. For 'very noise-enhancing meteorological conditions' (see glossary) a limit is set based on the limit derived under standard or noise-enhancing conditions (whichever is adopted in the assessment) plus 5 dB. In this way a development is subject to noise limits under all meteorological conditions.

It should be noted that noise limit conditions will include the wind speed (scalar quantity without direction) under which noise limits will apply.

In consultation with NCIG, it was decided that the second option be conservatively adopted by updating noise modelling parameters based on the meteorological dataset for the period January 2017 to August 2019 collected from the NCIG automatic weather station (AWS) located on the NCIG project site on Kooragang Island. The contemporary meteorological dataset identified a broader range of wind and drainage flow directions during the evening and night-time periods (by comparison with the CET NIA) and the upper bound of F class stability (i.e. temperature gradient 4.0°C/100 m) has been applied to temperature inversion and drainage flow conditions, with the resulting meteorological modelling parameters presented in **Table 6**.

Table 6 NPfl Optimisation Project Assessment Meteorological Modelling Parameters

Period	Meteorological Condition	Meteorological Parameter	Air Temp	Relative Humidity	Wind Direction and Speed	Temperature Gradient
Daytime	Standard	Calm	20°C	70%	0 m/s	0°C/100 m
Evening	Noise-enhancing	Wind only	15°C	80%	W, WNW, NW, NNW 3 m/s	0°C/100 m
Night-time	Noise-enhancing	Wind only	10°C	90%	ENE, E, ESE 3 m/s W, WNW, NW, NNW 3 m/s	0°C/100 m
		Inversion only	10°C	90%	0 m/s	4.0°C/100 m
		Inversion plus drainage flow ¹	10°C	90%	W, WNW, NW, NNW 2 m/s	4.0°C/100 m

Note 1: Inversion 4.0°C/100 m plus 2 m/s drainage flow towards Fern Bay East and West and Stockton East and West receivers.

4.4 Noise Environment in the Absence of the NCIG CET

Although the NCIG CET has approved noise limits in PA 06_0009 MOD2, the NPfl procedures for the modification, expansion or upgrade of existing industrial premises require that noise impact assessments determine the relevant Rating Background Levels (RBLs) and noise amenity levels ($L_{Aeq(period)}$) in the absence of the existing industrial premises.

Background noise data and monitoring results to characterise and quantify the noise environment in the absence of the NCIG CET were previously collated and presented in the CET NIA. In addition, supplementary ambient noise monitoring results presented in the T4 Project NIA have been utilised to determine RBLs and noise amenity levels in the residential receiver areas of Fern Bay North, Warabrook and Maryville, which were not previously assessed in the CET NIA. The background and amenity levels at Fern Bay North, Maryville and Warabrook residential areas are relatively unaffected by the NCIG CET's operation and therefore the measured noise levels are suitable for setting project noise trigger levels (PNTLs).

The resulting single representative RBLs and $L_{Aeq(period)}$ noise amenity levels for each residential receiver area in the absence of NCIG CET are presented in **Table 7**.

Table 7 Background and Industrial Noise for Assessment (dBA re 20 µPa)

Receiver Area	ID	Measured RBL All Noise Sources			Measured LAeq(period) ² All Noise Sources			Estimated LAeq(period) ² Industrial Noise Only		
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Existing CET NIA Background and Industrial Noise Data										
Fern Bay West Residential	FW1	50	42	44	60	55	54	<54	46	48
Fern Bay East Residential	FE1	40	44	42	48	46	46	<54	42	43
Stockton West Residential	SW1	42	44	44	63	57	59	<54	47	48
Stockton East Residential	SE1	41	43	43	55	50	49	<54	43	44
Warabrook/Mayfield West Residential	W1-W2	45	46	41	61	56	55	<54	45	43
Mayfield Residential	M1-M5	46	47	43	63	59	56	<54	45	44
Carrington Residential	C1	42	41	37	62	67	57	46	45	42
Sandgate ³ Residential	SG2-SG3	48	45	40	57	54	55	<54	<44	<39
Sandgate Commercial	SG1	48	45	40	57	54	55	<59	46	43
Steel River ¹ Commercial	MW1	-	-	-	-	-	-	<59	<59	<59
Kooragang Island Industrial	KI1	51	51	47	61	56	55	<64	53	51
Mayfield North Industrial	MN1	56	57	57	60	59	59	<64	57	57
Supplementary T4 Project NIA Background and Industrial Noise Data										
Fern Bay North Residential	FN1	44	46	41	62	61	58	<49	43	42
Maryville Residential	MV1	48	47	45	51	49	48	<54	50	45
Warabrook Residential	W4	45	43	39	56	53	51	<54	<44	<39

Note 1: Assumed industrial noise levels.

Note 2: Daytime 0700 hours to 1800 hours, Evening 1800 hours to 2200 hours and Night-time 2200 hours to 0700 hours.

Note 3: RBL and amenity levels conservatively estimated from operator-attended measurements at SG1 (refer CET NIA).

5 Noise Criteria and Assessment Procedure

5.1 Construction Noise Assessment Criteria

As discussed in **Section 3.3**, the Optimisation Project would not involve any additional construction activities. Improvements and upgrades as part of the existing approved NCIG CET will continue to be managed in accordance with PA 06_0009 MOD2 (as modified).

5.2 Operating Noise Assessment Criteria

5.2.1 Recommended Amenity, Project Amenity and Intrusive, PNTLs

The EPA has regulatory responsibility for the control of noise from “scheduled premises” under the *Protection of the Environment Operations Act, 1997*. In implementing the NPfl, the EPA has two broad objectives:

- Controlling intrusive noise levels in the short term; and
- Maintaining noise amenity levels for particular land uses over the medium to long-term.

The Optimisation Project comprises on-site industrial operations (as described in **Section 3.2**) which are dealt with in the accordance the NPfl, whereas road, rail and waterway transportation corridors are specifically excluded from the NPfl. In general terms, the NPfl sets out procedures for establishing the project intrusive noise level and project amenity noise level, with a view determining the lower (that is, the more stringent) being the project noise trigger level (PNTL).

Firstly, the NPfl Section 2.4 states:

*The recommended noise amenity levels represent the objective for **total** industrial noise at a receiver location, whereas the **project amenity noise level** represents the objective for noise from a **single** industrial development at a receiver location.*

As described in **Section 2.1**, the nearest potentially affected residential areas to the Optimisation Project equate with the “urban” residential receiver category. In accordance with NPfl Section 2.4, the proposed recommended amenity noise levels (RANL) for each locality are presented in **Table 8**, together with the project amenity noise levels (PANL) being 5 dBA less than the recommended amenity noise level from derived from NPfl Table 2.2. The NPfl Section 2.4 states:

The recommended amenity noise levels have been selected on the basis of studies that relate industrial noise to annoyance in communities (Miedema and Voss, 2004). They have been subjectively scaled to reflect the perceived differential expectations and ambient noise environments of rural, suburban and urban communities for residential receivers. They are based on protecting the majority of the community (90%) from being highly annoyed by industrial noise.

Table 8 NPfl Recommended Amenity and Project Amenity Noise Levels LAeq(period) (dBA re 20µPa)

Receiver Area	NPfl Noise Amenity Area ^{1, 2}	Recommended Amenity Noise Level LAeq(period) ³			Project Amenity Noise Level LAeq(period) ³		
		Daytime	Evening	Night	Daytime	Evening	Night
Fern Bay North Fern Bay West and East Stockton West and East Carrington, Maryville Mayfield, Mayfield West Warabrook, Sandgate	Urban ⁴	60	50	45	55	45	40
Mayfield West, Sandgate	Commercial	65 when in use			60 when in use		
Mayfield West, Mayfield North, Kooragang Island	Industrial	70 when in use			65 when in use		
Any	School ^{5, 6}	45 when in use			40 when in use		
Any	Hospital ^{5, 6}	50 when in use			45 when in use		

Receiver Area	NPfl Noise Amenity Area ^{1, 2}	Recommended Amenity Noise Level LAeq(period) ³			Project Amenity Noise Level LAeq(period) ³		
		Daytime	Evening	Night	Daytime	Evening	Night
Any	Church, Cemetery	50 when in use			45 when in use		
Any	Active Recreation	55 when in use			50 when in use		
Any	Passive Recreation	50 when in use			45 when in use		

Note 1: In accordance with the NPfl Table 2.2.

Note 2: In accordance with the NPfl Table 2.3.

Note 3: Daytime Monday to Saturday 7:00am to 6:00pm, Sunday and Public Holidays 8:00am to 6:00pm; Evening Monday to Sunday 6:00pm to 10:00pm; Night-time Monday to Saturday 10:00pm to 7:00am, Sunday and Public Holidays 10:00pm to 8:00am.

Note 4: At the most-affected point within 30 m of the residential premises.

Note 5: External criteria equivalent to internal criteria plus 10 dBA.

Note 6: Noisiest LAeq(1hour).

Secondly, the NPfl Section 2.1 states:

The project intrusiveness noise level aims to protect against significant changes in noise levels, whilst the project amenity noise level seeks to protect against cumulative noise impacts from industry and maintain amenity for particular land uses. Applying the most stringent requirement as the project noise trigger level ensures that both intrusive noise is limited and amenity is protected and that no single industry can unacceptably change the noise level of an area.

The project intrusive noise level (LAeq(15minute)) should not exceed the RBL (once beyond a minimum threshold) more than 5 dBA. The PNTLs are then determined in accordance with NPfl Section 2.1, by identifying the lower of the project amenity noise level or project intrusive noise level [following conversion of the project amenity noise level LAeq(period) to an equivalent LAeq(15minute) value for comparison with the project intrusive noise level LAeq(15minute) using the NPfl Section 2.2 default conversion factor of plus 3 dBA].

The project amenity noise levels, the project intrusive noise levels and the resulting LAeq(15minute) PNTLs for the various localities in the vicinity of the Optimisation Project are presented in **Table 9**. These criteria are nominated for the purposes of assessing potential noise impacts from the NCIG CET incorporating the Optimisation Project.

Table 9 NPfl Project Amenity, Intrusive Noise Levels and Resulting LAeq(15minute) PNTLs (dBA re 20µPa)

Receiver Area	NPfl Noise Amenity Area ^{1, 2}	Project Amenity Noise Level LAeq(15minute) ^{1,2}			Project Intrusive Noise Level LAeq(15minute) ^{1,3}			Resulting PNTL LAeq(15minute) ^{1,4}		
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Fern Bay North ⁷	Urban ⁴	58	48	43	49	49	46	49	48	43
Fern Bay West					55	47	47	55	47	43
Fern Bay East					45	45	45	45	45	43
Stockton West					47	47	47	47	47	43
Stockton East					46	46	46	46	46	43
Carrington					47	46	42	47	46	42
Maryville ⁷					53	52	50	53	48	43

Receiver Area	NPfl Noise Amenity Area ^{1, 2}	Project Amenity Noise Level LAeq(15minute) ^{1,2}			Project Intrusive Noise Level LAeq(15minute) ^{1,3}			Resulting PNTL LAeq(15minute) ^{1,4}		
		Day	Evening	Night	Day	Evening	Night	Day	Evening	Night
Mayfield					51	51	48	51	48	43
Mayfield West					50	50	46	50	48	43
Warabrook ⁷					50	48	44	50	48	43
Sandgate ⁷					53	50	45	53	48	43
Mayfield West, Sandgate	Commercial	63 when in use			not applicable			63 when in use		
Mayfield West, Mayfield North, Kooragang Island	Industrial	68 when in use						68 when in use		
Any	School ^{5, 6}	43 when in use						43 when in use		
Any	Hospital ^{5, 6}	48 when in use						48 when in use		
Any	Church, Cemetery	48 when in use						48 when in use		
Any	Active Recreation	53 when in use						53 when in use		
Any	Passive Recreation	48 when in use						48 when in use		

Note 1: Daytime Monday to Saturday 7:00am to 6:00pm, Sunday and Public Holidays 8:00am to 6:00pm; Evening Monday to Sunday 6:00pm to 10:00pm; Night-time Monday to Saturday 10:00pm to 7:00am, Sunday and Public Holidays 10:00pm to 8:00am.

Note 2: Project amenity noise level LAeq(15minute) equivalent to the project amenity noise level LAeq(period) (Table 8) plus 3 dBA.

Note 3: Project intrusive noise level LAeq(15minute) equivalent to the RBL (Table 7) plus 5 dBA.

Note 4: Resulting LAeq(15minute) PNTL is the lower of the project amenity noise level or project intrusive noise level.

Note 5: At the most-affected point within 30 m of the residential premises.

Note 5: External criteria equivalent to internal criteria plus 10 dBA.

Note 6: Noisiest LAeq(1hour).

Note 7: PNTL determined based upon RBLs presented in T4 Project NIA (Table 7).

It is noted under the NPfl assessment approach that resultant PNTLs are in some cases more or less stringent (i.e. higher or lower) than existing CET noise limits. In qualitative terms, the extent of noise protection provided by the PNTLs is described in A Guide to the Noise Policy for Industry (EPA, 2017).

In those cases where the NPfl noise assessment criteria are not achieved, it does not automatically follow that all people exposed to the noise would find the noise “unacceptable”. In subjective terms, NPfl Table 4.1 and Table 4.2 characterise the noise impacts resulting from residual noise exceedances generally as follows:

- If the residual noise exceedance is 1-2 dBA above the PNTL, then noise impacts are considered to be negligible (i.e. not discernible by the average listener);
- If the residual noise exceedance is 3-5 dBA above the PNTL, and the project would contribute less than (or equal to) 1 dB to the total industrial noise level, then noise impacts are considered to be marginal;
- If the residual noise exceedance is 3-5 dBA above the PNTL, and the project would contribute more than 1 dB to the total industrial noise level, then noise impacts are considered to be moderate;
- If the residual noise exceedance is >5 dBA above the PNTL, and the total industrial noise level is less than (or equal to) the relevant amenity level, then noise impacts are considered to be moderate; or

- If the residual noise exceedance is >5 dBA above the PNTL, and the total industrial noise level is greater than the relevant amenity level, then noise impacts are considered to be significant.

5.2.2 Noise Modifying Adjustment Factors

In accordance with the NPfI's Fact Sheet C, where a noise source contains certain characteristics, such as dominant low frequency content, the NPfI states that there is evidence to suggest that it can cause greater annoyance at a receiver than other noise at the same noise level. The modifying factors (if applicable) are to be applied to the measured or predicted noise level at the receiver and then assessed against the PNTLs. In the case of low frequency (10 hertz [Hz] to 160Hz) noise at the receiver, subject to the extent of the exceedance above the thresholds presented in the NPfI's Fact Sheet C (Table C2), requires a 2 dB to 5 dB correction to be applied to the measured or predicted intrusive noise levels where the difference between the C and A weighted level is 15dB (or more) in accordance with NPfI's Fact Sheet C (Table C1).

The NCIG CET, incorporating the Optimisation Project comprises predominately fixed mechanical plant (ie conveyors, drives and transfer stations) together with relatively stationary items of mobile equipment (ie stacker/reclaimers and shiploaders). Noise associated with multiple noise sources operating simultaneously gives rise to a relatively continuous (or steady) emission - which is typical of NCIG CET's existing noise levels particularly at far-field receivers.

The off-site intrusive $L_{Aeq(15\text{minute})}$ and $L_{A1(1\text{minute})}$ noise level monitoring results are summarised in **Appendices D1** and **D2** respectively. As discussed in **Section 2.4.2**, NCIG CET noise emissions are generally not discernible from other industrial noise, and do not exhibit any discernible low frequency, intermittent or tonal characteristics at the nearest residential receiver areas.

It is concluded that NCIG CET noise emissions do not attract any modifying factor adjustments accordance with the NPfI's assessment procedures.

5.2.3 Sleep Disturbance Noise Assessment Criteria

A sleep disturbance assessment procedure is described in the NPfI Section 2.5, which states:

Where the subject development/premises night-time noise levels at a residential location exceed:

- $L_{Aeq,15\text{min}}$ 40 dBA or the prevailing RBL plus 5 dB, whichever is the greater, and/or
- $L_{AF\text{max}}$ 52 dBA or the prevailing RBL plus 15 dB, whichever is the greater,

a detailed maximum noise level event assessment should be undertaken.

Based on the foregoing, the applicable night-time sleep disturbance noise levels (SDNLs) for residential areas are: an intrusive ($L_{Aeq(15\text{minute})}$) noise level of 40 dBA; and a maximum noise level ($L_{AF(\text{maximum})}$) 52 dBA (free field).

The night-time maximum ($L_{AF(\text{maximum})}$) and intrusive ($L_{Aeq(15\text{minute})}$) Sleep Disturbance Noise Levels (SDNLs) determined in accordance with the NPfI are presented in **Table 10** together with the NCIG CET approved $L_{A1(1\text{minute})}$ noise limits from PA 06_0009 MOD2.

Table 10 NPfl Night-time maximum (LAF(max)) and intrusive (LAeq(15minute)) SDNLs (dBA re 20 µPa)

Residential Receiver Area	NCIG CET Approved LA1(1minute) Limit ¹	NPfl Maximum LAF(maximum)) SDNL ¹	NPfl Intrusive LAeq(15minute) SDNL ¹
Fern Bay North	-	56	46
Fem Bay West	57	59	49
Fern Bay East	55	57	47
Stockton West	57	59	49
Stockton East	56	58	48
Carrington	52	52	42
Maryville	-	60	50
Mayfield	62	58	48
Mayfield West	55	56	46
Warabrook	-	54	44
Sandgate	-	55	45

Note 1: Monday to Saturday 2200 hours to 0700 hours; Sundays and Public Holidays 2200 hours to 0800 hours.

As discussed in **Section 5.2.2**, NCIG CET incorporating the Optimisation Project comprises predominately fixed mechanical plant (i.e. conveyors, drives and transfer stations) together with relatively stationary items of mobile equipment (i.e. stacker/reclaimers and shiploaders). Noise associated with multiple noise sources operating simultaneously gives rise to a relatively continuous (or steady) emission - which is typical of NCIG CET's existing noise levels particularly at far-field receivers. However, some noise sources have the potential to emerge from the relatively steady level including the operation of trains on the rail loop. Existing and new alarms are subject to the low noise procurement specifications thus minimising potential off-site noise disturbance.

The off-site intrusive LAeq(15minute) and LA1(1minute) noise level monitoring results are summarised in **Appendices D1** and **D2** respectively. As discussed in **Section 2.4.2**, NCIG CET noise emissions are generally not discernible from other industrial noise at the nearest residential receiver areas and any difference between the intrusive and maximum level has not be quantified by noise monitoring. In the absence of any field noise measurement results, a conservative 6 dBA emergence factor has been adopted for this impact assessment (which is also generally consistent with the T4 Project NIA).

6 Noise Assessment Methodology

6.1 Existing NCIG CET Noise Control and Management Measures

The potential for machinery to emit noise is quantified as the sound power level (SWL) expressed in A-weighted decibels (dBA) relative to 1 pW. At the receptor, the received noise is quantified as the sound pressure level (SPL) expressed in dBA re 20 µPa. In general terms, any variation in the on-site SWLs will produce a similar variation in the off-site intrusive LAeq(15minute) noise level at the nearest receivers. To achieve the residential receiver noise limits, the existing NCIG CET plant and equipment SWLs have been limited at the source and/or the noise propagation path restricted (i.e. barriers, enclosures, etc).

The existing NCIG CET Stage 1, Stage 2AA and Stage 2F infrastructure acoustic design employed the use of best economically available technology when setting equipment noise specifications and plant conformance requirements. The approval and design process involved the use of two noise performance categories, namely:

- Equipment with item-specific SWL Procurement Specifications (i.e. conveyors drive assemblies, conveyor idlers, stacker/reclaimers and shiploaders) as well as occupational noise requirements.; and
- Plant with nominal SWL Conformance Requirements (i.e. dump stations and transfer stations) in order to demonstrate “fit for purpose” as well as occupational noise requirements.

As discussed in **Section 2.4.4**, the Rail Flyover Audit Report presents the cumulative Stage 1, Stage 2AA and Stage 2F noise performance including the Rail Flyover Modification, against the relevant PA 06_0009 MOD2 requirements.

Furthermore, the ONMP describes NCIG’s approved noise control and management measures comprising plant and equipment acoustical design, procurement, construction and commissioning together with noise monitoring and reporting, to ensure that the approved noise limits (**Table 3**) are achieved as summarised in **Table 11**.

Table 11 Construction and Operating Noise Control and Management Measures

Equipment Type	Noise Mitigation Measure
Construction Noise and Vibration Management	
Piling, drilling, dozing, dynamic ground compaction	Vibratory equipment used in a manner which minimises noise impacts at sensitive receivers for example avoiding piling outside of standard hours.
Mobile Equipment Alarms	Use of alternative alarms as such quacker type or selectable frequency and volume control alarms where appropriate.
Noise Management	Construction staff noise awareness training; Noise awareness part of the site induction training; Integrated community enquiries and response programme; and Regular noise monitoring programme and analysis of results.
Operating Noise Controls and Management	
Conveyor drives	Low noise specification and compliance programme; Noise monitoring of the conveyor drives will be undertaken regularly to ensure compliance with low noise specifications; and Noise barriers will be installed where required e.g. cladded enclosures.
Stockyard and Shiploading conveyors	Low noise idlers and random spacing implemented on the return idlers of the stockyard and ship-loading conveyors.
Transfer conveyors	Covered conveyors with low noise idlers where appropriate. All transfer conveyors that are elevated in enclosed within a gantry.
Yard machinery and Shiploaders	Stacker/reclaimers and shiploaders low noise specification including conveyor drives and idlers; and Demonstration of compliance with low noise specification by supplier at design, manufacture and commissioning stages.
Buffer Bins, Chutes	Belt feeders and soft flow chutes implemented at the buffer bins and chutes.
Receival, Sample and Dump Station buildings	Enclosure of sample stations with minimum penetrations; and The dump station will be partially enclosed (roof and side walls with openings only for train ingress/egress).

Equipment Type	Noise Mitigation Measure
Equipment start up and travel alarms	Install alarm systems with selectable frequency and volume control. ¹
Rail Loop and Spur	Partial barrier on rail loop.
Noise Management	Maintenance and operational staff noise awareness training; Noise awareness part of the site induction training; Integrated community enquiries and response programme; and Regular noise monitoring programme and analysis of results.

Note 1: Alarms are subject to procurement specifications detailing the tone frequency, noise emission levels, directionality and coverage. Alarms are installed to optimise safety and to minimise off-site noise. In the unlikely event that alarm noise remains a source of disturbance, then further on-site optimisation and fine adjustments are implemented to achieve further noise reductions without compromising safety standards.

6.2 NCIG CET Incorporating the Optimisation Project

The existing NCIG CET items of plant and equipment have been measured during commissioning trials and quarterly (now bi-annual) noise monitoring surveys and the NCIG CET SWL database maintained with the latest operating SWLs (**Section 2.4.3**). The plant and equipment SWLs for all installed NCIG CET infrastructure (as measured at June 2019) are presented in **Appendix E** and summarised in **Table 12**.

The total site SWL at the completion of Stage 2F was approximately 128.4 dBA inclusive of the rail loop and is generally consistent of the outcomes anticipated in the CET NIA. It is noted that no new plant and equipment was introduced to the NCIG CET by the Rail Flyover Modification. As such, the on-site operating plant and equipment remains unaltered from that at the completion of Stage 2F.

As discussed in **Section 3.2** no new items of plant and equipment are proposed as part of the Optimisation Project, rather, the increase in capacity and throughput has been achieved through operational improvements to the existing plant and equipment. The Optimisation Project will utilise existing infrastructure while increasing conveyor efficiencies, with no alteration to the existing approved infrastructure footprint.

Increases in SWL associated with the Optimisation Project are anticipated due to the increased conveyor inloading rates from 8,500 tph to 10,000 tph. While there will be no increase in conveyor speed, it is anticipated that the volumetric increase in coal on the belt will require an increase in the power demand of the associated conveyor drives and hence a marginal increase in operating SWL.

The Optimisation Project SWLs have therefore been determined by increasing the measured SWLs of the existing conveyor drives in accordance with the proposed increase in capacity and anticipated increase in demand power. **Appendix E** highlights the existing plant and equipment modified by the optimisation processes along with the anticipated increase in SWL, while **Table 12** summarises the total site SWL for the Optimisation Project. **Table 12** shows that the existing total site SWL of 127.8 dBA (as of June 2019) is anticipated to increase by a negligible less than 0.1 dBA due to the increase in capacity associated with the Optimisation Project.

Table 12 NCIG CET Total Plant and Equipment LAeq Sound Power Levels (dBA re 1pW)

As at Completion	Stage 1 30 Mtpa	Stage 2AA 53 Mtpa	Stage 2F ¹ 66 Mtpa	NCIG CET 66 Mtpa June 2019	NCIG CET 79 Mtpa Optimisation Project ²
Stage 1	125	125	125	125	125
Stage 2AA	-	124	124	123	123
Stage 2F	-	-	121	121	121
TOTAL SITE³	125.0	127.7	128.4	127.8	127.8
Incremental SWL change	-	2.7	0.7	-0.6	<0.1

Note 1: Inclusive of Rail Flyover Modification.

Note 2: No new plant and equipment proposed as part of the Optimisation Project (preliminary design).

Note 3: Total site SWL inclusive of coal trains and wagons operating on the NCIG CET rail loop.

6.3 Noise Modelling Scenario

The computer model developed for the CET NIA incorporates the significant noise sources associated with the NCIG CET site and rail loop, surrounding terrain, aspects of the built environment and nearby receiver areas. Subsequent to the CET NIA, the noise model was modified to include key components of the as built layout and typical operation features of the NCIG CET Stage 1, Stage 2AA and Stage 2F infrastructure (inclusive of the Rail Flyover) as guided by NCIG in various information updates, including:

- Train movements on the rail loop;
- Rail loop noise berms;
- Stockpile arrangements and layouts;
- Weighting of stacker/reclaimer operations based on the distribution of stockpile utilisation;
- Lateral distribution of conveyor noise emissions; and
- Vertical distribution of stacker/reclaimer and shiploader noise emissions.

The NCIG CET noise model has been updated to include the changes to SWLs associated with the Optimisation Project as presented in **Appendix E**. The NCIG CET incorporating the Optimisation Project operating noise levels are predicted from concurrent operation of all items of plant and equipment and therefore represents the maximum operating noise from the simultaneous operation of Stage 1, Stage 2AA and Stage 2F (inclusive of the Rail Flyover).

7 Optimisation Project Noise Impact Assessment

7.1 Predicted Intrusive Noise Levels at Residential Receiver Areas

The predicted CET incorporating the Optimisation Project intrusive LAeq(15minute) noise levels to the nearest residential receiver areas are presented in **Table 13** together with the CET approved intrusive noise limits (**Table 3**) and NPfI PNTLs (**Table 9**).

Table 13 Residential Receiver Predicted Operating Intrusive LAeq(15minute) Noise Levels (dBA re 20 µPa)

Receiver Area	ID/Location		Predicted Intrusive LAeq(15minute) Noise Level ¹			Noise Assessment Criteria	
			Daytime	Evening	Night-time	Approved Intrusive Noise Limit	NPfI PNTL Daytime/evening /night-time
Fern Bay North	FN1	Bayway Village Nelson Bay Rd	23	34	35	-	49/48/43
	FN2	2 Seaside Bvd	18	30	32		
Fern Bay West	FW1	1 Fullerton Lane	25	36	39	41	55/47/43
Fern Bay East	FE1	21 Braid Road	22	35	38	39	45/45/43
Stockton West	SW1	284 Fullerton St	24	37	39	41	47/47/43
	SW2	Cnr Pembroke St & Fullerton St	23	35	38		
Stockton East	SE1	40 Eames Avenue	23	36	38	38	46/46/43
	SE3	10 Pitt Street	20	31	34		
Mayfield West	W1	47 Stevenson Ave	29	35	41	45	50/48/43
	W2	4 Groongal Street	31	38	43		
Warabrook	W4	Cnr Decora Cr & Elata Way	27	28	36	-	50/48/43
	W5	Cnr Decora Cr & Mabellae Pl	21	23	37		
	W6	14 O'Learia Crescent	26	33	39		
Mayfield	M1	68 Bull Street	32	38	43	44	51/48/43
	M2	45 Simpson Cr	32	39	43		
	M3	1 Arthur St	29	41	43		
	M4	52 Arthur St	31	41	42		
	M5	21 Crebert St	31	42	43		
Carrington	C1	Cnr Hargrave St & Young St	24	35	36	36	47/46/42
	C2	Cnr Harrison St & Northumberland St	23	34	36		
Maryville	MV1	George Street	28	39	40	-	53/48/43
Sandgate	SG2	117 Pacific Highway	30	30	40	-	53/48/43
	SG3	151 Pacific Highway	28	28	39		

Note 1: Highest predicted noise level to each receiver from the daytime, evening and night-time NPfI meteorological conditions (Table 6).

Note 2: Intrusive noise level complies with the relevant CET approved intrusive noise limit and NPfI PNTL.

7.2 Predicted Noise Amenity Levels at Residential Receiver Areas

The predicted night-time CET incorporating the Optimisation Project LAeq(night) noise amenity levels to the nearest residential receiver areas are presented in Table 14 together with the CET approved noise amenity limits (Table 3).

Table 14 Residential Receiver Predicted Operating LAeq(night) Noise Amenity Levels (dBA re 20 µPa)

Receiver Area	ID/Location ¹	Predicted LAeq(night) Noise Amenity Level ¹	Approved LAeq(night) Noise Amenity Limit
Fern Bay West	FW1 1 Fullerton Lane	35	37
Fern Bay East	FE1 21 Braid Road	34	36
Stockton West	SW1 284 Fullerton Street	35	37
	SW2 Cnr Pembroke St & Fullerton St	34	
Stockton East	SE1 40 Eames Avenue	34	35
	SE3 10 Pitt Street	30	
Mayfield West	W1 47 Stevenson Avenue	37	40
	W2 4 Groongal Street	39	
Mayfield	M1 68 Bull Street	39	39
	M2 45 Simpson Crescent	39	
	M3 1 Arthur Street	39	
	M4 52 Arthur Street	38	
	M5 21 Crebert Street	39	
Carrington	C1 Cnr Hargrave St & Young St	32	33
	C2 Cnr Harrison St & Northumberland St	32	

Note 1: Highest predicted noise level to each receiver from the night-time NPfi meteorological conditions (Table 6).

Note 2: Noise amenity level complies with the relevant CET approved noise amenity limits.

7.3 Predicted Sleep Disturbance Noise Levels at Residential Receiver Areas

The predicted CET incorporating the Optimisation Project night-time sleep disturbance noise levels to the nearest residential receiver areas are presented in Table 15 together with the CET approved LA1(1minute) noise limits (Table 3) and NPfi SDNLs (Table 10).

Table 15 Residential Receiver Predicted Operating Night-time LAF(maximum) SDNLs (dBA re 20 µPa)

Receiver Area	ID/Location	Predicted LAF(maximum) Noise Level ¹	Noise Assessment Criteria	
			Approved LA1(1minute) Noise Limit	NPfi SDNL LAF(maximum)
Fern Bay North	FN1 Bayway Village Nelson Bay Road	41	-	56
	FN2 2 Seaside Bvd	38		
Fern Bay West	FW1 1 Fullerton Lane	45	57	57
Fern Bay East	FE1 21 Braid Road	44	55	55
Stockton West	SW1 284 Fullerton St	45	57	57
	SW2 Cnr Pembroke St & Fullerton St	44		
Stockton East	SE1 40 Eames Avenue	44	56	56
	SE3 10 Pitt Street	40		
Mayfield West	W1 47 Stevenson Av	47	55	56
	W2 4 Groongal Street	49		
Warabrook	W4 Cnr Decora Cr & Elata Way	42	-	54

Receiver Area	ID/Location	Predicted LAF(maximum) Noise Level ¹	Noise Assessment Criteria	
			Approved LA1(1minute) Noise Limit	NPfi SDNL LAF(maximum)
	W5 Cnr Decora Cr & Mabellae Pl	43		
	W6 14 O'Leiria Crescent	45		
Mayfield	M1 68 Bull Street	49	62	58
	M2 45 Simpson Cr	49		
	M3 1 Arthur St	49		
	M4 52 Arthur St	48		
	M5 21 Crebert St	49		
Carrington	C1 Cnr Hargrave St & Young St	42	52	52
	C2 Cnr Harrison St & Northumberland St	42		
Maryville	MV1 George Street	46	-	60
Sandgate	SG2 117 Pacific Highway	46	-	55
	SG3 151 Pacific Highway	45		

Note 1: Highest predicted level to each receiver from the night-time INP meteorological conditions (Table 6).

Note 2: Night-time sleep disturbance noise level complies with the relevant CET approved LA1(minute) noise limits and LAF(maximum) SDNL

7.4 Predicted Intrusive Noise Levels at Non-residential Receiver Areas

The predicted NCIG CET incorporating the Optimisation Project intrusive LAeq(15minute) noise levels to the nearest non-residential receiver areas are presented in Table 16 together with the NPfi PTNLs (Table 9).

Table 16 Non-residential Receivers Predicted Operating Intrusive LAeq(15minute) Noise Levels (dBA re 20 µPa)

Receiver Area	ID/Location	Predicted LAeq(15minute) Noise Level ¹			NPfi PNTL
		Daytime	Evening	Night-time	
Fern Bay West	FW2 Stockton Hospital	23	37	39	48 when is use
Fern Bay East	FE2 Fern Bay Primary	24	36	-.3	43 when is use
Stockton East	SE2 Stockton Primary	22	33	-.3	
Mayfield West	W3 Mayfield West Primary	30	39	-.3	
Mayfield	M6 Hunter Christian School	32	38	-.3	
	M7 Mayfield East Primary	28	40	-.3	
Sandgate	SG1 4 Mangrove Road -Commercial	35	36	44	63 when in use
	SG4 Catholic Care Centre	23	20	36	48 when in use
Mayfield West	MW1 Steel River	36	42	46	63 when in use
Kooragang Island	KI1 Blue Circle Southern	55	58	58	68 when in use
	KI2 Origin Energy	52	56	56	
	KI3 Boral Country Concrete	49	54	55	
	KI4 Port Waratah Coal Services	38	48	49	
	KI5 Cargill Australia	41	50	51	
	KI6 ERS Australia	43	52	52	

Receiver Area	ID/Location	Predicted LAeq(15minute) Noise Level ¹			NPfi PNTL
		Daytime	Evening	Night-time	
	KI7 Cleanaway	47	54	54	
	KI8 Port Hunter Commodities	47	53	53	
	KI9 BOC Gas	48	55	55	
	KI10 Sims Metal	45	52	52	
Mayfield North	MN1 OneSteel	47	53	53	68 when in use

Note 1: Highest predicted noise level to each receiver from the daytime, evening and night-time NPfi meteorological conditions (Table 6).

Note 2: Predicted intrusive noise level complies with the relevant NPfi PNTL.

Note 3: Not in use during the night-time period.

7.5 Noise Impact Assessment Summary

In summary, the predicted daytime, evening and night-time intrusive LAeq(15minute) noise levels and night-time LAeq(night) amenity and LAF(maximum) noise levels, show that:

- No exceedance of the PA 06_0009 MOD2 intrusive noise limits and intrusive PNTLs are predicted during the daytime, evening and night-time (Table 13) at residential receiver areas;
- No exceedance of the PA 06_0009 MOD2 amenity noise limits are predicted during the night-time (Table 14) at residential receiver areas;
- No exceedance of the PA 06_0009 MOD2 sleep disturbance noise limits and SDNLs are predicted during the night-time (Table 15) at residential receiver areas;
- No exceedance of the intrusive PNTLs are predicted during the daytime, evening and night-time (Table 16) at non-residential receiver areas (when in use); and
- Predicted intrusive noise levels are generally consistent with those presented in the Rail Flyover Modification NIA and rail Flyover Audit Report, with any predicted noise level variations from the NCIG CET incorporating the Optimisation Project being largely due to the consideration of previously unassessed noise enhancing meteorological conditions (refer Section 4.1).

Based on the above, the predicted daytime, evening and night-time intrusive LAeq(15minute) noise levels, night-time LAeq(night) amenity and LAF(maximum) noise levels would comply with existing PA 06_0009 MOD2 noise limits and contemporary NPfi PNTLs. Any noise impacts from the proposed operation of the NCIG CET, incorporating the Optimisation Project, are therefore considered acceptable.

The outer envelope intrusive LAeq(15minute) noise level contours are presented in Appendix G. The calculation of the noise contours involves numerical interpolation of a noise level array with a graphical accuracy of up to ±2 dBA. This means that in some cases the contour locations presented in Appendix G will differ slightly from values presented in Table 13.

8 Cumulative Amenity Impact Assessment

The NPfi notes:

Where the project amenity noise levels apply and it can be met, no additional consideration of cumulative industrial noise is required.

The NPfl seeks to protect against cumulative noise impacts and by setting the PNTLs at the more stringent of the project intrusiveness criteria or project amenity criteria, that aims to ensure intrusive noise is limited, and amenity is protected. Notwithstanding, given the significant industry within the study area an assessment of cumulative noise levels has been conducted. The NPfl recommended noise amenity levels for receivers in the vicinity of the NCIG CET are shown in **Table 8**.

8.1 Approved/Proposed Industrial Developments in the Vicinity of the NCIG CET

Ambient noise monitoring in the vicinity of the NCIG CET has been previously conducted as described in **Section 4.4**.

A review of major approved and proposed industrial developments in the vicinity of the NCIG CET that may not be captured within the ambient noise monitoring was conducted and is presented in **Table 17**. The anticipated night-time operating $L_{Aeq(9\text{hour})}$ amenity levels from each of these developments have been established by reviewing the project approvals and environmental assessments and then used for the purposes of the cumulative night-time noise amenity assessment.

Table 17 Approved/Proposed Industrial Developments in the Vicinity of the NCIG CET

Development Site	Approval Date	Status	Source of Noise Data
PWCS KCT Stage 4 120 Mtpa MOD 1 (MOD 2, MOD 3)	31/05/2010 (05/04/2012, 26/11/2012)	Operating	Umwelt (2010)
PWCS Terminal 4 Project (Preferred Project) ⁵	30/09/2015	Approved but no longer proceeding ¹	EMM (2013)
Orica Ammonium Nitrate Facility MOD 1 (MOD 2)	11/07/2012 (17/12/2014)	Under Construction (Not commenced)	Atkins Acoustics (2011) (AECOM 2013)
Incitec Pivot Ammonium Nitrate Facility	16/12/2014	Construction deferred ²	URS (2012)
Knauf Glass Wool Manufacturing Plant	14/10/2009	Approved but no longer proceeding ³	JBA Urban Planning Consultants (2009)
Park Fuels (formerly Manildra Park) Bulk Liquids Facility - Kooragang Island (MOD 5)	09/05/2018	Operating	Heggies (2008)
Stolthaven Fuel Storage Terminal Mayfield (formerly Marstel Bulk Fuel Storage Facility) (MOD 1)	16/04/2015, (28/09/2015)	Operating	AECOM (2015)
NPC Dredging and Remediation of Hunter River, Relocation of Swing Basin	Not approved	Progressive program ¹ Partially complete	ERM (2011)
NPC Port Terminal Facilities Concept Plan (MOD 1)	11/07/2012, (17/3/2014)	Remediation commenced	AECOM (2010)
Boral Recycling - Kooragang Island Recycling Facility Expansion	10/07/2019	Approved	MAC (2015)
Elgas Storage Facility	23/11/2018	Approved ⁴	Koikas Acoustics (2017)

Note 1: Proposed developments considered for cumulative assessment purposes as a conservative measure.

Note 2: Incitec Pivot announcement dated 26 September 2012 however project remains for cumulative assessment.

Note 3: Proposed development approved but no longer proceeding and therefore not considered.

Note 4: No noise limits in project approval or predicted noise levels at residential receivers and assumed to have negligible noise contribution within study area and therefore not considered.

Note 5: The proposed Newcastle Gas Terminal would be located on the same site as the approved Terminal 4 Project and, therefore, has not been included in cumulative noise assessment as it could not operate concurrently with the modelled operation of the Terminal 4 Project.

8.2 Cumulative Night-time Noise Amenity Assessment

The night-time cumulative sum of existing, approved/proposed developments as well as the NCIG CET incorporating the Optimisation Project $L_{Aeq(9hour)}$ noise amenity levels have been calculated. These are presented in **Table 18**, together with the acceptable and maximum $L_{Aeq(9hour)}$ noise amenity criteria for the residential receiver areas.

It should be noted that the likelihood of any one receiver area being exposed to the predicted cumulative noise level derived from the simultaneous operation of all existing and approved/proposed developments as well as the NCIG CET incorporating Optimisation Project is remote, due to the range of development locations and differences in the noise enhancing weather effects. This cumulative assessment is therefore considered to be conservative.

As presented in **Table 18**, the night-time cumulative noise amenity levels including NCIG CET incorporating Optimisation Project are predicted to be above the recommended night-time noise amenity level at all receiver locations under noise enhancing weather conditions, with the exception of Warabrook and Sandgate.

It is recognised that industrial noise is a feature of the existing residential night-time noise environment for receiver areas located proximal to the NCIG CET, which is located within a heavily industrialised port area. The incremental increase in cumulative noise levels due to the Optimisation Project (in comparison with existing approved NCIG CET noise levels) would be negligible and not discernible at all receiver locations, and is expected to be a maximum incremental increase of less than 0.1 dBA at all receiver areas during noise enhancing weather conditions.

Table 18 Cumulative Night-time (L_{Aeq(9hour)}) Noise Amenity Levels (dBA re 20 µPa)

Receiver Area	Night-time (L _{Aeq(9hour)}) Noise Amenity Levels (dBA re 20 µPa) ²													NPfi Recommended Amenity Level
	Estimated Industrial Noise ¹	NCIG CET/NCIG CET including Optimisation Project	Orica MOD 1, MOD 2	Incitec Facility	Manildra Facility	Stolthaven Fuel Storage Terminal	NPC Dredging	NPC Terminal Facilities	Boral Recycle	T4	Total Cumulative less Optimisation Project ³	Total Cumulative ³	Incremental Increase due to Optimisation Project	
Fern Bay North	43	31/31	20	30	20	22	25	35	21	25	44	44	<0.1	40
Fern Bay West	48	35/35	29	35	25	22	30	37	25	25	49	49	<0.1	45
Fern Bay East	44	34/34	29	35	20	22	28	37	24	24	46	46	<0.1	
Stockton West	48	35/35	35	40	37	22	35	37	28	24	50	50	<0.1	
Stockton East	45	34/34	31	39	35	22	30	37	27	23	47	47	<0.1	
Carrington	42	32/32	27	35	20	37	30	45	28	23	48	48	<0.1	
Mayfield	45	39/39	27	20	20	37	35	43	32	36	49	49	<0.1	45
Mayfield West	44	39/39	25	20	20	38	39	43	35	36	48	48	<0.1	
Warabrook	43	32/32	25	10	20	31	33	40	33	29	43	43	<0.1	
Sandgate	36	35/35	20	10	20	31	33	35	32	33	42	42	<0.1	

Note 1: Existing noise amenity levels (Heggies 2009) adjusted to include complete KCT and exclude the existing NCIG CET.

Note 2: Noise levels obtained from source of noise data presented in **Table 17**. Where only intrusive noise predictions were available, amenity levels were estimated as intrusive noise level minus 3 dB.

Note 3: Noise amenity levels are the measured and predicted noise levels during noise enhancing weather conditions.

9 Rail Traffic Noise Assessment

9.1 Noise Assessment Criteria

The ARTC operates the Hunter Valley Rail Network in NSW and the extent of the network is shown Hunter Valley Network Corridor Diagram dated 5 July 2019 attached as **Appendix H1**. Noise emissions from the ARTC's railways are regulated via their Environmental Protection Licence (EPL) No 3142 dated 20 September 2019 (**Appendix H2**).

In addition, the EPA RING (EPA, May 2013) specifies noise and vibration trigger levels for (new and existing) heavy and light rail infrastructure projects. However, land use developments other than rail infrastructure projects (i.e. mining and extractive industries) that are likely to generate additional rail traffic on an existing rail network (i.e. the Project) with potential noise impacts are assessed against the requirements detailed in the RING Appendix 2 (refer **Appendix I3**).

As a result, the rail noise assessment criteria from the ARTC's EPL and EPA's RING (Appendix 2) are now similar and the RING rail noise assessment trigger levels are reproduced **Table 19**

Table 19 RING (Appendix 2) Rail Noise Assessment Trigger Levels

Railway	Descriptor	Rail Noise Assessment Trigger Levels
Main North Railway	Daytime/evening LAeq(15hour)	65 dBA
	Night-time LAeq(9hour)	60 dBA
	Maximum Pass-by [L _{Amax} (95 th percentile)]	85 dBA
	Project related rail noise increase	> 0.5 dBA

Note: 95th percentile equates to the 5% exceedance value.

It is noted that rail traffic generated by coal mines transporting to the NCIG CET would have been assessed and approved as part of these projects.

The existing NCIG CET receives coal by rail transportation only. Trains travelling on the Main Northern Railway in the vicinity of the NCIG CET pass through the nearest potentially affected residential areas in the suburbs of Sandgate, Tarro, Beresfield, Woodberry and Thornton. Coal trains then enter the NCIG CET from the Kooragang Island mainline (via the Rail Flyover) to the rail spurs, follow the rail loops and empty their wagons into a hopper at train unloading stations. The Optimisation Project does not involve any change to the NCIG CET rail spur, rail sidings or rail loop.

9.2 Rail Movements

Based on a nominal 7,000 t capacity train, an average of approximately 26 trains can be unloaded per day at the existing NCIG CET. Allowing for the time taken to manoeuvre trains and equipment, the approved NCIG CET has capacity to receive up to a maximum of 40 trains on any one day. The NCIG CET incorporating the Optimisation Project would unload an average of approximately 28 trains per day. There would be no change to the approved capacity to receive up to a maximum of 40 trains on any one day. The nominal daytime and night-time breakdown of the approved NCIG CET and proposed Optimisation Project capacity to receive coal trains is presented in **Table 20** along the Main Northern Railway.

Table 20 Approved NCIG CET and Proposed Optimisation Project Railway Traffic

Status	Train Type	Number of Train Passbys ¹			Train Length ²	Train Capacity ²	Terminal Capacity ²
		Daytime	Night-time	24 Hours			
Approved NCIG CET	Average	33	19	52	1380 m to 1610 m	7000 t to 8,500 t	66 Mtpa
	Peak	50	30	80			
Optimisation Project	Average	38	22	56	1380 m to 1610 m	7000 t to 8,500 t	79 Mtpa
	Peak	50	30	80			

Source: NCIG (2019)

Note 1: One train arrival plus one train departure is equivalent to two passbys.

Note 2: Nominal train length, nominal train capacity and nominal terminal capacity.

9.3 Rail Noise Impact

The increase in the number of coal train movements (i.e. average increase of approximately 4 train movements per day) together with an increase in the coal train capacities (i.e. on average longer trains) will give rise to an increase in the daytime/evening $L_{Aeq(15hour)}$ and night-time $L_{Aeq(9hour)}$ train pass-by noise levels along the Main Northern Railway in the vicinity of the NCIG CET. The increase in the train pass-by noise levels (in isolation from other coal, freight and passenger traffic) can be estimated from the 20% increase to terminal capacity (i.e. from 66 Mtpa to 79 Mtpa).

The estimated 20% terminal capacity increase (i.e. resulting from the combine average increase to coal train movements and coal train capacities) would produce a minimal 0.8 dB project related increase to the existing daytime/evening $L_{Aeq(15hour)}$ noise levels from coal trains servicing the NCIG CET incorporating the Optimisation Project (in isolation) compared to trains servicing the existing NCIG CET (in isolation).

Assuming an even distribution of NCIG CET coal train movements throughout the day (**Table 20**) then, the corresponding Optimisation Project related increase to the existing night-time $L_{Aeq(9hour)}$ noise levels from coal trains servicing the NCIG CET incorporating the Optimisation Project (in isolation) would also be a minimal 0.8 dB compared to trains servicing the existing NCIG CET (in isolation).

The Optimisation Project related increase to the existing daytime/evening $L_{Aeq(15hour)}$ and night-time $L_{Aeq(9hour)}$ train pass-by noise levels from coal trains servicing the NCIG CET (incorporating the Optimisation Project) would be appreciably less than 0.8 dB if considered against the baseline of all existing and approved coal, freight and passenger train movements (and their associated pass-by noise levels) and would be less than 0.5 dB.

There is no change to the approved peak number of daytime/evening and peak night-time coal train movements, and therefore generally no change to the peak daytime/evening $L_{Aeq(15hour)}$ and peak night-time $L_{Aeq(9hour)}$ train pass-by noise levels along the Main Northern Railway in the vicinity of the NCIG CET.

As there would be no change to the maximum train capacity there would be generally no change to the maximum train pass-by noise level as a result of the Optimisation Project [L_{Amax} (95th percentile)].

9.4 ARTC Noise Management

The issue of rail noise generally, and the potential increase in rail noise along the Hunter Valley Rail Network (**Appendix H1**) from mine to port, is an issue of community concern that has been documented in the T4 Project Assessment Report (DP&E, 2014), which includes the following outcomes:

- Management of coal transportation by rail is the responsibility of the ARTC and is regulated by an EPL (**Appendix H2**) and administered by the EPA.
- Rail freight operators are responsible for maintaining their fleets to ensure consistency with operational standards.
- Coal terminal operators do not control the trains that transport coal and are therefore not responsible for the management of the rail corridor or the rolling stock that uses it.
- Coal terminal operators must be able to respond to the demands of the Hunter Valley Rail Network to export coal and therefore cannot be held responsible for the volume of rail traffic that is generated by the export demand.
- The rolling stock is dependent on mine contracts with freight providers and the rail infrastructure is leased by the ARTC which is responsible for managing use of the infrastructure and allocating train paths and not something which coal terminal operators are able to control.
- The EPA is also concerned about increases on the greater rail network as a result of increased coal haulage but acknowledges that a strategic approach is needed to the assessment and management of noise generated on the rail network.
- Anticipated noise increases along the rail corridor are not solely attributable to one coal terminal operator, and it would be unreasonable to hold a single operator responsible for all rail noise impacts on the rail network.
- The ARTC is committed to developing and funding a noise abatement program, similar to that operated by the Roads and Maritime Services. Such a program was trialled in 2015 (i.e. the trial Hunter Valley Noise Abatement Program) but is yet to be implemented. Such a program would help meet the objectives of ARTC's EPL 3142 to progressively reduce noise levels at affected residential properties.

10 Summary of Findings

NCIG has undertaken a review of the operation of the CET to identify inherent unutilised capacity and opportunities to handle additional tonnes. The Optimisation Project incorporates a series of on-site process control and operational improvements that have been implemented by NCIG within the existing NCIG CET boundary, utilising existing NCIG CET infrastructure and at a low capital cost.

The Optimisation Project (Appendix A) seeks to increase the maximum approved capacity to 79 Mtpa. A comparison of the currently approved NCIG CET and the NCIG CET incorporating the Optimisation Project is provided in **Appendix F**.

The noise impacts associated with the approved NCIG CET were assessed in the CET NIA and this report assesses the noise impacts associated with Optimisation Project. A summary of the approved NCIG CET noise impacts by comparison with Optimisation Project are summarised in **Table 21** and it is concluded that the potential noise impacts generally remain unaltered by the Optimisation Project.

Table 21 Approved NCIG CET Noise Impacts by Comparison with Optimisation Project

Assessment	Approved NCIG CET	Proposed Optimisation Project
Existing Noise Compliance	CET construction and operating noise generally not discernible from other industry at the nearest residential receiver areas.	Unchanged.
Construction Noise	Construction works generally daytime 0700 hours to 1800 hours, 7 days per week.	Unchanged.
Operating Noise	<p>Operation and maintenance activities 24 hours, 7 days per week against approved:</p> <p>LAeq(15minute) intrusive noise limits; LAeq(night) noise amenity limits; and LA1(1minute) night-time noise limits</p>	<p>Generally unchanged, with:</p> <p>In summary, the predicted daytime, evening and night-time intrusive LAeq(15minute) noise levels and night-time LAeq(night) amenity and LAF(maximum) noise levels, show that:</p> <ul style="list-style-type: none"> • No exceedance of the PA 06_0009 MOD2 intrusive noise limits and intrusive PNTLs are predicted during the daytime, evening and night-time (Table 13) at residential receiver areas; • No exceedance of the PA 06_0009 MOD2 amenity noise limits are predicted during the night-time (Table 14) at residential receiver areas; • No exceedance of the PA 06_0009 MOD2 sleep disturbance noise limits and SDNLs are predicted during the night-time (Table 15) at residential receiver areas. • No exceedance of the intrusive PNTLs are predicted during the daytime, evening and night-time (Table 16) at non-residential receiver areas (when in use). • Predicted intrusive noise levels are generally consistent with those presented in the Rail Flyover Modification NIA and rail Flyover Audit Report, with any predicted noise level variations from the NCIG CET incorporating the Optimisation Project being largely due to the consideration of previously unassessed noise enhancing meteorological conditions (refer Section 4.1). • NCIG CET noise emissions are generally not discernible from other industrial noise (Section 2.4.2), and do not exhibit any discernible low frequency, intermittent or tonal characteristics at the nearest residential receiver areas. <p>Based on the above, the predicted daytime, evening and night-time intrusive LAeq(15minute) noise levels, night-time LAeq(night) amenity and LAF(maximum) noise levels would comply with existing PA 06_0009 MOD2 noise limits and contemporary NPfI PNTLs.</p> <p>Any noise impacts from the proposed operation of the NCIG CET incorporating the Optimisation Project are therefore considered acceptable.</p>

Assessment	Approved NCIG CET	Proposed Optimisation Project
Cumulative Noise	Cumulative night-time LAeq(9hour) noise amenity levels from industrial developments in the vicinity of the CET within the INPs acceptable to maximum noise amenity criteria for urban residential receiver areas.	<p>Unchanged, however, updated cumulative assessment based on NPfI recommended amenity noise levels indicate that cumulative noise levels are predicted to be above the night-time recommended noise amenity level at all receiver locations under noise enhancing weather conditions, with the exception of Warabrook and Sandgate. Note, the cumulative assessment has been conservatively prepared and for example includes the Terminal 4 Project which is unlikely to proceed.</p> <p>It is recognised that industrial noise is a feature of the existing residential night-time noise environment for receiver areas located proximal to the NCIG CET, which is located within a heavily industrialised port area. The incremental increase in cumulative noise levels due to the Optimisation Project (in comparison with existing approved NCIG CET noise levels) would be negligible and not discernible at all receiver locations, and is expected to be a maximum incremental increase of less than 0.1 dBA at all receiver areas during noise enhancing weather conditions.</p>
Off-Site Road Traffic Noise	Project related road traffic noise levels reviewed in accordance with prevailing EPA noise guideline with negligible impacts.	Unchanged.
Off-Site Rail Traffic Noise	Project related rail traffic noise levels reviewed in accordance with prevailing EPA noise guideline, ARTC EPL and ARTC noise management strategies.	Generally unchanged.

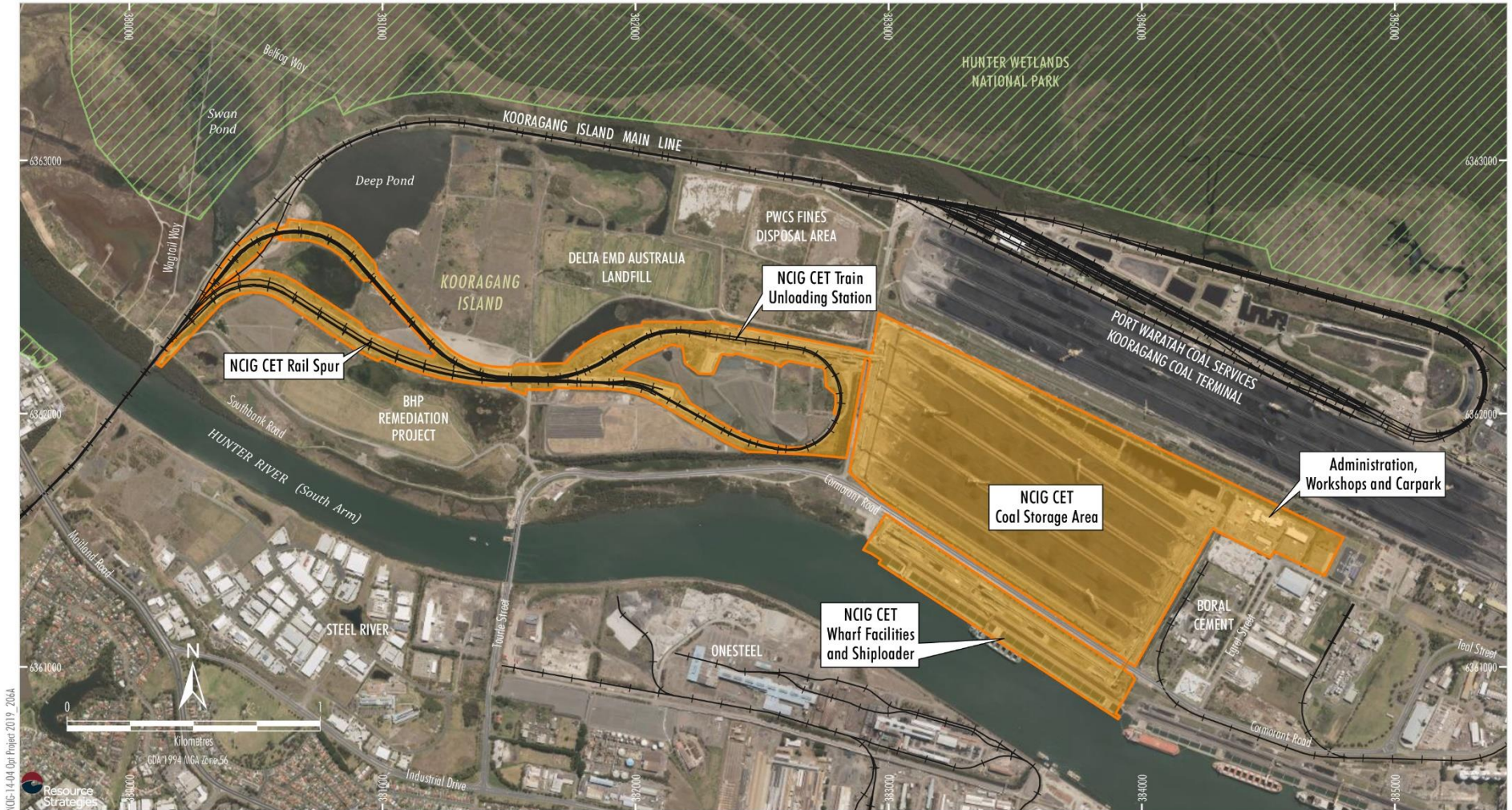
11 References

- 2019 Hunter Valley Corridor Capacity Strategy (HVCCS) (Australian Rail Track Corporation [ARTC], 2019);
- A Guide to the Noise Policy for Industry (EPA, 2017);
- Major Project Assessment, NCIG Coal Export Terminal (CET Assessment Report) (NSW Department of Planning, 2007);
- Major Project Assessment, PWCS Terminal 4 Project, Kooragang Island (T4 Project Assessment Report) (NSW Department of Planning Industry and Environment [DPIE], 2014);
- NCIG 2019 Compliance Tracking Program – Project Approval 06_0009 (CTP 2019) (NCIG, 2019);
- NCIG Coal Export Terminal, Independent Environmental Audit 2018 (Audit 2018) (pitt&sherry, 2019);
- NCIG Noise Enquiry, 64 Douglas Street, Stockton (SLR, 2013)
- NCIG Operation Noise Management Plan HSEC.MP.12.03 (ONMP) (NCIG, 2017) NCIG Coal Export Terminal, Construction, Operation and Road Transport Noise Impact Assessment (CET NIA) (Heggies Australia, 2006);
- NCIG Rail Flyover Modification, Noise Prediction and Assessment Review (Rail Flyover Modification NIA) (SLR, 2012);
- Newcastle Coal Export Terminal, Stage 2F Noise Audit Report (Stage 2F Audit Report) (SLR, 2013);
- Newcastle Coal Export Terminal, The High Capacity Optional Inlet Rail Spur and Rail Siding (Modification 2) Condition 3.6 Noise Audit Report (Rail Flyover Audit Report) (SLR, 2015);

- NSW Department of Planning Industry and Environment (DPIE) Voluntary Land Acquisition and Mitigation Policy (VLAMP): For State Significant Mining, Petroleum and Extractive Industry Developments (NSW Government, 2018);
- PWCS Terminal 4 Project, Noise and Vibration Impact Assessment (T4 Project NIA) (SLR, 2012); and
- T4 Project Assessment Report (DP&E, 2014).

APPENDIX A

CET Existing and Approved General Arrangement Plan



NCIG-14-04 April Project 2019_Z06A
Resource Strategies

- LEGEND**
- Railway
 - National Park/Conservation Area
 - Approximate Extent of Approved NCIG CET

Source: NSW Spatial Services (2019)
Orthophoto: NSW Spatial Services (2019)

Newcastle Coal
INFRASTRUCTURE GROUP
OPTIMISATION PROJECT
Approved General Arrangement
of the NCIG CET

APPENDIX B

CET Local Area Plan, Receiver Areas and Monitoring Locations



APPENDIX C1

NCIG Modified Project Approval (PA) 06_0009
Mod 2 Noise Extracts

2. Specific Environmental Conditions

Noise Impacts

2.13 The Proponent shall design, construct, operate and maintain the project to ensure that the noise contributions from the project do not exceed the maximum allowable noise contributions specified in Table 1 below, at those locations and during those periods indicated. The maximum allowable noise contributions apply under:

- a) meteorological condition of: wind speeds up to 3 ms⁻¹ (measured at 10 metres above ground level);
or
- b) temperature inversion conditions of up to 3°C per 100 metres and wind speeds up to 2 ms⁻¹ (measured at 10 metres above ground level).

Table 1 - Maximum Allowable Noise Contributions (dBA)

Location	Day, Evening, Night At all times	Night 10.00 pm Monday to Saturday 10.00pm to 6.00am on Sundays and Public Holidays	
	LAeq(15minute)	LAeq(night)	LA1(1minute)
Fem Bay West	41	37	57
Fern Bay East	39	36	55
Stockton West	41	37	57
Stockton East	38	35	56
Mayfield West	45	40	55
Mayfield	44	39	62
Carrington	36	33	52

2.14 For the purpose of assessment of noise contributions specified under condition 2.13 of this consent, noise from the project shall be:

- a) measured at the most affected point on or within the Site boundary at the most sensitive receiver to determine compliance with LAeq(15 minute) night noise limits;
- b) measured at one metre from the dwelling facade to determine compliance with LA1(1minute) noise limits; and
- c) subject to the modification factors provided in Section 4 of the New South Wales Industrial Noise Policy (EPA, 2000), where applicable.

Notwithstanding, should direct measurement of noise from the development be impractical, the Proponent may employ an alternative noise assessment method deemed acceptable by the DEC (refer to Section 11 of the New South Wales *Industrial Noise Policy* (EPA, 2000)). Details of such an alternative noise assessment accepted by the DEC shall be submitted to the Director-General to the implementation of the assessment method.

Train Noise Performance

2.15 The Proponent shall take necessary action to ensure that trains operated on the Site meet the noise performance criteria established under condition 2.13.

3. ENVIRONMENTAL MONITORING AND AUDITING

Noise Auditing

- 3.6 Within 90 days of the commencement of operation of the project, or as otherwise agreed by the Director-General, and during a period in which the project is operating under normal operating conditions, the Proponent shall undertake a program to confirm the noise performance of the project. The noise program shall include, but not necessarily be limited to:
- d) noise monitoring, consistent with the guidelines provided in the New South Wales Industrial Noise Policy (EPA, 2000), to assess compliance with condition 2.13 of this approval.
 - e) methodologies, locations and frequencies for noise monitoring;
 - f) identification of monitoring sites at which pre- and post-project noise levels can be ascertained;
 - g) details of any complaints and enquiries received in relation to noise generated by the project within the first 90 days of operation;
 - h) an assessment of night-time use of audible alarm systems;
 - i) a statement of whether the Site is in compliance with noise limits outlined in condition 2.13; and
 - j) any additional noise mitigation measures and timetables for implementation.
- 3.7 Within 28 days of conducting the noise monitoring referred to under condition 3.6 of this approval, the Proponent shall provide the Director-General and the DECC with a copy of the report. If the noise monitoring report identifies any non-compliance with the noise limits imposed under this approval (refer condition 2.13), the Proponent shall detail what additional measures would be implemented to ensure compliance, clearly indicating who would implement these measures, when these measures would be implemented, and how the effectiveness of these measures would be measured and reported to the Director-General.
- 3.8 The requirements of conditions 3.6 and 3.7 shall be repeated within 90 days of the commencement of operation of each stage of the project, including the operation of the High Capacity Operational Inlet Rail Spur and Rail Sidings.

5. COMPLIANCE MONITORING AND TRACKING

Compliance Tracking Program

- 5.1 The Proponent shall develop and implement a Compliance Tracking Program to track compliance with the requirements of this approval. The Program shall include, but not necessarily limited to:
- a) provisions for periodic review of the compliance status of the project against the requirements of this approval;
 - b) provisions for periodic reporting of compliance status to the Director-General;
 - c) a program for independent environmental auditing at least annually, or as otherwise agreed by the Director-General, in accordance with ISO 19011:2002 - Guidelines for Quality and/ or Environmental Management Systems Auditing; and
 - d) mechanisms for rectifying any non-compliance identified during environmental auditing or review of compliance.
- 5.2 The independent environmental audit referred to in condition 5.1c) shall:

- a) be conducted by a suitable qualified, experienced and independent team of experts whose appointment has been endorsed by the Director-General;
- b) include consultation with the relevant agencies;
- c) assess the environmental performance of the project and assess whether it is complying with the requirements of this approval, and any other relevant approvals and relevant EPL/s;
- d) review the adequacy of any approved strategy, plan or program required under the abovementioned approvals; and
- e) recommend measures or actions to improve the environmental performance of the project, and/or any strategy, plan or program required under these approvals.

Note: This audit team must be led by a suitable qualified auditor, and include experts in biodiversity, air quality, noise, surface water and groundwater management and other fields as specified by the Director-General.

7. ENVIRONMENTAL MANAGEMENT

Construction Environmental Management Plan

7.3 As part of the Construction Environmental Management Plan for the project required under condition 7.2 of this approval, the Proponent shall prepare and implement the following:

- c) a Construction Noise Management Plan to detail how construction noise and vibration impacts would be minimised and managed, including, but not necessarily limited to:
 - (i). details of construction activities and a schedule for construction works;
 - (ii). identification of construction activities that have the potential to generate noise and/ or vibration impacts on surrounding land uses, particularly residential areas;
 - (iii). a detailed description of what actions and measures would be implemented to ensure that these works would comply with the relevant noise and vibration criteria/ guidelines;
 - (iv). procedures for notifying residents of construction activities that are likely to effect their noise and vibration amenity, as well as procedures for dealing with and responding to noise complaints; and
 - (v). a description of how the effectiveness of these actions and measures would be monitored during the proposed works, clearly indicating how often this monitoring would be conducted, how the results of this monitoring would be recorded; and, if any non-compliance is detected.

Operation Environmental Management Plan

7.6 As part of the Operation Environmental Management Plan for the project required under condition 7.5 of this approval, the Proponent shall prepare and implement the following:

- b) a Noise Management Plan to outline monitoring, management procedures and measures to minimise total operational noise emissions from the project. The Plan shall also include, but not necessarily be limited to:
 - (i). identification of all relevant receivers and the applicable criteria at those receivers commensurate with the noise limits specified under this approval;
 - (ii). identification of activities that will be carried out in relation to the project and the associated noise sources;

- (iii). assessment of project noise impacts at the relevant receivers against the noise limits specified under this approval;
- (iv). details of all management methods and procedures that will be implemented to control individual and overall noise emissions from the Site during the project;
- (v). details regarding the procurement process to guarantee that equipment levels meet the noise levels as provided in the documents listed in condition 1.1;
- (vi). development of reactive and pro-active strategies for dealing promptly with any noise complaints;
- (vii). noise monitoring and reporting procedures; and
- (viii). regular internal audits of compliance of all plant and equipment with acceptable design noise.

APPENDIX C2

NCIG Environment Protection Licence No 12693
dated 3 January 2019 Noise Extracts

L3 Noise Limits

Note: 'safety or emergency reasons' refers to emergency works which may need to be undertaken to avoid loss of life, property loss and / or to prevent environmental harm.

L3.1 All site preparation, filling/preloading and construction works that may generate an audible noise at any residential receptor shall only be undertaken between 7.00 am and 6.00 pm.

This condition does not apply in the event of a direction from police or other emergency authority for safety or emergency reasons.

L3.2 Notwithstanding any other condition of this licence, piling works shall not be conducted on Sundays or public holidays.

L3.3 The licensee shall design, construct, operate and maintain the project to ensure that the noise contributions from the premises do not exceed the maximum allowable noise contributions specified in the Table below, at those locations and during those periods indicated. The maximum allowable noise contributions apply under:

- a) wind speeds up to 3m/s (measured at 10 metres above ground level), or
- b) temperature inversion conditions up to 3°C per 100 metres and wind speeds up to 2m/s (measured at 10 metres above ground level).

NOTE: For the purposes of the Table, 'Night' is defined as being 10:00pm to 7:00am Monday to Saturday and 10:00pm-7:00am on Sundays and Public Holidays.

For the purpose of assessment of noise contributions specified in this licence, noise from the project shall be:

- a) measured at the most affected point on or within the site boundary at the most sensitive locations to determine compliance with LAeq(15 minute) noise limits.
- b) measured at one metre from the dwelling façade to determine compliance with LA1(1minute) noise limits.
- c) subject to the modification factors provided in Section 4 of the *New South Wales Industrial Noise Policy* (EPA 2000) where applicable.

Notwithstanding, should direct measurement of noise from the development be impractical, the licensee may employ an alternative noise assessment method deemed acceptable by the EPA (refer to Section 11 of the *New South Wales Industrial Noise Policy* (EPA 2000)). Details of such an alternative noise assessment method must be accepted by the EPA prior to the implementation of the assessment method.

Location	Day, Evening, Night at all times LAeq(15minute)	Night - LAeq(night)	Night - LA1(1minute)
Fem Bay West (1 Fullerton Street/Stockton Centre)	41	37	57
Fern Bay East (21 Braid Road/Fern Bay Primary School)	39	36	55
Stockton West (284 Fullerton Street/ Corner of Pembroke Street and Fullerton Street)	41	37	57
Stockton East (40 Eames Avenue/10 Pitt Street/ Stockton Primary School)	38	35	56
Mayfield West (47 Stevenson Avenue/4 Groongal Street/Mayfield West Primary School)	45	40	55
Mayfield (68 Bull Street/45 Simpson Crescent/1 Arthur Street/52 Arthur Street/21 Crebert Street/Hunter Christian School/Mayfield East Primary School)	44	39	62
Carrington (Corner of Hargrave Street and Young Street)	36	33	52

APPENDIX D1

CET Stage 1, 2AA and 2F
Measured Night-time Intrusive $L_{Aeq(15\text{minute})}$ Noise Levels (dBA re 20 μPa)

APPENDIX D2

CET Stage 1, 2AA and 2F
Measured Night-time $L_{A1(1\text{minute})}$ Noise Levels (dBA re 20 μPa)

APPENDIX E

Existing and Optimisation Project Sound Power Levels
(Optimised Plant Shown in Blue, Changes Highlighted in Red) (dBA re 1 μ W)

ENM Source No	Component	ID	Description	Capacity / Optimisation Project Capacity	Conveyor Length (m)	Existing SWL (dBA) [as at Jun 2019]			Optimisation Modification SWL (dBA)		
						Overall SWL	Conveyor Drive P1	Conveyor Drive P2	Overall SWL	Conveyor Drive P1	Conveyor Drive P2
Stage 1											
	Rail-Loop	Train 1	PN 8200 Series (per 4 Loco set)	Locomotive high idle		110			110		
	Rail-Loop	Train 2	PN 8200 Series (per 3 Loco set)/QR 5000 Series (per 2 Loco set)	Locomotive Moving - Approaching Dump Station		109			109		
	Rail-Loop	Train 2	PN 8200 Series (all wagons - 1600m excluding locos)	All Noise including squeal, coupling		111			111		
100	Rail-receival	DS01	Dump Station	8500tph		106			106		
	Rail-receival	TBA	Dust extraction fan	300kW fan							
103	Rail-receival	FE01	Belt Feeder	8500tph		100			100		
108	Rail-receival	CV01	Belt Conveyor	8500tph / 10000tph	582	113			113 ¹		
109	Rail-receival	CV01	Conveyor Drive P1, P2	2 x 1000kW		106	106	98	108 ²	107 ²	99 ²
110	Rail-receival	TR01	Fixed Tripper for inbound sample	-		90			90		
111	Rail-receival	SA01	Sample Station	80tph		99			99		
112	Rail-receival	TH01	Transfer House (8 Chutes, only 2 see coal at any one time)	-		105			105		
200	Stacking	CV04	Belt Conveyor	8500tph / 10000tph	349	109			109 ¹		
201	Stacking	CV04	Conveyor Drive P1	As built 1000kW		100	100		102 ²	102 ²	
202	Stacking	TT02	Transfer Point	-		96			96		
203	Stacking	CV05	Belt Conveyor	8500tph / 10000tph	207	107			107 ¹		
204	Stacking	CV05	Conveyor Drive P1	630kW		99	99		101 ²	101 ²	
205	Stacking	TT03	Transfer Point	-		96			96		
300	Stockyard	CV08	Belt Conveyor	10500tph	1334	113			113		
301	Stockyard	CV08	Conveyor Drive P1, P2	2 x 1250kW		104	102	100	104	102	100
302	Stockyard	SR01	Stacker/Reclaimer	10500tph		110			110 ³		

ENM Source No	Component	ID	Description	Capacity / Optimisation Project Capacity	Conveyor Length (m)	Existing SWL (dBA) [as at Jun 2019]			Optimisation Modification SWL (dBA)		
						Overall SWL	Conveyor Drive P1	Conveyor Drive P2	Overall SWL	Conveyor Drive P1	Conveyor Drive P2
303	Stockyard	TR04	Fixed Tripper for magnet & dewatering	-		90			90		
304	Stockyard	TH06	Transfer Point	10500tph		96			96		
305	Stockyard	CV09	Belt Conveyor	10500tph	1374	115			115		
306	Stockyard	CV09	Conveyor Drive P1, P2	2 x 1250kW		104	101	102	104	101	102
307	Stockyard	SR02	Stacker/Reclaimer	10500tph		113			113 ³		
308	Stockyard	TR05	Fixed Tripper for magnet & dewatering	-		90			90		
309	Stockyard	TH07	Transfer Point	10500tph		96			96		
400	Reclaiming	CV12	Belt Conveyor	10500tph	611	109			109		
401	Reclaiming	CV12	Conveyor Drive P1 & P2	2 x 1250kW		103	100	100	103	100	100
402	Reclaiming	BN01	Buffer Bin	2000t bin		110			110		
403	Reclaiming	FE04	Belt Feeder	6250tph, Hydraulic 500kW		99			99		
404	Reclaiming	FE05	Belt Feeder	6250tph, Hydraulic 500kW		99			99		
405	Reclaiming	CV15	Belt Conveyor	11500tph	625	112			112		
406	Reclaiming	CV15	Conveyor Drive P1 & P2	2 x 1000kW		107	105	101	107	105	101
407	Reclaiming	SA04	Sample Station	80tph		105			105		
408	Reclaiming	TH10	Transfer Point (2 Chutes)	-		96			96		
426	Reclaiming	CV19 - 30Mt	Belt Conveyor	11500tph	63	104			104		
427	Reclaiming	CV19 - 30Mt	Conveyor Drive P1	1000kW		99			100		
430	Reclaiming	TH12	Transfer Point (2 Chutes)	-		102			102		
502	Shiploading	SL01 - 30Mt	Ship Loader	12500tph		106			106		

ENM Source No	Component	ID	Description	Capacity / Optimisation Project Capacity	Conveyor Length (m)	Existing SWL (dBA) [as at Jun 2019]			Optimisation Modification SWL (dBA)		
						Overall SWL	Conveyor Drive P1	Conveyor Drive P2	Overall SWL	Conveyor Drive P1	Conveyor Drive P2
506	Shiploading	CV21 - 30Mt	Belt Conveyor	11500tph	689	113			113		
507	Shiploading	CV21 - 30Mt	Conveyor Drive P1 & P2	2 x 1000kW		103	100	100	103	100	100
700	Stockyard		Dozer ⁴	D11		118			118		
600	Clearwater Pond	1	Clearwater Pond Pump 1 (Lift Pump)	-		90			90		
601	Clearwater Pond	4	Main Dust Suppression and Fire Pump 1	-		90			90		
602	Clearwater Pond	5	Main Dust Suppression and Fire Pump 2	-		90			90		
603	Clearwater Pond	6	Main Dust Suppression and Fire Pump 3	-		90			90		
604	Clearwater Pond	7	Main Dust Suppression and Fire Pump 4	-		90			90		
605	Clearwater Pond	10	Pressure Maintaining Pump (Jacking Pump 1)	-		90			90		
606	Clearwater Pond	21	Transfer House TH03 Pump	-		90			90		
607	Clearwater Pond	26	Conveyor CV12 Mid Point Sump Pump	-		90			90		
608	Clearwater Pond	30	Administration Vehicle Spray Wash Supply Pump	-		90			90		
609	Clearwater Pond	49	Sewer Pump 4: 4000 L	-		90			90		
610	Clearwater Pond	51	Potable Water Pump no. 1	-		90			90		
Total Stage 1 (excluding Trains)						124			124		
Stage 1 Trains						115			115		
Stage 1 Total (including Trains)						125			125		

ENM Source No	Component	ID	Description	Capacity / Optimisation Project Capacity	Conveyor Length (m)	Existing SWL (dBA) [as at Jun 2019]			Optimisation Modification SWL (dBA)		
						Overall SWL	Conveyor Drive P1	Conveyor Drive P2	Overall SWL	Conveyor Drive P1	Conveyor Drive P2
Stage 2AA											
	Rail-Loop	Train 3	PN 8200 Seires (per 3 Loco set)/QR 5000 Seires (per 2 Loco set)	Locomotive Moving - Approaching DS		109			109		
	Rail-Loop	Train 3	PN 8200 Seires (all wagons - 1600m excluding locos)	All Noise including squeal, coupling		111			111		
	Rail-Loop	Train 4	QR 5000 Seires (per 4 Loco set)	Locomotive Moving - Approaching DS		110			110		
	Rail-Loop	Train 4	QR 5000 Seires	All Noise including squeal, coupling		111			111		
104	Rail-receival	DS02	Dump Station	8500tph		104			104		
113	Rail-receival	CV02	Belt Conveyor	8500tph / 10000tph		112			112 ¹		
114	Rail-receival	CV02	Conveyor Drive P1, P2	2 x 1000kW		104	101	101	105 ²	102 ²	102 ²
115	Rail-receival	TR02	Fixed Tripper for inbound sample	-		90			90		
180	Rail-receival	SA02	Sample Station	80tph		99			99		
206	Stacking	CV06	Belt Conveyor	8500tph / 10000tph		100			100 ¹		
207	Stacking	CV06	Conveyor Drive P1	1000kW		98	98		100 ²	100 ²	
208	Stacking	TH04	Transfer Point	-		97			97		
310	Stockyard	CV10	Belt Conveyor	10500tph		113			113		
311	Stockyard	CV10	Conveyor Drive P1, P2	2 x 1250kW		102	99	98	102	99	98
312	Stockyard	SR03	Stacker/Reclaimer	10500tph		111			111 ³		
314	Stockyard	TH08	Transfer Point	10500tph		96			96		
511	Reclaiming	CV13	Belt Conveyor	10500tph		110			110		
512	Reclaiming	CV13	Conveyor Drive P1, P2	2 x 1000kW		102	100	97	102	100	97
513	Reclaiming	BN02	Buffer Bin/Belt Feeders	2000t bin		104			104		
514	Reclaiming	FE06	Belt Feeder	6250tph, Hydraulic 500kW		99			99		

ENM Source No	Component	ID	Description	Capacity / Optimisation Project Capacity	Conveyor Length (m)	Existing SWL (dBA) [as at Jun 2019]			Optimisation Modification SWL (dBA)		
						Overall SWL	Conveyor Drive P1	Conveyor Drive P2	Overall SWL	Conveyor Drive P1	Conveyor Drive P2
515	Reclaiming	FE07	Belt Feeder	6250tph, Hydraulic 500kW		99			99		
516	Reclaiming	CV16	Belt Conveyor	10500tph		109			109		
517	Reclaiming	CV16	Conveyor Drive P1, P2	2 x 1000kW		102	98	100	102	98	100
518	Reclaiming	SA05	Sample Station	80tph		96			<96		
528	Reclaiming	CV20	Belt Conveyor	10500tph		105			105		
529	Reclaiming	CV20	Conveyor Drive P1	1000kW		97			97		
603	Shiploading	CV22	Belt Conveyor	10500tph		115			115		
604	Shiploading	CV22	Conveyor Drive P1, P2	2 x 1000kW		102	99	99	102	99	99
605	Shiploading	SL02	Ship Loader	12500tph		110			110		
Total Stage 2AA (excluding Trains)						121			121		
Stage 2AA Trains						116			116		
Stage 2AA Total (including Trains)						123			123		
Stage 2F											
209	Stacking	CV7	Conveyor	8,500 tph / 10000 tph	78	100			100 ¹		
210	Stacking	CV7	Conveyor Drive P1	1000 kW		97	97		98 ²	98 ²	
211	Stacking	TH05	Transfer Tower	10,500 tph		103			103		
315	Stockyard	CV11	Conveyor	10,500 tph	1447	114			114		
316	Stockyard	CV11	Conveyor Drive P1, P2	1250 kW		102	100	99	102	10099	99
317	Stockyard	SR04	Stacker/Reclaimer	10,500 tph		110			110 ³		
319	Stockyard	TH09	Transfer Tower	10,500 tph		105			105		
509	Reclaiming	CV17	Conveyor	10,500 tph	229	107			107		
410	Reclaiming	CV17	Conveyor Drive	1000 kW		100	100		100	100	
519	Reclaiming	CV18	Conveyor	10,500 tph	363	113			113		
520	Reclaiming	CV18	Conveyor Drive	1000 kW		100	100		100	100	

ENM Source No	Component	ID	Description	Capacity / Optimisation Project Capacity	Conveyor Length (m)	Existing SWL (dBA) [as at Jun 2019]			Optimisation Modification SWL (dBA)		
						Overall SWL	Conveyor Drive P1	Conveyor Drive P2	Overall SWL	Conveyor Drive P1	Conveyor Drive P2
521	Reclaiming	TH11	Transfer Tower	10,500 tph		103			103		
522	Reclaiming	CV19	Conveyor	10,500 tph	63	102			102		
523	Reclaiming	CV19	Conveyor Drive	1000 kW		99	99		99	99	
524	Reclaiming	CV20	Conveyor	10,500 tph	62	105			105		
525	Reclaiming	CV20	Conveyor Drive	1000 kW		99	99		99	99	
531	Reclaiming	TH12	Transfer Tower	10,500 tph		102			102		
606	Reclaiming	CV21 Ext	Conveyor	10,500 tph	362	112			112		
601	Reclaiming	CV21	Conveyor Drive P1, P2	1000 kW		102	100	99	102	100	99
603	Reclaiming	CV22 Ext	Conveyor	10,500 tph	362	113			113		
604	Reclaiming	CV22	Conveyor Drive P1, P2	1000 kW		102	99	100	102	99	100
				Stage 2F Total		121			121		
Total Existing (Excluding Trains)						127	Total Optimisation Modification (Excluding Trains)		127		
Total Existing - Trains						119	Total Optimisation Modification - Trains		119		
Total Existing (including Trains)						127.8	Total Optimisation Modification (including Trains)		127.8		

Note 1 - No SWL increase in conveyors due to no change in conveyor speeds.

Note 2 - Increase in SWL due to increase in drive demand power.

Note 3 - No SWL increase in Stacker/Reclaimer as only change is increase in long travel speeds during relocation to increase efficiencies. No change in speed during operations.

Note 4 - Approved but not currently operating.

APPENDIX F

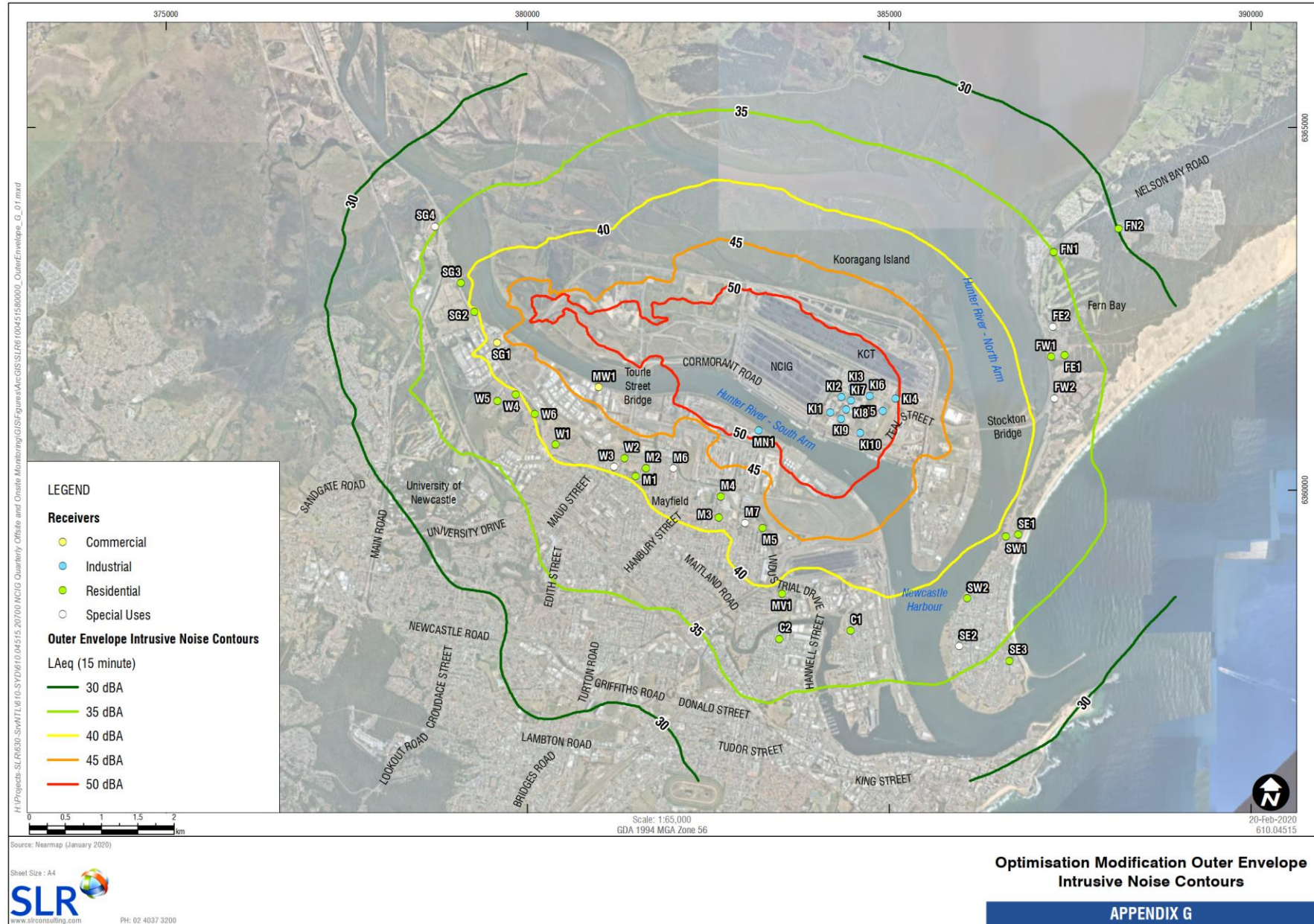
Summary Comparison of Approved and Modified NCIG CET

Development Component	Approved NCIG CET*	NCIG CET including the Optimisation Modification
Coal Throughput	Approved throughput of 66 Mtpa.	Proposed throughput of 79 Mtpa using existing coal handling infrastructure.
Coal Transport	Coal trains enter the NCIG CET site from the Kooragang Island mainline via a grade separation flyover to the rail spurs, follow the rail loops and empty their wagons into a hopper at train unloading stations. An average of approximately 26 trains unloaded each day. Up to a maximum of 40 trains unloaded on any one day.	An average of approximately 28 trains would be unloaded each day. No change to the maximum of 40 trains unloaded per day.
Train Unloading	Two train unloading stations designed to operate at up to 8,500 tph.	The two train unloading stations would operate at up to 10,000 tph.
Coal Stockpiles	Coal stacked to a maximum height of approximately 25 m allowing a maximum design capacity of up to 6.6 million tonnes (Mt) of coal to be stockpiled at the CET. The combined stacker/reclaimers each have a stacking capacity of up to 8,500 tph and a reclaiming capacity of up to 10,500 tph. Coal stockpiles served by rail-mounted combined stacker/reclaimers and associated conveyor systems.	Unchanged.
Wharf Facilities and Shiploaders	Three berths served by two rail-mounted shiploaders. Each shiploader operates at approximately 10,500 tph nominal capacity, peaking at up to 12,500 tph. Coal transferred from the coal stockpiles to the shiploaders via conveyors over Cormorant Road.	Unchanged.
Shipping	Wharf capable of receiving Cape size vessels which carry up to 230,000 tonnes (t) of coal. Up to approximately 12 ships loaded per week.	Up to approximately 815 ships per year or approximately 16 ships per week would be loaded.
Water Supply	Water supply requirements met from stormwater contained on-site and water purchased from the Hunter Water Corporation. Water recycled on-site to reduce the quantity of water purchased.	No change to sources of water supply. No change to water demand associated with ongoing dust suppression on the coal storage area. Potential change in water demand associated with other activities to be met via existing water supply sources.
Project Life	Expected to exceed 30 years dependent on the future development of coal reserves in the Hunter Valley and Gunnedah Basin.	Unchanged.
Employment	Construction workforce approved up to 500 employees. The current NCIG operational workforce comprises approximately 230 personnel (including around 100 NCIG employees, 30 fulltime contractors and 100 contractors during shutdown activities).	Unchanged (i.e. no increase in peak workforce).
Construction	Installation, construction and commissioning of rail infrastructure, coal storage area, wharf facilities and shiploaders. Construction materials provided from dredging activities associated with the approved Extension of Shipping Channels within the Port of Newcastle (DA-134-3-2003-i).	Unchanged (i.e. no additional construction activities required).
Hours of Operation	Construction activities with the potential to be audible at surrounding residential areas generally undertaken between 7.00am and 6.00pm, up to seven days a week. Oversize loads may be transported outside of these times to minimise traffic impacts. Dredged material from the south arm of the Hunter River deposited at the NCIG CET site 24 hours per day and seven days per week. CET operations take place 24 hours per day, seven days per week. Trains and shipping operate 24 hours per day, seven days per week.	Unchanged (i.e. CET hours of operations unchanged and no additional construction activities required).

Development Component	Approved NCIG CET*	NCIG CET including the Optimisation Modification
Access Roads	During the operation of the CET, the main access point for the NCIG CET is via the entrance to the administration and workshop buildings located off the western end of Raven Street near the intersection of Egret Street and Raven Street. Secondary access points is available to the wharf and rail infrastructure areas. Construction access via Transport for NSW (TfNSW) approved access points.	Unchanged.
Administration, Store and Workshop Buildings	Infrastructure and services including administration building, offices, general workstation areas, first aid room, store and workshop buildings.	Unchanged.
Electricity Supply and Distribution	An internal power reticulation network developed for the NCIG CET. Electricity supply infrastructure to the NCIG CET provided by Energy Australia.	Unchanged.

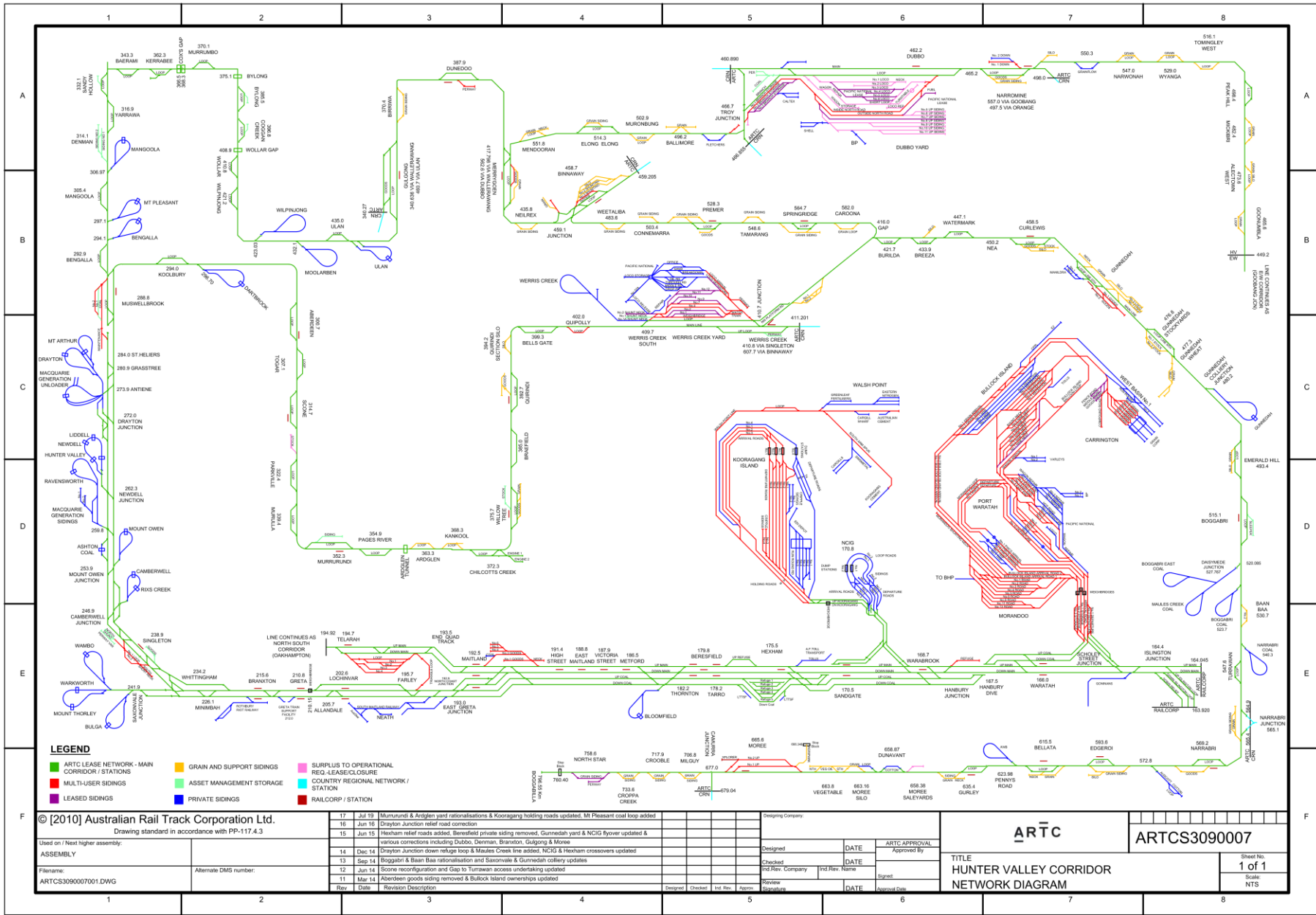
APPENDIX G

Optimisation Project Outer Envelope Intrusive $L_{Aeq}(15\text{minute})$ Noise Contours



APPENDIX H1

Hunter Valley Network Corridor Diagram dated 5 July 2019



LEGEND

■ ARTC LEASE NETWORK - MAIN CORRIDOR / STATIONS	■ GRAIN AND SUPPORT SIDINGS	■ SURPLUS TO OPERATIONAL REG. LEASE/CLOSURE
■ MULTI-USER SIDINGS	■ ASSET MANAGEMENT STORAGE	■ COUNTRY REGIONAL NETWORK / STATION
■ LEASED SIDINGS	■ PRIVATE SIDINGS	■ RAILCORP / STATION

© [2010] Australian Rail Track Corporation Ltd.
 Drawing standard in accordance with PP-117.4.3
 Used on / Next higher assembly:
 ASSEMBLY
 File name:
 ARTCS309000701.DWG
 Alternate DMS number:

Rev	Date	Revision Description	Designed	Checked	Iss. by	Agency
17	Jul 19	Murrumbidgee & Arding yard rationalisations & Kooragang holding roads updated, Mt Pleasant coal loop added				
16	Jun 16	Drayton Junction relief road correction				
15	Jun 15	Hexham relief roads added, Beresfield private siding removed, Gunnedah yard & NCIG flyover updated & various corrections including Dubbo, Denman, Branston, Gulugong & Moree				
14	Dec 14	Drayton Junction down refuge loop & Maudsley Creek line added, NCIG & Hexham crossovers updated				
13	Sep 14	Boggabri & Blain Baa rationalisation and Saxonville & Gunnedah colliery updates				
12	Jun 14	Scione reconfiguration and Gap to Turraman access undertaking updated				
11	Mar 14	Aberdeen goods siding removed & Bullock Island ownerships updated				

Designing Company:		ARTC	
Designed	DATE	ARTC APPROVAL	
Checked	DATE	Approved By	
Proj Rev. Company	Proj Rev. Name	Signature	
Review Signalling	DATE	Approved Date	

ARTC

HUNTER VALLEY CORRIDOR NETWORK DIAGRAM

ARTCS3090007

Sheet No.
1 of 1
Scale:
NTS

APPENDIX H2

ARTC Environment Protection Licence No 3142
dated 20 September 2019 Noise Extracts

L2 Noise limits

Note: It is an objective of this Licence to progressively reduce noise impacts from railways systems activities to the noise level goals of 65 dB(A)Leq, (day and evening time from 7am – 10pm), 60 dB(A)Leq, (night time from 10pm – 7am) and 85dB(A) (24 hr) max pass-by noise, at one metre from the facade of affected residential properties.

L2.1 The licensee must obtain approval from the EPA prior to permitting operation on the "premises" of:
1. a class or type/model of locomotive, whether new or existing, that is not included in Condition E2; or
2. a locomotive that has been substantially modified since it was last used on the licenses premises.
A new class of locomotive type/model previously approved under Condition L2 may be brought onto the rail network without further approval provided that it is consistent with that type/model and EPA is notified at least 7 days in advance. Condition E2 will then be updated at the next opportunity.

Note: EPA approval for a new locomotive will be granted on the basis of compliance with the locomotive noise limits in Condition L2.5, L2.6 and L2.7 and will require submission of noise test results from a representative number of locomotives from that class or type/model.

L2.2 Locomotives not included in Condition E2 must not operate on the licensed premises unless otherwise exempt.

L2.3 Conditions L2.1 and L2.2 do not apply to the operation of a locomotive solely for the purposes of conducting noise or other tests that are required for the locomotive's approval by the EPA, the licensee or any person concerned with the design, manufacture, supply or acquisition of the locomotive, provided that:

- a) operation of the locomotive is not undertaken for commercial purposes, gain, or to offset any losses; and
- b) more than ten pass-bys in a 24 hour period do not occur within (adjacent to) 200m of any one particular noise sensitive receiver in the course of the testing.

L2.4 An application for the approval of a locomotive as required by Condition L2.2 must be made in the form of a licence variation application in accordance with s.58 of the Protection of the Operations Act 1997 and be accompanied by data of type testing of the locomotive.

Note: Type testing of the locomotive must be in accordance with Condition L2.8.

L2.5 EPA Locomotive Noise Limits

Operating Condition	Location of Measurement	Noise Limit - Microphone Height: 1.5 Metres Above
Low idle with compressor radiator fans and air conditioning operating at maximum load occurring at low idle	Stationary 15 metre contour, except end positions (front and rear)	70 dB(A) LAMax, F, 30s
All other throttle settings under self load with compressor radiator fans and air conditioning operating	Stationary 15 metre contour, except end positions (front and rear)	87 dB LAMax, F, 30s 95 dB LZMax,F,30s

L2.6 Limits for Tonality

All external noise <1000 Hz must be non-tonal. For the purpose of this condition, external noise is non-tonal if the Leq 30s sound pressure level in each Z - weighted one-third octave band does not exceed the level of the adjacent bands on both sides by:

- a) 5 dB if the centre frequency of the band containing the tone is above 400 Hz; and
- b) 8 dB if the centre frequency of the band containing the tone is between 160 and 400 Hz, inclusively; and
- c) 15 dB if the centre frequency of the band containing the tone is below 160 Hz.

L2.7 Locomotive Noise Emission Test Methods

Application for approval as required by Condition L2.1 must be supported by type testing of the locomotive using procedures that are consistent with the requirements of Australian Standard AS2377-2002 (Acoustics – Methods for the measurement of railbound vehicle noise) except as otherwise specified in this licence or approved by the EPA. The type testing must provide all necessary measurement parameters for demonstrating compliance with the locomotive noise limits in Condition L2.5 and Condition L2.6.

Information supplied to the EPA as part of the application for approval must fulfil the requirements of Section 11 of AS2377-2002 for reporting.

Note: The measurement parameters required in Condition L2.5 and Condition L2.6 differ in some cases from those identified in AS2377-2002. The test procedures, measurement equipment and environmental conditions applied in supporting the application to the EPA for approval are to yield all parameters identified in Condition L2.5 and L2.6 but are otherwise to be applied in a manner that is consistent with the requirements of AS2377-2002. The 15 metre contour specified in Condition L2.5 is to be represented by the measurement points shown in AS2377-2002, Figure 1 excluding the front and rear positions (i.e. 10 points). The 15 metre contour is to be measured from the track centre line as shown in AS2377-2002, Figure 2.

L2.8 The Licensee must submit data obtained by type testing of the locomotive required by Condition L2.7 in a format specified by the EPA.

Note: The format required by Condition L2.8 must include a written report on the results of the testing and an electronic version of the test results in a spreadsheet form nominated by the EPA.

L2.9 Approval of Locomotives Not Meeting All EPA Limits

The EPA may approve locomotives that do not comply with all limits prescribed by Condition L2.6 and L2.7, if that the application for approval demonstrates, to the satisfaction of the EPA, that:

- a) the noise emission performance of the locomotive is consistent with current best practice; and
- b) all measures for minimising the extent of any non-compliance have been investigated and those that are identified as reasonable and feasible have been implemented; and
- c) none of the non-compliances will result in unacceptable environmental impacts.

L2.10 An EPA approval for locomotives under Condition L2.9 is to be taken as an approval for operation of those locomotives on the premises, notwithstanding the requirements of Condition L2.1, L2.5 and L2.6.

O4 Other operating conditions

Railway Maintenance and Construction Activities

Note: The objective of this condition is to minimise noise impacts from railway maintenance and construction activities, recognising that operational safety and other factors constrain when these activities can be carried out on the “premises”. These factors include avoiding disruptions during peak periods for passenger services and ensuring that programmed track closures facilitate the efficient completion of maintenance and construction activities. Night time and weekend work will be required for some activities.

Railway maintenance activities

O4.1 So far as is reasonably practicable and where to do so would not adversely affect ARTC's ability to provide safe and reliable services or a safe working environment, maintenance activities must be undertaken:

- a) between the hours of 7:00am and 6:00pm Mondays to Friday
- b) between the hours of 8:00am and 1:00pm Saturday; and
- c) not on Sundays or public holidays.

Note: Maintenance works to provide safe and reliable services, or a safe working environment may be undertaken outside of standard hours specified in O4.1 where the requirements of Condition O4.3 are met.

Exemption to standard maintenance hours

O4.2 Activities that may also be undertaken outside the hours specified in Condition O4.1 are:

- (a) the delivery of oversized plant or structures that police or other authorised authorities determine require special arrangements to transport along public roads;
- (b) emergency activities to avoid the loss of life or property, or to prevent environmental harm;
- (c) activities that do not exceed:
 - i. 5dBA(Laeq, 15min) above the relevant rating background level, at all times and assessed at the nearest sensitive receiver, and additionally,
 - ii. 15dBA(LA1, 1min) above the relevant rating background level at night time, and assessed at the nearest noise sensitive receiver as assessed by acoustic investigation
 - iii. The results of any acoustic investigation undertaken in relation to Condition O4.2c must be provided by the licensee when requested by an authorised officer of the EPA.

Note: Activities may also be undertaken outside the hours specified in Condition O4.1 where there are no sensitive receivers. An acoustic investigation is not required in the absence of sensitive receivers.

O4.3 Where maintenance activities are undertaken, including outside of the hours specified in Condition O4.1 noise impacts must be managed in accordance with those provisions of the Interim Construction Noise Guideline (DECCW,2009) which require the licensee to:

- a) Identify sensitive receivers that may be affected;
- b) Identify hours of work for the proposed activities;
- c) Identify noise impacts at noise sensitive receivers;
- d) Select and apply reasonable and feasible work practices to minimise noise impacts.
- e) notify the noise sensitive receivers at least 5 days prior to the commencement of railway maintenance activities undertaken outside of the hours specified in Condition O4.1, except where the licensee first becomes aware of the need to undertake those railway maintenance activities less than 5 days prior to the proposed commencement date, in which case the notification must be provided as soon as practicable after becoming aware of the need to undertake the railway maintenance activities.

O4.4 When requested by an authorised officer of the EPA, the licensee must provide the following information regarding any proposed maintenance activities on the premises:

- a) dates and times of the proposed maintenance activity;
- b) location of the proposed maintenance activity;
- c) type(s) of work to be performed in conducting the proposed maintenance activity;
- d) plant and equipment to be used; and
- e) contact name and telephone number of a person who will be on site during the activity and who is authorised by the licensee to take action, including the cessation of the activity or any part of it, if so directed by the EPA. A contact person must be contactable 24 hours a day via the supplied telephone number(s) during the whole of the period that the activity takes place outside normal business hours.

O4.5 When requested by an authorised officer of the EPA, the licensee must provide written reasons that demonstrate that maintenance activities undertaken outside of the hours specified in Condition O4.1 comply with that condition

Railway construction activities

O4.6 So far as is reasonably practicable and where to do so would not adversely affect ARTC's ability to provide safe and reliable services or a safe working environment, construction activities must be undertaken:

- a) between the hours of 7:00am and 6:00pm Mondays to Friday
- b) between the hours of 8:00am and 1:00pm Saturday; and
- c) not on Sundays or public holidays.

Exemption to standard construction hours

O4.7 Activities that may also be undertaken outside the hours specified in Condition O4.6 are:

- a) the delivery of oversized plant or structures that police or other authorised authorities determinerequire special arrangements to transport along public roads;
- b) emergency activities to avoid the loss of life or property, or to prevent environmental harm;
- c) activities that do not exceed:
 - i. 5dBA(Laeq, 15min) above the relevant rating background level, at all times and assessed at the nearest sensitive receiver, and additionally;
 - ii. 15dBA(LA1, 1min) above the relevant rating background level at night time, and assessed at the nearest noise sensitive receiver as assessed by acoustic investigation;
 - iii. The results of any acoustic investigation undertaken in relation to Condition O4.7c must be provided by the licensee when requested by an authorised officer of the EPA.

Note: Activities may also be undertaken outside the hours specified in Condition O4.6 where there are no sensitive receivers. An acoustic investigation is not required in the absence of sensitive receivers.

Note: Project specific activities that may also be undertaken outside the hours specified in Condition O4.6 are specified in Condition E3.

O4.8 The licensee may also undertake works outside of standard construction hours if agreement between the licensee and potentially affected noise sensitive receivers, termed the "local community" has been reached. Any agreement(s) between the licensee and the local community must be recorded in writing and a copy of the agreement(s) kept on the premises by the licensee for the duration of the works.

High noise generating works

O4.9 When construction activities are required to be undertaken outside of the hours specified in Condition O4.6, any high noise generating works must only be undertaken:

- a) between the hours of 8:00am and 10:00pm Monday to Friday;
- b) between the hours of 8:00am and 6:00pm Saturdays and Sundays; and
- c) where the high noise impact generating works are likely to impact the same noise sensitive receivers, in blocks of no more than 3 hours, with at least a 1 hour respite between each block of work.

Note: High noise impact generating works may also be undertaken outside the hours specified in Condition O4.9 where there are no sensitive receivers or agreement has been reached with the community as per Condition O4.8.

O4.10 Where construction activities are undertaken, including outside of the hours specified in Condition O4.6, noise impacts must be managed in accordance with those provisions of the Interim Construction Noise Guideline (DECCW, 2009) which require the licensee to:

- a) Identify sensitive receivers that may be affected;
- b) Identify hours of work for the proposed activities; c) Identify noise impacts at noise sensitive receivers;
- d) Select and apply reasonable and feasible work practices to minimise noise impacts; and e) notify the noise sensitive receivers as per Condition O4.11.

- O4.11 With regard to construction activities and the notification required by Condition O4.10e), the notification must be made not less than 5 days and not more than 14 days before those activities are to be undertaken.
- a) The notification must be:
 - i) by letterbox drop; and
 - ii) detailed on the project website where one exists,
 - b) The notification required by this condition must:
 - i) clearly outline the reason that the work is required to be undertaken outside the hours specified in Condition O4.6;
 - ii) include a diagram that clearly identifies the location of the proposed works in relation to nearby cross streets and local landmarks;
 - iii) include details of relevant time restrictions that apply to the proposed works;
 - iv) clearly outline in plain English the location, nature, scope and duration of the proposed works;
 - v) detail the expected noise impact of the works on noise sensitive receivers;
 - vi) clearly state how complaints may be made and additional information obtained; and
 - vii) include the number of the telephone complaints line required by this licence, an afterhours contact phone number specific to the works, and the project website address where applicable.
- O4.12 When requested by an authorised officer of the EPA, the licensee must provide the following information regarding any construction activities on the premises:
- a) dates and times of the construction activity;
 - b) location of the construction activity;
 - c) type(s) of work to be performed in conducting the construction activity;
 - d) plant and equipment to be used; and
 - e) contact name and telephone number of a person who will be on site during the activity and who is authorised by the licensee to take action, including the cessation of the activity or any part of it, if so directed by the EPA. A contact person must be contactable 24 hours a day via the supplied telephone number(s) during the whole of the period that the activity takes place outside normal business hours.
- O4.13 When requested by an authorised officer of the EPA, the licensee must provide written reasons that demonstrate that construction activities undertaken outside of the hours specified in Condition O4.6 comply with that condition.

Emergency Works

O4.14 Condition O4.1 to O4.13 do not apply to emergency works

Blasting

O4.15 All blasting activities are prohibited unless approved under another condition of this licence.

7 Pollution Studies and Reduction Programs

U1 Whole of network strategies

Note: PRP's U1, U2, U3 and U4 have been completed but are retained for historical purpose.

U2 PRP 3.1 Audit of the Noise Performance of Locomotives on the ARTC Network

U2.1 Almost a third of all rail noise complaints received by the Environment Protection Authority (EPA) between 2007 and 2011 were generated by pass by noise from locomotives. For this reason the EPA considers the ongoing monitoring and management of locomotive noise to be a critical component of environmental regulation of the NSW rail network.

The purpose of PRP 3.1 is for the licensee to:

1. obtain accurate measurements of the noise performance of locomotives operating on the NSW rail network by conducting wayside noise monitoring and to provide that data to relevant locomotive operators and the EPA; and
2. obtain accurate information on the actions of locomotive operators to rectify locomotives identified by the wayside monitoring as poorly performing in order to determine whether locomotive operators are implementing all reasonable and feasible noise mitigation measures.

The licensee is required to comply with PRP3.1 outlined in U1.2 below by completing each described action in the program within the set timeframe.

U2.2 **Action 3.1A**

The licensee will implement and maintain a monitoring program which will:

- Monitor noise emissions from locomotives and rolling stock accessing ARTC's network and passing the Metford wayside measurement location; and
- Record and store data from wayside noise monitoring.

The noise monitoring program must be consistent with the Australian Rail track Corporation Wayside Noise Monitoring Program Work Plan submitted to the EPA by ARTC on 17 April 2009 and with the previous noise ARTC Wayside Noise Pilot Monitoring Program conducted between January – July 2010.

Timeframe – Commencement of the program will be within 16 weeks of inclusion of the PRP on the licence. The program will be conducted for a period of 12 months.

Action 3.1B

The licensee will submit to the EPA for approval a comprehensive reporting procedure that, as a minimum, includes:

1. providing quarterly reports to relevant locomotive operators on noise data collected which identify those locomotives with noise levels in the top 5% of locomotives measured in that quarter;
2. obtaining quarterly reports from locomotive operators on actions taken to reduce noise levels from identified locomotives; and
3. providing the EPA with quarterly reports which include:
 - noise monitoring data showing all noise monitoring results, and
 - the information received (from the preceding quarter) from locomotive operators on measures taken to reduce noise levels from identified locomotives.

Timeframe – Within 12 weeks of inclusion of the PRP on the licence.

Action 3.1C

The licensee will implement the EPA approved reporting procedure from Action 3.1B.

Timeframe – Within three weeks of the EPA approving the procedure.

8 Special Conditions

E3 WestConnex Enabling Works

Definition

E3.1 The WestConnex Enabling works means the extension of Wentworth Avenue at Mascot which will necessitate the construction of a road underpass beneath the current freight line in that location.

The work involves

- construction of a temporary rail deviation with the ARTC rail corridor and
- construction of a temporary embankment primarily within the ARTC rail corridor, the toe of which would occupy a portion of Sydney Airport Corporation Limited (SACL) land.

Additional Construction Activities and High Noise Generating Works Approved by the EPA

- E3.2 (a) Works and activities associated with the construction of a track deviation for the Wentworth Avenue Rail Overpass in Mascot may be undertaken on 16 August 2016, 17 August 2016 and 18 August 2016 subject to the following conditions:
- (i) High noise generating works may be undertaken between the hours 10:00pm and 7:00am on E3.2a);
 - (ii) High noise generating works may be undertaken at any time during this period and the respite period required by Condition 04.9 c) does not apply.
- E3.3 (a) Works and activities associated with the construction of a track deviation for the Wentworth Avenue Rail Overpass in Mascot may be undertaken continuously between 26 August 2016 at 1800hrs and 29 August 2016 at 0700hrs subject to the following conditions:
- (i) High noise generating works may be undertaken at any time during this period and the respite period required by Condition 04.9 c) does not apply.

APPENDIX H3

EPA Rail Infrastructure Noise Guideline Appendix 2

Appendix 2 Environmental assessment requirements for rail traffic-generating developments

Land-use developments other than rail projects that are likely to generate additional rail traffic on an existing rail network should be assessed against the following requirements:

- Identify the typical offset distance/s of sensitive receivers from the rail line/s that are likely to be affected by increased rail movements.
- Quantify the existing level of rail noise at the offset distance/s identified above using the noise descriptors $L_{Aeq,15/9hr}$ and L_{Amax} (95th percentile) dB(A).
- Predict the cumulative rail noise level (i.e. from the existing and proposed rail movements) using a calibrated noise model (based on predicted increased rail movements) at the offset distances identified above.
- Compare the cumulative noise level with the rail noise assessment trigger levels: $L_{Aeq,15hr}$ 65 dB(A), $L_{Aeq,9hr}$ 60 dB(A), and L_{Amax} (95th percentile) 85 dB(A).
- Implement all feasible and reasonable noise mitigation measures where the cumulative noise level exceeds the noise assessment trigger levels and project-related noise increases are predicted.
- Where the L_{Aeq} noise level increases are more than 2 dB(A), which is equivalent to approximately 60 per cent of the total line or corridor rail traffic, and exceeds the relevant noise assessment trigger level, strong justification should be provided as to why it is not feasible or reasonable to reduce the increase.

Notes

1. A project-related noise increase is an increase of more than 0.5 dB over the day or night periods.
2. The geographical extent of the rail noise assessment ideally should be where project-related rail noise increases are less than 0.5 dB. This roughly equates to where project-related rail traffic represents less than 10 per cent of the total line or corridor rail traffic.
3. Guidance on the concept of 'feasible and reasonable' is outlined in Appendix 6.

Mitigating noise from rail traffic-generating developments

For a traffic-generating development like a coal mine, the proponent would not have control over the public rail infrastructure. Consequently they would have limited opportunities to implement mitigation, such as noise barriers. In such cases, control of noise and vibration at the source is the most effective means of mitigation. However, the land-use developer responsible for the additional rail traffic (such as a mine, quarry or industrial site) could contract to a rail service provider who would use best practice rolling stock, including locomotives approved to operate on the NSW rail network in accordance with environment protection licences issued by the EPA. At property (architectural) treatments should be considered for affected receivers, if reasonable.

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AIR QUALITY AND GREENHOUSE GAS ASSESSMENT

NCIG CET OPTIMISATION PROJECT

Newcastle Coal Infrastructure Group

18 February 2020

Job Number 14060327D

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Air Quality and Greenhouse Gas Assessment NCIG CET Optimisation Project

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1 INTRODUCTION

Todoroski Air Sciences has prepared this report for Newcastle Coal Infrastructure Group (NCIG). The report presents an air quality and greenhouse gas assessment for the proposed NCIG Coal Export Terminal (CET) Optimisation Project (hereafter referred to as the Optimisation Project). The Optimisation Project incorporates a number of on-site control system and operational process improvements that NCIG has identified and implemented to improve the efficiency of the operations, which would allow an increased coal throughput of up to 79 million tonnes per annum (Mtpa).

To assess the potential air quality impacts associated with the Optimisation Project, this report outlines the current NCIG CET operations and the proposed Optimisation Project, defines the applicable air quality criteria, reviews the existing environmental conditions surrounding the site, describes the assessment approach, and presents the study results and conclusions.

This assessment has been prepared in general accordance with the New South Wales (NSW) Environment Protection Authority (EPA) document *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (**NSW EPA, 2017**).

2 OPTIMISATION PROJECT BACKGROUND

2.1 Assessment and development history

The NCIG CET was assessed in the "Newcastle Coal Infrastructure Group Coal Export Terminal Environmental Assessment" (NCIG, 2006) and was approved by the NSW Minister for Planning in April 2007. An Air Quality Impact Assessment of the existing NCIG CET was prepared by **Holmes Air Sciences (2006)**.

Construction of the NCIG CET commenced in February 2008 and was completed in three main stages:

- ✦ Stage 1 – capacity of 30 Mtpa was completed in May 2010.
- ✦ Stage 2AA – capacity of 53 Mtpa was completed in June 2012.
- ✦ Stage 2F – capacity of 66 Mtpa was completed in June 2013.

The High Capacity Optional Inlet Rail Spur and Rail Siding (referred to as the NCIG CET Rail Flyover Modification) was approved on the 13 May 2013 with construction commencing in the third quarter of 2013. The Rail Flyover Modification commenced operations on 1 July 2015.

2.2 Local setting

The NCIG CET is located on Kooragang Island within the Port of Newcastle in the Lower Hunter Valley region of NSW, approximately 6 kilometres (km) north of Newcastle and 4 km northwest of Stockton (see **Figure 2-1**).

Land use surrounding the NCIG CET predominately consists of commercial and industrial uses. Other coal terminals in the area operated by Port Waratah Coal Services (PWCS) include the Kooragang Coal Terminal and the Carrington Coal Terminal. Approximately 35% of all coal exports from the Port of Newcastle is attributed to the NCIG CET.

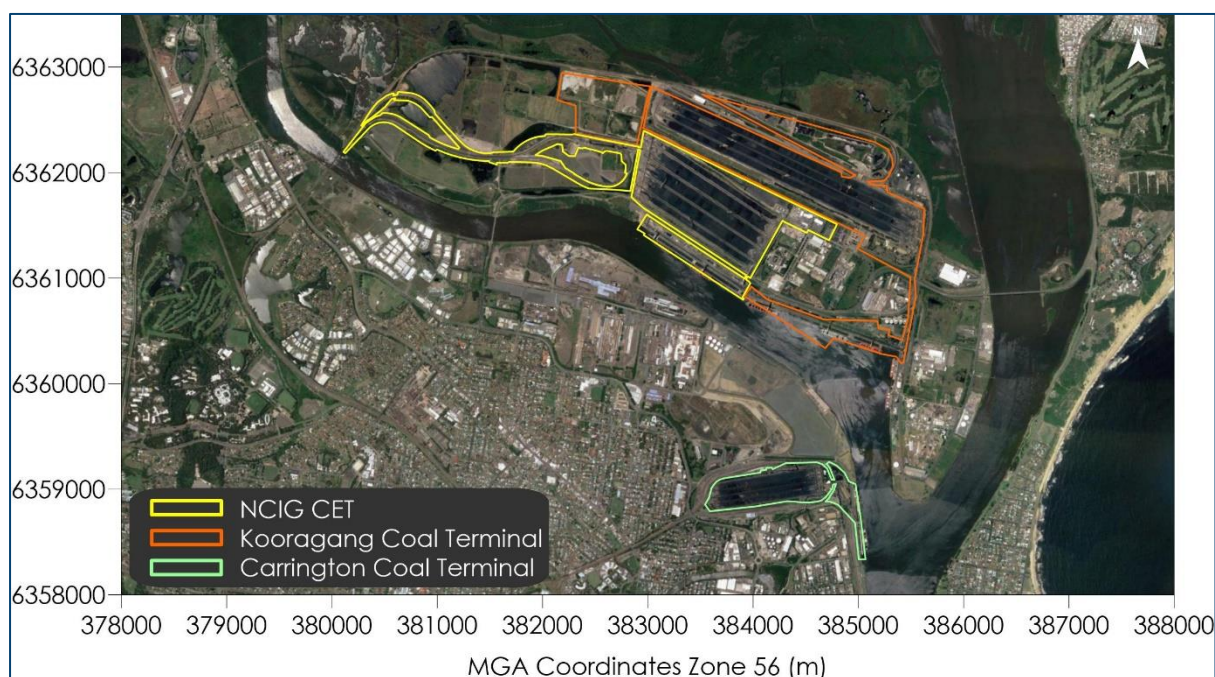


Figure 2-1: NCIG CET location

2.3 Optimisation Project description

2.3.1 Current operations

The current approved operations at the NCIG CET allow for a capacity of 66 Mtpa of product coal. Product coal is delivered to the site via trains from the Newcastle, Hunter Valley, Gloucester, Gunnedah and Western Coalfields, where it is unloaded into one of the two train unloading stations.

The two train unloading stations are housed within a single multi-level structure and each receive 8,500 tonnes per hour (tph). Coal is transferred via a series of conveyors and stockpiled until it is ready to be shipped.

The coal stockpiles consist of a series of parallel pads and intermediate berms and are serviced by rail-mounted combined stacker/reclaimers. Reclaimed coal is transferred via another network of conveyors to the wharf facilities and ship loaders. Buffer bins near the wharf are used for 'break' capacity as a critical part of the ship loading process.

The main infrastructure includes two train unloading stations, coal stockpiles, four stacker/reclaimers, a network of conveyors and transfers, two buffer bins, wharf facilities, three berths and two ship loaders.

2.3.2 Optimisation Project

The Optimisation Project incorporates a number of on-site control system and operational process improvements that NCIG has identified and implemented to improve the efficiency of the operations. The Optimisation Project would incorporate the following key efficiency improvements implemented to date which have increased the maximum capacity to 79 Mtpa:

- ✦ streamlining train approach times to unloading stations through the use of automated processes;
- ✦ decreasing time between unloading of trains carrying the same coal type, and process and network changes to promote sequencing of trains carrying the same coal type;
- ✦ extending stockpiles to the eastern limit of the existing stockyard pads;
- ✦ improved utilisation of the existing coal stockpiles within the approved height of 25 metres (m);
- ✦ optimising the operation of stacker/reclaimers to improve relocation times and reduce mode change times (i.e. change times between stack and reclaim modes);
- ✦ increasing conveyor in-loading rates from up to approximately 8,500 tph to up to approximately 10,000 tph through a volumetric increase of coal on the belt;
- ✦ minimisation of unproductive process delays;
- ✦ increasing average reclaim rates through control system improvements (with no proposed change to the approved maximum rate of 10,500 tph);
- ✦ better utilising existing buffer bin capacity and operation;
- ✦ improving ship loader hatch changes; and
- ✦ improving shipping vessel arrival and departure processes.



The Optimisation Project would not require additional surface disturbance outside of the existing disturbance footprint and would essentially entail the more efficient handling of coal to allow a greater throughput.



3 AIR QUALITY CRITERIA

Air quality criteria are benchmarks set to protect the general health and amenity of the community in relation to air quality. The sections below identify the potential air emissions generated by the NCIG CET incorporating the Optimisation Project and the applicable air quality criteria.

3.1 Particulate matter

Particulate matter refers to particles of varying size and composition. The air quality goals relevant to this assessment refer to three classes of particulate matter based on the sizes of the particles. The first class is referred to as Total Suspended Particulate matter (TSP) which measures the total mass of all particles suspended in air. The upper size range for TSP is nominally taken to be 30 micrometres (μm) as in practice, particles larger than 30 to 50 μm settle out of the atmosphere too quickly to be regarded as air pollutants.

The second and third class are sub-classes of TSP, namely, particulate matter with aerodynamic diameters of 10 μm or less (PM_{10}), and particulate matter with aerodynamic diameters of 2.5 μm or less ($\text{PM}_{2.5}$).

Table 3-1 summarises the air quality goals that are relevant to this assessment as outlined in the NSW EPA document *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (NSW EPA, 2017)*.

The air quality goals for total impact relate to the total dust burden in the air and not just the dust from the proposed Optimisation Project. Consideration of background dust levels needs to be made when using these goals to assess potential impacts.

Table 3-1: NSW EPA air quality impact assessment criteria

Pollutant	Averaging Period	Impact	Criterion
TSP	Annual	Total	90 $\mu\text{g}/\text{m}^3$
PM_{10}	Annual	Total	25 $\mu\text{g}/\text{m}^3$
	24 hour	Total	50 $\mu\text{g}/\text{m}^3$
$\text{PM}_{2.5}$	Annual	Total	8 $\mu\text{g}/\text{m}^3$
	24 hour	Total	25 $\mu\text{g}/\text{m}^3$
Deposited dust	Annual	Incremental	2 $\text{g}/\text{m}^2/\text{month}$
		Total	4 $\text{g}/\text{m}^2/\text{month}$

Source: **NSW EPA, 2017**

$\mu\text{g}/\text{m}^3$ = micrograms per cubic metre

$\text{g}/\text{m}^2/\text{month}$ = grams per square metre per month

3.2 Other air pollutants

Emissions of other air pollutants will also potentially arise from the exhaust of diesel-powered trains and ships delivering and exporting the coal on-site. Emissions from diesel powered equipment generally include carbon monoxide (CO), nitrogen dioxide (NO_2) and other pollutants, such as sulfur dioxide (SO_2).

CO is colourless, odourless and tasteless and is generated from the incomplete combustion of fuels when carbon molecules are only partially oxidised. The ambient CO levels in the area are minor compared to the relevant criteria. Hence, the CO impact of the NCIG CET incorporating the Optimisation Project is not assessed in this study.

Sulfur dioxide (SO₂) is a colourless, toxic gas with a pungent and irritating smell. It commonly arises in industrial emissions due to the sulphur content of the fuel. Sulfur is actively removed from fuel to prevent the release and formation of SO₂. The sulphur content of Australian diesel is controlled to a low level by national fuel standards and as such the emissions of SO₂ and other pollutants generated from diesel powered equipment are generally considered to be too low to generate any significant pollutant concentrations and have not been assessed further in this study. Also, the ambient SO₂ levels are minor compared to the relevant criteria.

NO₂ is reddish-brown in colour (at high concentrations) with a characteristic odour. NO₂ belongs to a family of reactive gases called nitrogen oxides (NO_x). These gases form when fuel is burned at high temperatures, mainly from motor vehicles, power generators and industrial boilers (**United States Environment Protection Authority, 2011**). NO_x may also be generated by blasting activities. It is important to note that when formed, NO₂ is generally a small fraction of the total NO_x generated.

Table 3-2 summarises the air quality goals for NO₂ assessed in this report.

Table 3-2: NSW EPA air quality impact assessment criteria for NO₂

Pollutant	Averaging period	Criterion
NO ₂	1 hour	246 µg/m ³
	Annual	62 µg/m ³

Source: **NSW EPA, 2017**

4 EXISTING ENVIRONMENT

This section describes the existing environment including the climate and ambient air quality in the area surrounding the NCIG CET.

4.1 Local climatic conditions

Long-term climatic data from the Bureau of Meteorology (BoM) weather station at Newcastle Nobbys Signal Station Automatic Weather Station (AWS) (Site No. 061055) were used to characterise the local climate in the proximity of the NCIG CET. The Newcastle Nobbys Signal Station AWS is located approximately 6 km southeast of the NCIG CET.

Table 4-1 and **Figure 4-1** present a summary of data from the Newcastle Nobbys Signal Station AWS collected over a 44 to 155-year period for the various meteorological parameters.

The data indicate that January is the hottest month with a mean maximum temperature of 25.6 degrees Celsius (°C) and July as the coldest month with a mean minimum temperature of 8.5°C.

Rainfall peaks in the first half of the year and declines thereafter. The data indicate that March is the wettest month with an average rainfall of 119.2 millimetres (mm) over 9.2 days and November is the driest month with an average rainfall of 70.9 mm over 7.8 days. Average annual rainfall for the station is 1,121.0 mm occurring over an average of 98.7 days.

Humidity levels exhibit variability over the day and seasonal flux across the year. Mean 9am humidity levels range from 68% in October to 80% in February. Mean 3pm humidity levels range from 56% in August to 74% in February.

Wind speeds during the warmer months tend to have a greater spread between the 9am and 3pm conditions compared to the colder months. Mean 9am wind speeds range from 20.8 kilometres per hour (km/h) in February and March to 26.4 km/h in June. Mean 3pm wind speeds range from 26.1 km/h in May to 35.3 km/h in November.

Table 4-1: Monthly climate statistics summary – Newcastle Nobbys Signal Station AWS

Parameter	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Ann.
Temperature													
Mean max. temp. (°C)	25.6	25.4	24.8	22.8	20.0	17.5	16.8	18.1	20.2	22.1	23.5	24.9	21.8
Mean min. temp. (°C)	19.3	19.4	18.3	15.4	12.0	9.8	8.5	9.3	11.5	14.1	16.2	18.0	14.3
Rainfall													
Rainfall (mm)	89.0	106.9	119.2	116.7	114.5	118.9	91.9	72.5	71.9	72.7	70.9	80.3	1121.0
No. of rain days	8.1	8.2	9.2	9.2	8.9	9.2	8.1	7.4	7.2	7.8	7.8	7.6	98.7
9am conditions													
Mean temp. (°C)	21.9	21.9	20.9	18.1	14.6	12.1	10.9	12.2	15.1	17.9	19.5	21.1	17.2
Mean R.H. (%)	77	80	79	78	79	79	77	72	69	68	72	74	75
Mean W.S. (km/h)	20.9	20.8	20.8	21.5	23.6	26.4	26.3	25.8	25.1	23.7	23.2	21.7	23.3
3pm conditions													
Mean temp. (°C)	23.3	23.5	22.9	21.3	18.8	16.5	15.9	16.9	18.5	19.8	21.0	22.4	20.1
Mean R.H. (%)	72	74	72	66	64	63	59	56	59	64	68	71	66
Mean W.S. (km/h)	33.2	32.6	30.6	28.0	26.1	28.2	28.9	30.5	33.9	34.4	35.3	35.2	31.4

Source: BoM, 2019 (accessed August 2019)

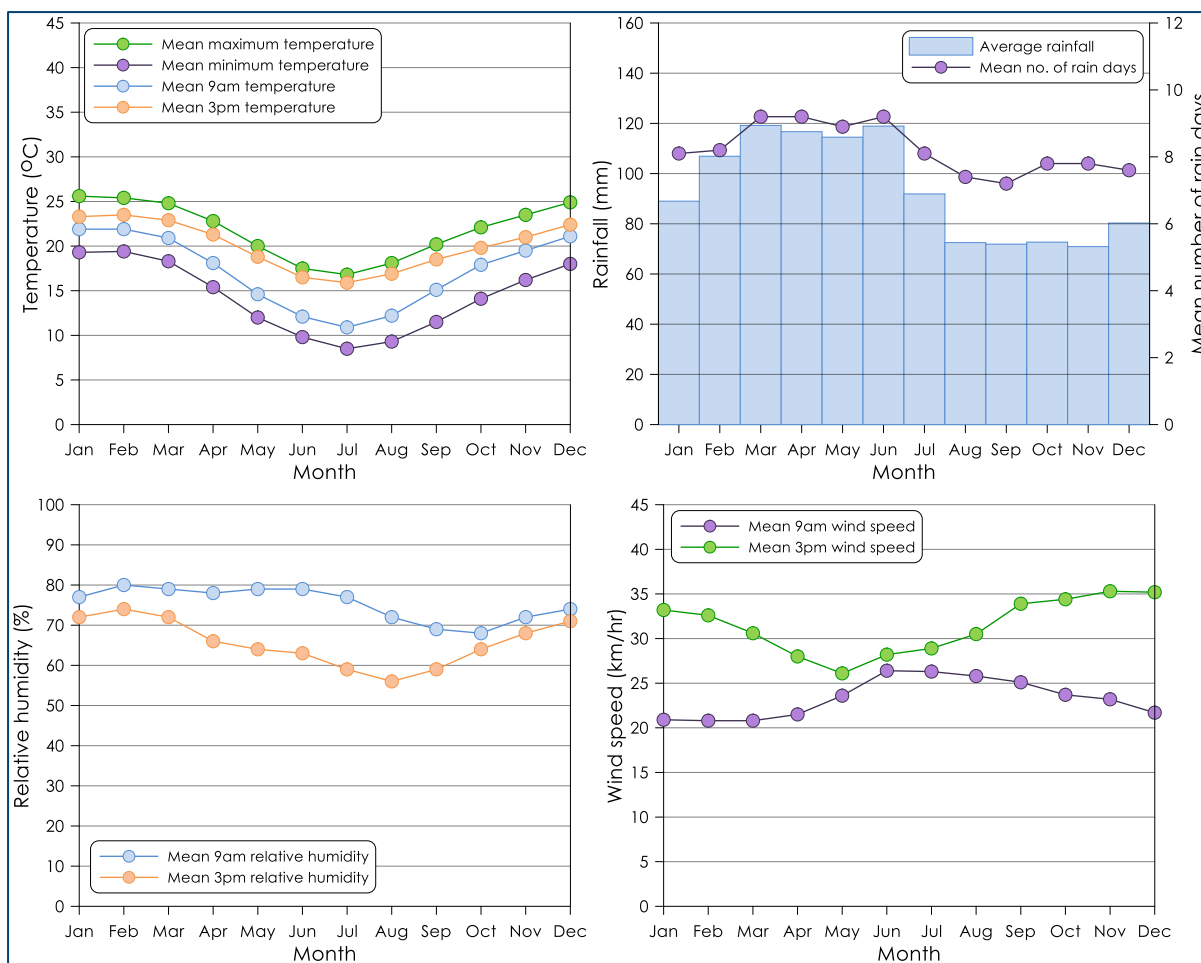


Figure 4-1: Monthly climate statistics summary – Newcastle Nobbys Signal Station AWS

4.2 Local meteorological conditions

The available site-specific meteorological data collected by NCIG were reviewed for this assessment. Annual and seasonal windroses prepared from data collected from the 2015 calendar year are presented in **Figure 4-2**.

The 2015 calendar year was selected as the meteorological year for the dispersion modelling based on an analysis of long-term data trends in meteorological data recorded for the area as outlined in **Appendix A**.

On an annual basis, winds from the north-northwest and northwest are most frequent. During summer, winds from the southeast and east-southeast dominate the distribution. The autumn and spring wind distribution patterns are similar to the annual distribution, and are typically dominated by winds from the north-northwest and northwest, however, with spring showing a higher proportion of winds from the east-southeast. The winter distribution pattern indicates wind predominately from the north-northwest and northwest with few winds originating from the southeast and east-southeast.

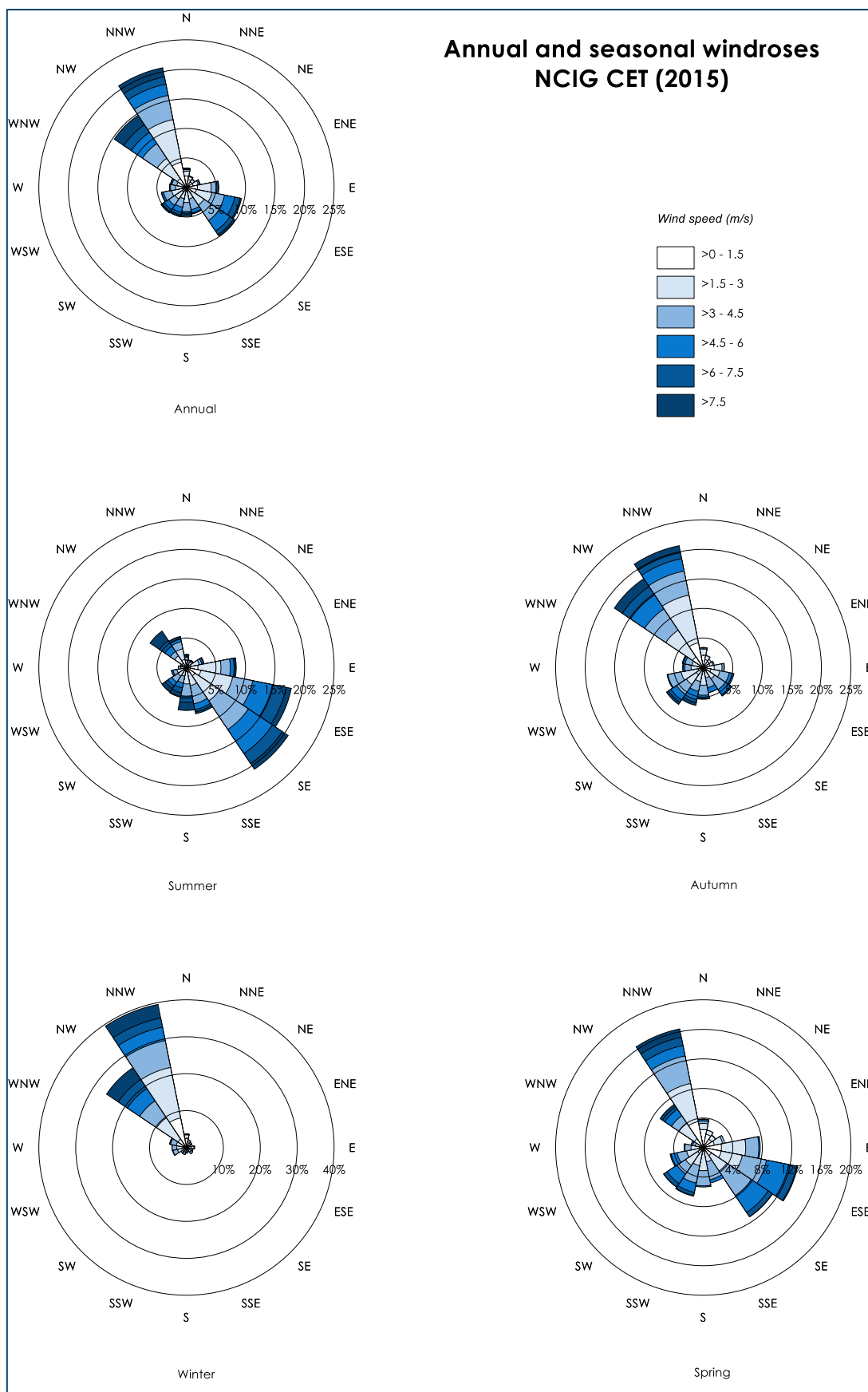


Figure 4-2: Annual and seasonal windroses for NCIG weather station (2015)

4.3 Ambient air quality

The main sources of particulate matter in the wider area around the NCIG CET include emissions from the neighbouring industries and emissions from local anthropogenic activities such as motor vehicle exhaust and domestic wood heaters, urban activity and various other commercial and industrial activities.

Available data from the air quality monitors operated by the NCIG CET and the nearest NSW Office of Environment and Heritage (OEH) sites were used to quantify the existing background level of the assessed pollutants for the proposed Optimisation Project.

4.3.1 NCIG monitoring

NCIG conducts internal ambient dust monitoring using a network of Beta-Attenuation Mass samplers (BAMs) and external ambient dust monitoring using High Volume Air Samplers (HVAS) and dust deposition gauges. The monitoring is conducted at various locations in the wider area surrounding the NCIG CET and are shown in **Figure 4-3**.

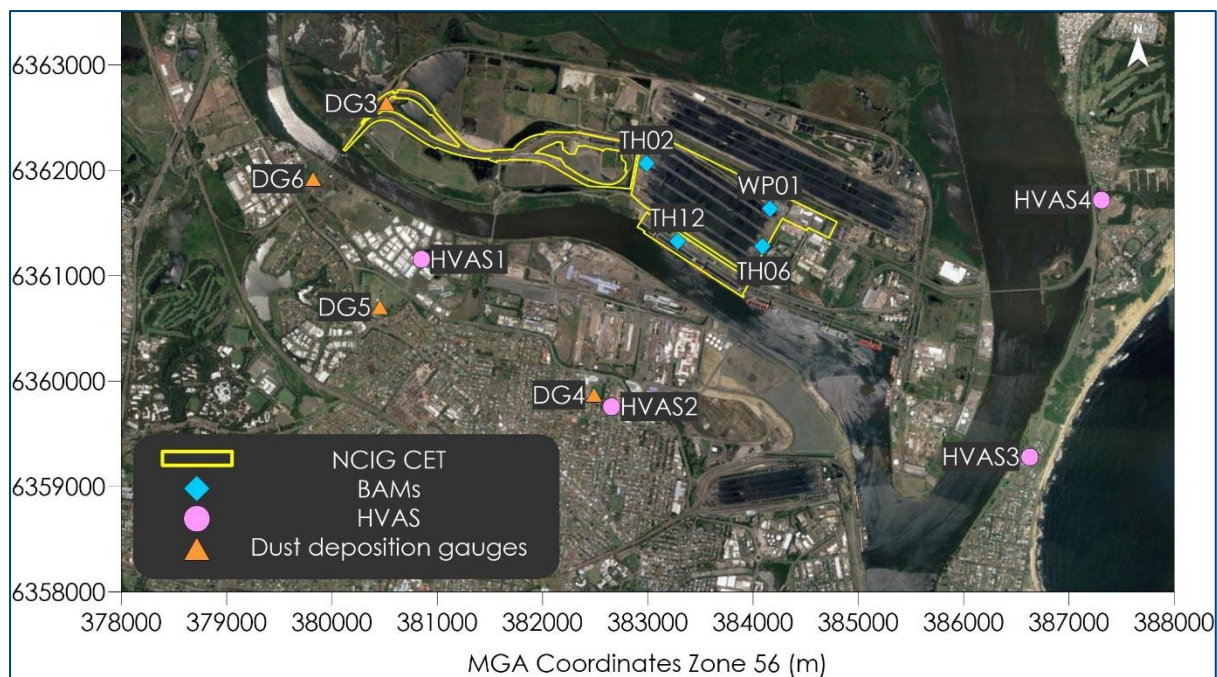


Figure 4-3: Location of NCIG CET monitoring stations

4.3.1.1 Internal monitoring

A summary of the available data collected from the internal BAMs during 2014 to 2018 is presented in **Table 4-2**. The monitoring data indicate that the annual average TSP concentrations were below the criterion of $90 \mu\text{g}/\text{m}^3$ for each of the monitoring stations on the site. The BAMs are located at the NCIG and in close proximity (within 80m) of active coal stockpiling areas.

Table 4-2: BAMs TSP monitoring data – NCIG CET ($\mu\text{g}/\text{m}^3$)

Period	WP01	TH06	TH12	TH02
2014	20.9	46.7	34.1	28.5
2015	10.8	38.9	32.7	21.5
2016	11.5	38.9	35.3	33.2
2017	20.5	42.9	30.6	34.6
2018	21.5	46.4	27.3	37.4

4.3.1.2 External monitoring

4.3.1.2.1 HVAS monitoring

Table 4-3 presents a summary of the annual average TSP monitoring data collected from the NCIG CET HVAS monitoring stations from 2014 to 2018. With the exception of the HVAS 2 monitoring during the 2014 calendar year, the data indicate that the annual average TSP concentrations recorded have been below the relevant criteria of $90 \mu\text{g}/\text{m}^3$. The higher dust levels recorded at the HVAS 2 monitor during 2014 were attributed to sources which were not related to NCIG, including residential construction works close to the monitor location at the time.

Table 4-3: Summary of TSP levels from NCIG CET monitoring sites ($\mu\text{g}/\text{m}^3$)

	HVAS 1	HVAS 2	HVAS 3	HVAS 4
2014	41.4	93.0*	49.3	40.8
2015	34.3	40.4	46.6	34.7
2016	40.1	44.0	51.7	37.1
2017	44.8	47.5	50.3	39.9
2018	47.5	47.5	54.8	44.1

* Construction works (unrelated to NCIG) were being undertaken close to the monitor location at the time.

Figure 4-4 presents the recorded 24-hour average TSP concentrations from the HVAS monitoring. It is clear from the graph that the periods of elevated dust levels at HVAS 2 in 2014 were associated with residential construction works (unrelated to NCIG) occurring close to the monitor location.

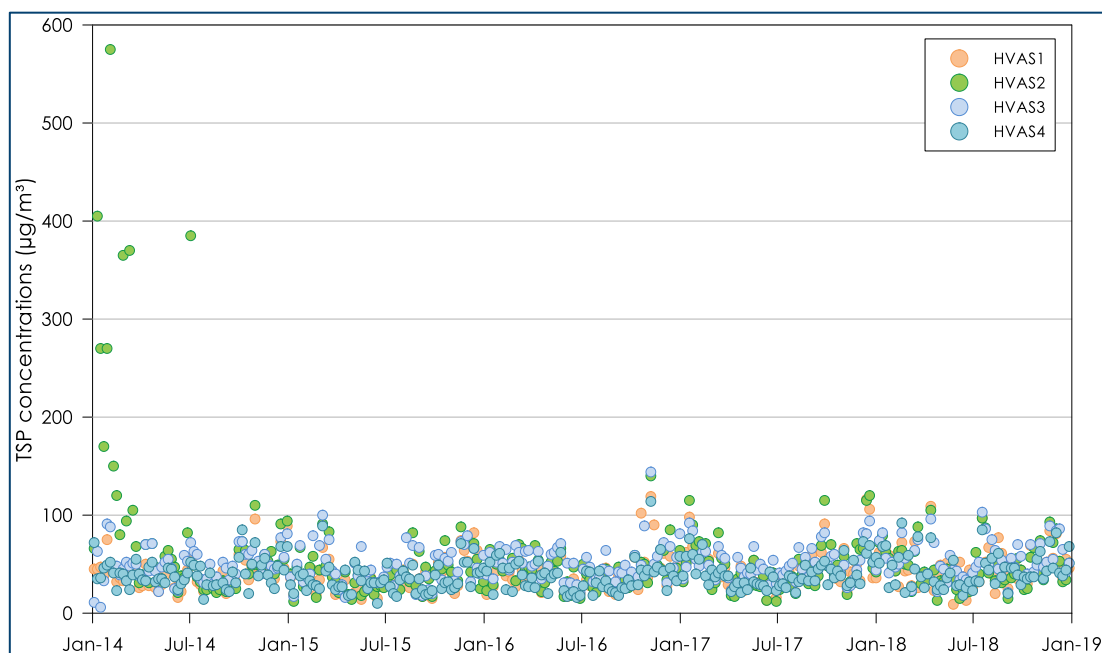


Figure 4-4: Summary of TSP monitoring data – HVAS

Table 4-4 presents a summary of the PM₁₀ monitoring data collected from the HVAS monitoring stations. The data indicate the annual average PM₁₀ concentrations exceed the annual average criterion of 25 µg/m³ during 2014 at HVAS 2. The cause of this is likely due to elevated levels associated with residential construction works (unrelated to NCIG) occurring close to the monitor location during this period.

Table 4-4: Summary of PM₁₀ levels from NCIG CET monitoring sites (µg/m³)

	HVAS1	HVAS2	HVAS4
Annual average			
2014	19.1	29.7*	20.1
2015	16.6	19.1	17.7
2016	18.9	21.5	19.7
2017	19.1	20.8	19.6
2018	20.6	21.9	20.1
Maximum 24-hour average			
2014	47.0	140.0*	45.0
2015	37.0	47.0	40.0
2016	79.0	88.0	82.0
2017	50.0	44.0	48.0
2018	47.0	46.0	42.0
Number of days greater than 50 µg/m³			
2014	0	8*	0
2015	0	0	0
2016	1	1	1
2017	0	0	0
2018	0	0	0

* Construction works (unrelated to NCIG) were being undertaken close to the monitor location at the time.

The recorded 24-hour average PM₁₀ concentrations from the HVAS monitoring stations are shown in **Figure 4-5**. The monitors show a slight seasonal trend, with concentrations nominally highest in the spring and summer months with the warmer weather raising the potential for drier ground elevating windblown dust, pollen levels and the occurrence of bushfires.

In 2014, eight days of elevated 24-hour average PM₁₀ levels were recorded at HVAS 2 which are also associated with residential construction works (unrelated to NCIG) occurring close to the monitor location.

On 7 November 2016, all HVAS monitors recorded elevated levels above the criterion. A review of available satellite imagery indicates extensive bushfires occurring in the region, which are the likely cause of the elevated levels at the monitors. **Figure 4-6** presents satellite imagery of the area showing bushfire smoke on 7 November 2016.

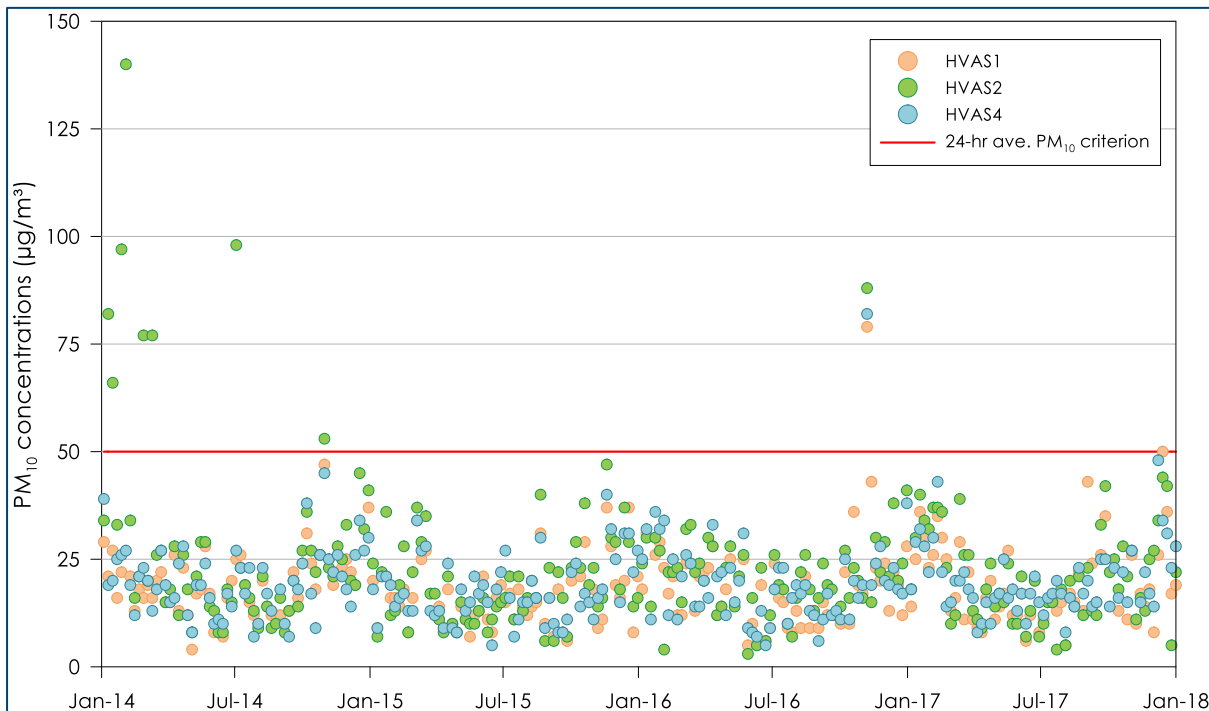
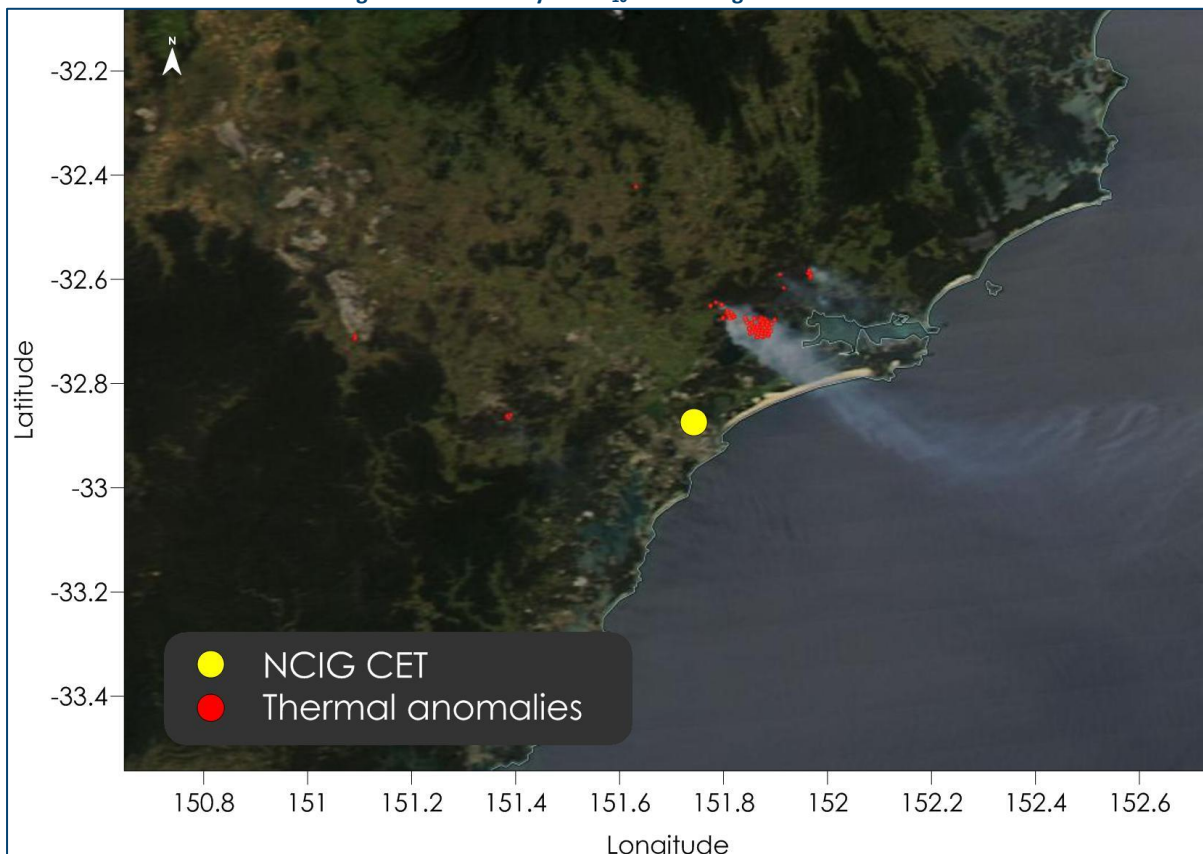


Figure 4-5: Summary of PM₁₀ monitoring data – HVA5



Source: NASA, 2017

Figure 4-6: Satellite imagery of the area around the NCIG CET on 7 November 2016

4.3.1.2.2 Dust deposition monitoring

Table 4-5 summarises the annual average dust deposition levels recorded at each gauge from 2014 to 2018. With the exception of monitoring results recorded at DG3 in 2015, the annual average dust deposition levels were below the criterion of 4 g/m²/month. In general, the air quality in terms of dust deposition is considered good with levels between 0.5 and 2.1 g/m²/month.

The high dust deposition levels recorded at DG3 during 2015 may be attributed to potential contamination of the samples during this period as indicated by the level of combustible matter in the samples. A study was conducted to investigate the potential cause of the elevated levels and included the installation of a portable aerosol monitor adjacent to DG3 to measure concentrations of PM₁₀ in real-time for a three month period. The analysis of the data failed to find a correlation between the PM₁₀ and depositional dust levels and was unable to be explained, nevertheless additional management measures were employed to control dust from construction activity occurring nearby (**Ramboll, 2015**).

As noted for the TSP and PM₁₀ monitoring at HVAS 2, the high dust deposition levels recorded at DG4 during 2014 were attributed to residential construction works, not related to NCIG, occurring close to the monitor location at the time.

Table 4-5: Annual average dust deposition levels (g/m²/month)

Year	DG3	DG4	DG5	DG6
2014	- ⁽¹⁾	3.8 ⁽²⁾	1.3	1.6
2015	4.8	0.9	1.3	2.1
2016	1.8	1.1	1.3	1.6
2017	0.8	0.6	0.6	1.0
2018	0.6	0.6	0.5	0.6

⁽¹⁾ There are less than 75% reliable data available due to the contamination of samples.

⁽²⁾ Construction works (unrelated to NCIG) were being undertaken close to the monitor location at the time.

4.3.2 NSW OEH monitoring

Ambient air quality data recorded at monitors operated by the NSW OEH in the wider area have also been reviewed. These monitors are located at:

- ✦ Mayfield (approximately 2.6 km west-southwest of the NCIG CET);
- ✦ Stockton (approximately 3.8 km southeast of the NCIG CET);
- ✦ Carrington (approximately 3.6 km south-southeast of the NCIG CET);
- ✦ Newcastle (approximately 5.9 km south of the NCIG CET);
- ✦ Wallsend (approximately 8.1 km west-southwest of the NCIG CET); and,
- ✦ Beresfield (approximately 12.2 km northwest of the NCIG CET).

4.3.2.1 PM₁₀ monitoring

Table 4-6 presents a summary of the PM₁₀ concentrations for each of the relevant NSW OEH monitoring stations from 2014 to 2018. Recorded 24-hour average PM₁₀ concentrations are presented in **Figure 4-7**.

The data indicate that the annual average PM₁₀ concentration at the Stockton monitor exceeded the relevant criterion of 25 µg/m³ for 2015 to 2018. The Mayfield and Carrington monitors also exceeded the relevant of 25 µg/m³ in 2018. The annual average PM₁₀ concentrations at all the other monitoring stations were below the relevant criterion of 25 µg/m³.

The maximum 24-hour average PM₁₀ concentrations recorded at all stations were on occasion above the criterion of 50 µg/m³.

The elevated levels at the Stockton monitor were attributed to sand or salt particulate matter most likely originating from the northeast, along Stockton Beach (**Todoroski Air Sciences, 2013-2014**). Similarly, elevated levels at the other monitors in the Lower Hunter can also be attributed to sand or salt particulate matter.

A particle characterisation study which was conducted in the Lower Hunter that estimated the contribution of fresh sea salt particles from that of the recorded annual averages at the Newcastle, Stockton, Mayfield and Beresfield OEH monitors (**CSIRO, ANSTO & OEH 2016**). The contribution of fresh sea salt particles of PM_{2.5} concentrations is estimated to be 24% at Newcastle, 23% at Stockton, 20% at Mayfield and 13% at Beresfield. Contributions of fresh sea salt particles of PM_{2.5-10} concentrations were estimated to be 63% at Stockton and 40% at Mayfield. Fresh sea salt aerosol arises from the wave-breaking in the ocean and is a natural source of particles.

Table 4-6: Summary of PM₁₀ levels from the NSW OEH monitoring sites (µg/m³)

	Mayfield ^a	Stockton ^b	Carrington ^c	Newcastle	Wallsend	Beresfield
Annual average						
2014	-	-	-	21.4	16.9	19.4
2015	21.7	35.8	22.8	21.4	16.7	18.8
2016	22.6	35.1	23.6	21.6	16.6	19.1
2017	24.2	36.4	24.4	22.4	17.6	19.6
2018	26.9	38.7	27.3	24.5	19.4	21.6
Maximum 24-hour average						
2014	57.4	104.3	66.6	53.7	43.4	45.4
2015	84.7	101.4	80.6	70.4	77.5	64.9
2016	84.1	108.1	95.4	89.1	65.5	48
2017	70.6	96.7	64	55	59.3	49.4
2018	135.6	196.6	155.2	146	136.5	149.1
Number of days greater than 50 µg/m³						
2014	3	18	3	2	0	0
2015	4	67	4	3	1	2
2016	1	59	2	1	1	0
2017	3	60	10	1	1	0
2018	11	64	12	8	5	8

^a Mayfield data available from July 2014 ^b Stockton data available from October 2014 ^c Carrington data available from August 2014

Figure 4-7 presents measured 24-hour average PM₁₀ concentrations at the surrounding NSW OEH monitoring stations over the period reviewed. The concentrations are nominally highest in the spring and summer months with the warmer weather raising the potential for drier ground elevating windblown dust, pollen levels and the occurrence of bushfires.

The data in **Figure 4-7** indicate that the monitors reviewed generally follow a similar trend.

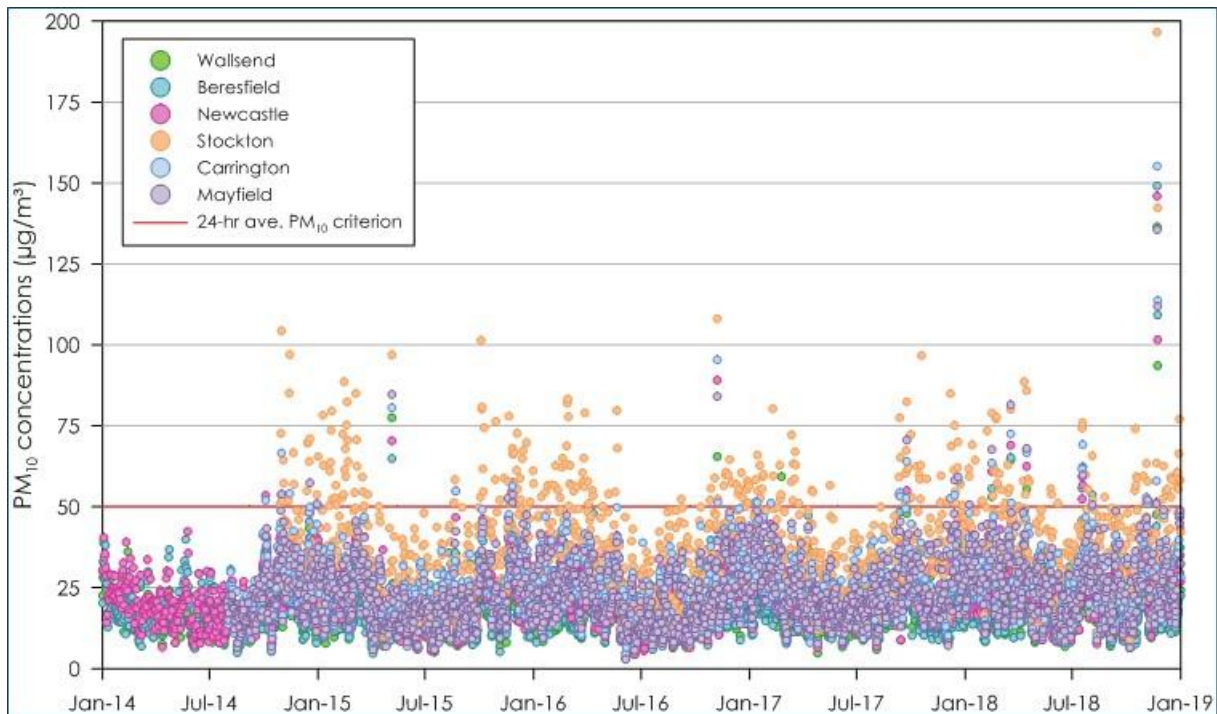


Figure 4-7: Daily 24-hour average PM₁₀ concentrations

4.3.2.2 PM_{2.5} monitoring

Table 4-7 presents a summary of the PM_{2.5} concentrations for each of the relevant NSW OEH monitoring stations from 2014 to 2018.

The data indicate that in some years the annual average PM_{2.5} concentrations at these stations were above the criterion of 8 µg/m³.

The maximum 24-hour average PM_{2.5} concentrations recorded at these stations were also above the criterion of 25 µg/m³ on some occasions and for most locations only once per calendar year.

Figure 4-8 presents the measured 24-hour average PM_{2.5} concentrations at the surrounding NSW OEH monitoring stations over the period reviewed. It can be seen that during periods when readings were elevated at multiple monitors (i.e. September 2015 and November 2016), these are likely attributed to widespread bushfire and hazard reduction burning events.

Table 4-7: Summary of PM_{2.5} levels from the NSW OEH monitoring sites (µg/m³)

	Mayfield ^a	Stockton ^b	Carrington ^c	Newcastle	Wallsend	Beresfield
Annual average						
2014	-	-	-	8.1	6.7	7.5
2015	7.4	9.5	8.1	7.8	7.3	7.3
2016	7.4	9.7	8.5	7.8	8.0	7.4
2017	7.5	9.8	8.6	7.4	7.3	7.6
2018	8.3	10.0	8.2	7.8	7.5	8.7
Maximum 24-hour average						
2014	20.3	25.5	21.3	21.2	18	19
2015	30.2	30.9	30.7	28.4	24	25.9
2016	57.9	66.4	70	66.1	50.7	27.9
2017	18.8	32	20.7	18	20.4	18.7
2018	21.3	26.9	20.8	20.2	20.2	24.9
Number of days greater than 25 µg/m³						
2014	0	1	0	0	0	0
2015	2	3	1	1	0	1
2016	1	1	1	1	1	1
2017	0	1	0	0	0	0
2018	0	1	0	0	0	0

^a Mayfield data available from July 2014 ^b Stockton data available from October 2014 ^c Carrington data available from August 2014

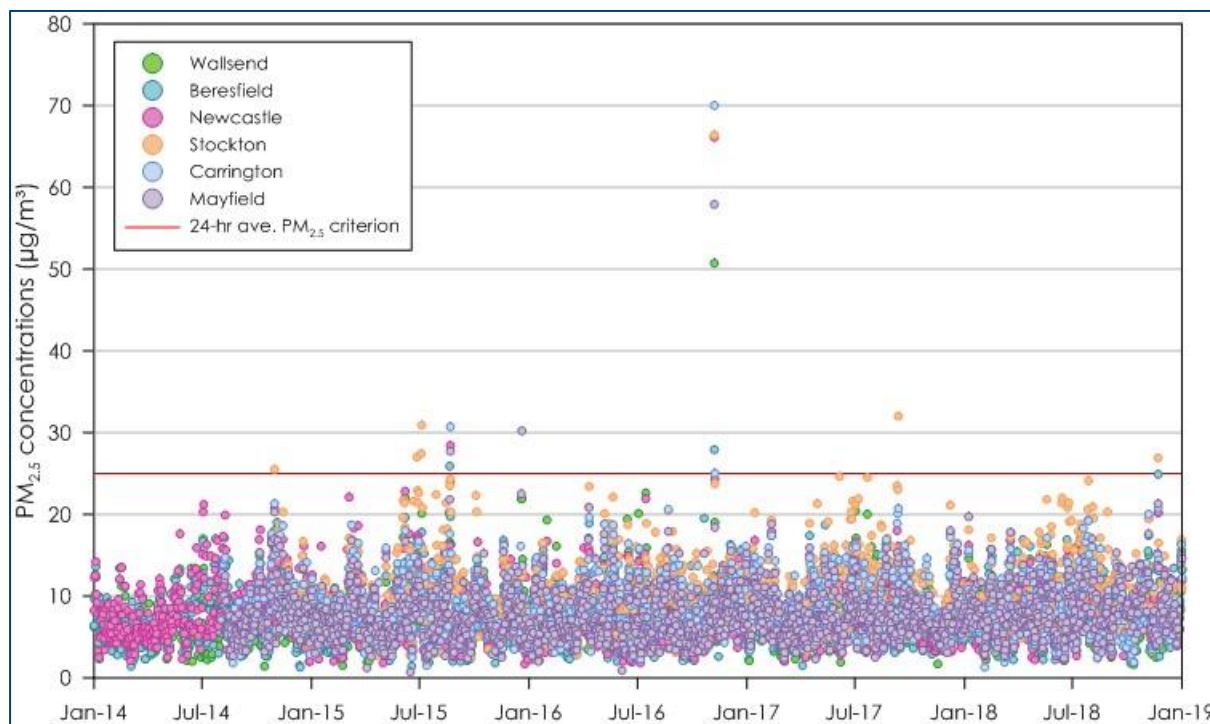


Figure 4-8: Daily 24-hour average PM_{2.5} concentrations

4.3.2.3 NO₂ monitoring

Table 4-8 presents a summary of the NO₂ concentrations for each of the relevant NSW OEH monitoring stations from 2014 to 2018.

The data indicate that the annual average NO₂ concentrations for each of the monitoring stations were below the relevant criterion of 62 µg/m³. The maximum 1-hour average NO₂ concentrations recorded at these stations were also below the relevant criterion of 246 µg/m³.

Table 4-8: Summary of NO₂ levels from the NSW OEH monitoring sites (µg/m³)

	Mayfield ^a	Stockton ^b	Carrington ^c	Newcastle	Wallsend	Beresfield
Annual average						
2014	-	-	-	34.4	33.0	39.8
2015	39.9	35.9	38.3	35.0	33.0	39.1
2016	38.7	39.3	40.7	36.1	32.4	37.5
2017	43.2	40.1	42.2	35.9	34.7	40.3
2018	35.6	38.2	37.7	33.4	32.4	39.6
Maximum level						
2014	75.9	63.6	88.2	94.3	69.7	80.0
2015	88.2	80.0	86.1	90.2	86.1	100.5
2016	94.3	92.3	118.9	77.9	75.9	84.1
2017	96.35	94.3	84.05	75.85	75.85	82
2018	79.95	90.2	79.95	92.25	71.75	82

^a Mayfield data available from July 2014 ^b Stockton data available from October 2014 ^c Carrington data available from August 2014

Figure 4-9 presents the daily maximum 1-hour average NO₂ monitoring data at the surrounding NSW OEH monitoring stations over the period reviewed. It can be seen that concentrations are generally higher in cooler months when temperatures are low and there is less sunlight, as NO₂ is not as readily converted to ozone in these conditions (**DECCW, 2010**).

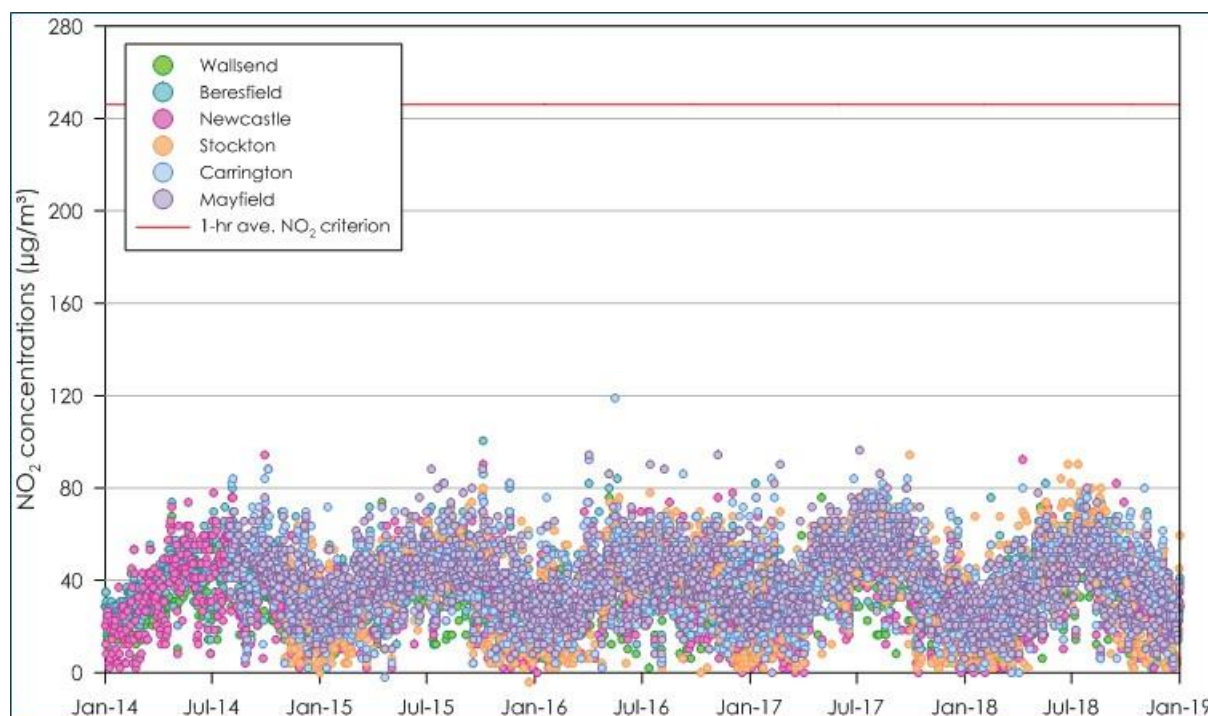


Figure 4-9: Daily maximum 1-hour average NO₂ concentrations

4.3.3 Background levels applied in the assessment

The background air quality levels applied in the assessment are sourced from a number of monitoring stations and are the levels selected as most likely to be generally representative of the background levels at receptors in the surrounding area.

The Mayfield NSW OEH monitoring station, which is the monitoring station closest to the NCIG CET, has been selected to be best representative of the air quality normally experienced at the NCIG CET. The Mayfield NSW OEH monitoring station records ambient air quality levels for PM_{2.5}, PM₁₀ and NO₂. For ambient air quality levels of TSP and dust deposition, HVAS 1 and DG5 monitors operated by NCIG have been selected and are most closely positioned to the Mayfield NSW OEH monitoring station.

These monitors are selected as they would likely have the least influence from other external sources not associated with the NCIG CET. For example, the Stockton NSW OEH monitoring station is significantly influenced by sea spray (**Orica, 2014 and CSIRO, ANSTO & OEH 2016**) and would skew the estimation of particulate matter background levels.

The recorded air quality levels from monitoring stations were used in this assessment to calculate the existing background air quality levels. The background levels were established as follows:

- ✦ annual average PM_{2.5} concentrations (Mayfield NSW OEH) - 7.4 µg/m³;
- ✦ annual average PM₁₀ concentrations (Mayfield NSW OEH) – 21.7 µg/m³;
- ✦ annual average TSP concentrations (HVAS 1) – 34.3 µg/m³;
- ✦ annual average Deposited dust levels (DG5) – 1.3 g/m²/month;
- ✦ one-hour average NO₂ concentrations (Mayfield NSW OEH) – 88.2 µg/m³; and
- ✦ annual average NO₂ concentrations (Mayfield NSW OEH) – 39.9 µg/m³.

It is noted that the predicted impacts due to the T4 Project, the Incitec Pivot Ammonium Nitrate Facility Project and the Kooragang Island Recycling Facility Expansion have also been included in this assessment (in addition to the existing measured background levels) to account for the potential future changes in the background air quality levels when determining the cumulative total impacts in future years.

5 DISPERSION MODELLING APPROACH

5.1 Introduction

For this assessment, the CALPUFF modelling suite is applied to dispersion modelling. The model was setup in general accordance with methods provided in the NSW EPA document *Generic Guidance and Optimum Model Settings for the CALPUFF Modeling System for Inclusion into the 'Approved Methods for the Modeling and Assessments of Air Pollutants in NSW, Australia'* (TRC Environmental Corporation, 2011).

5.2 Meteorological modelling

The meteorological modelling methodology applied a 'hybrid' approach which includes a combination of prognostic model data from The Air Pollution Model (TAPM) with surface observations in the CALMET model.

The centre of analysis for the TAPM modelling used is 32deg53min south and 151deg44.5min east. The simulation involved an outer grid of 30 km, with three nested grids of 10 km, 3 km and 1 km with 35 vertical grid levels. The CALMET domain was run on a 10 x 10 km grid with a 0.1 km grid resolution.

The 2015 calendar year was selected as the period for modelling the Optimisation Project. This period was selected based on a review of the long-term meteorological and ambient air quality conditions representative of the prevailing conditions. Accordingly, the available meteorological data for January 2015 to December 2015 from three nearby meteorological monitoring sites were included in the simulation. **Table 5-1** outlines the parameters used from each station.

Table 5-1: Surface observation stations

Weather Stations	Parameters						
	WS	WD	CH	CC	T	RH	SLP
NCIG CET Weather Station	✓	✓			✓	✓	
Williamtown RAAF (BoM) (Station No. 061078)	✓	✓	✓	✓	✓	✓	✓
Newcastle Nobbys Signal Station AWS (BoM) (Station No. 61055)	✓	✓			✓	✓	

WS = wind speed, WD= wind direction, CH = cloud height, CC = cloud cover, T = temperature, RH = relative humidity, SLP = station level pressure

The seven critical parameters used in the CALMET modelling are presented in **Figure 5-2**.

Table 5-2: Seven critical parameters used in CALMET

Parameter	Value
TERRAD	5
IEXTRP	-4
BIAS (NZ)	-1, -0.5, -0.25, 0, 0, 0, 0, 0
R1 and R2	3, 3
RMAX1 and RMAX2	6, 6

5.2.1 Evaluation of meteorological data

The outputs of the CALMET modelling are evaluated using visual analysis of the wind fields and extracted data.

Figure 5-1 presents a visualisation of the wind field generated by CALMET for a single hour of the modelling period. The wind fields are seen to follow the terrain well and indicate the simulation produces realistic fine scale flow fields (such as terrain forced flows) in surrounding areas.

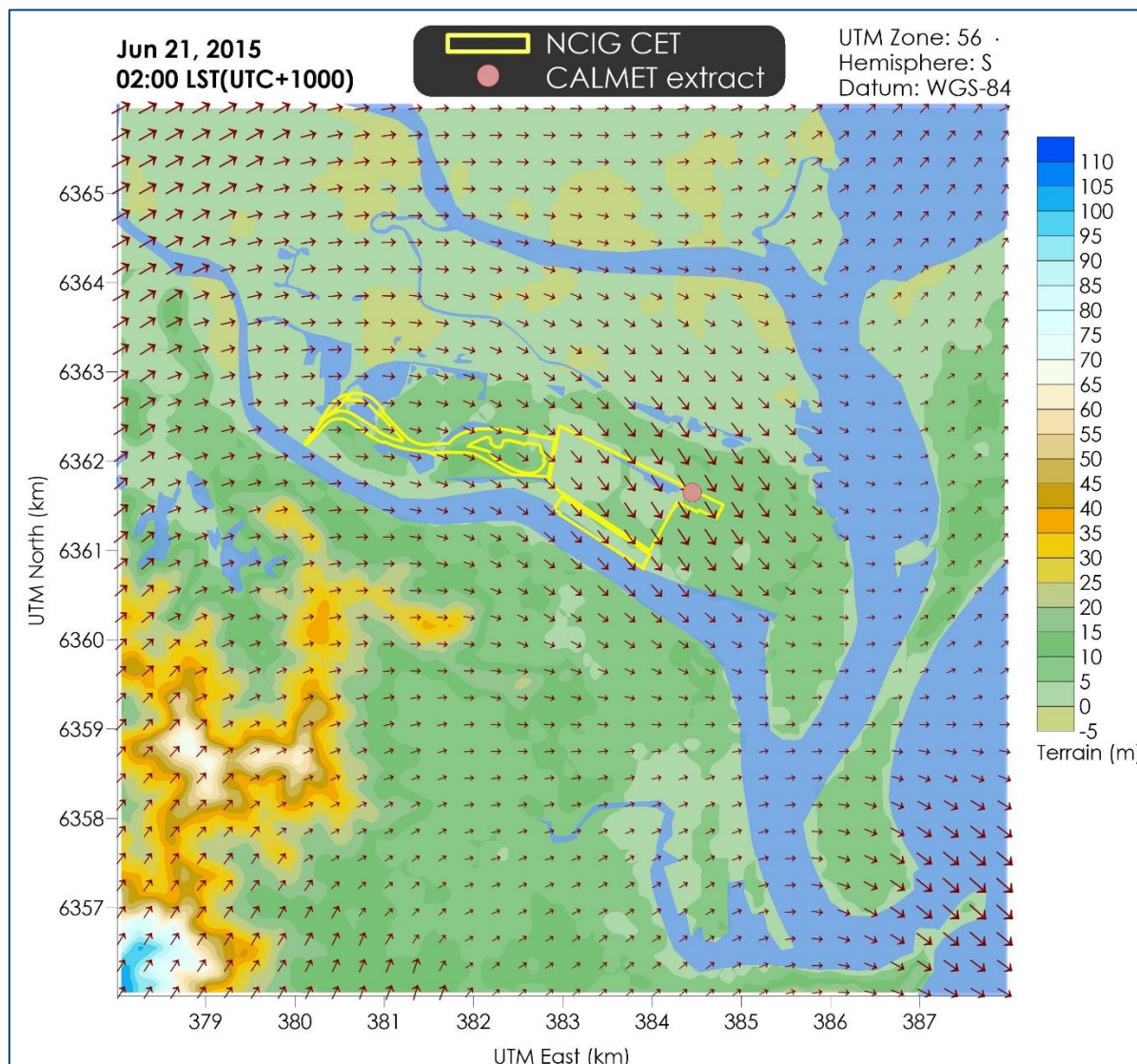


Figure 5-1: Example of the wind field for one of the 8,760 hours of the year that are modelled

CALMET generated meteorological data were extracted from a central point within the CALMET domain and are graphically represented in **Figure 5-2** and **Figure 5-3**.

Figure 5-2 presents annual and seasonal windroses extracted from one central point in the CALMET domain.

Overall the windroses generated in the CALMET modelling reflect the expected wind distribution patterns of the area as determined based on the available measured data and the expected terrain effects on the prevailing winds. This is evident as the windroses based on the CALMET data also compare well with the windroses generated with the measured data at the NCIG CET weather station, as presented in **Figure 4-2**.

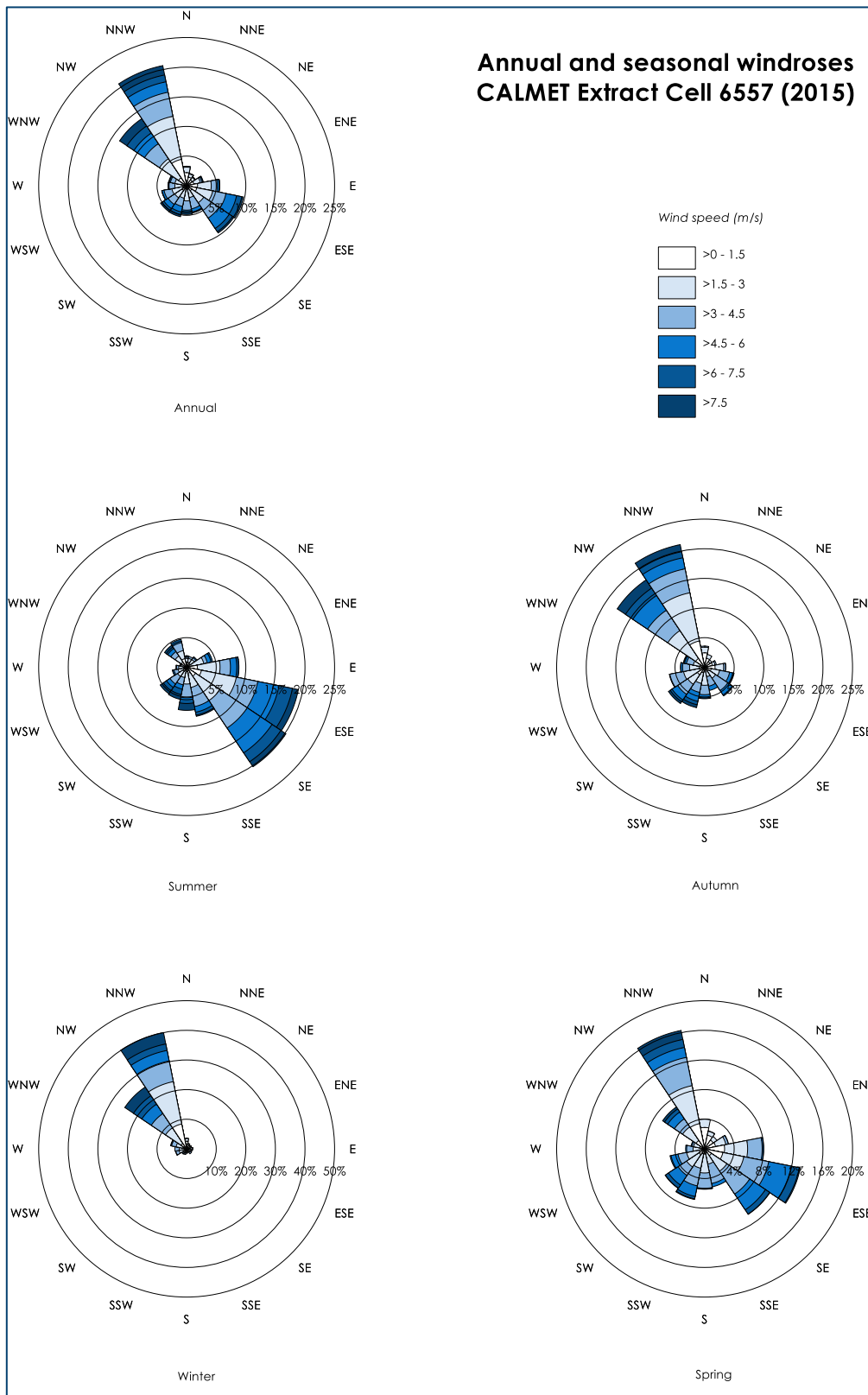


Figure 5-2: Windroses from CALMET extract (Cell ref 6557)

Figure 5-3 includes graphs of the temperature, wind speed, mixing height and stability classification over the modelling period and shows sensible trends considered to be representative of the area.

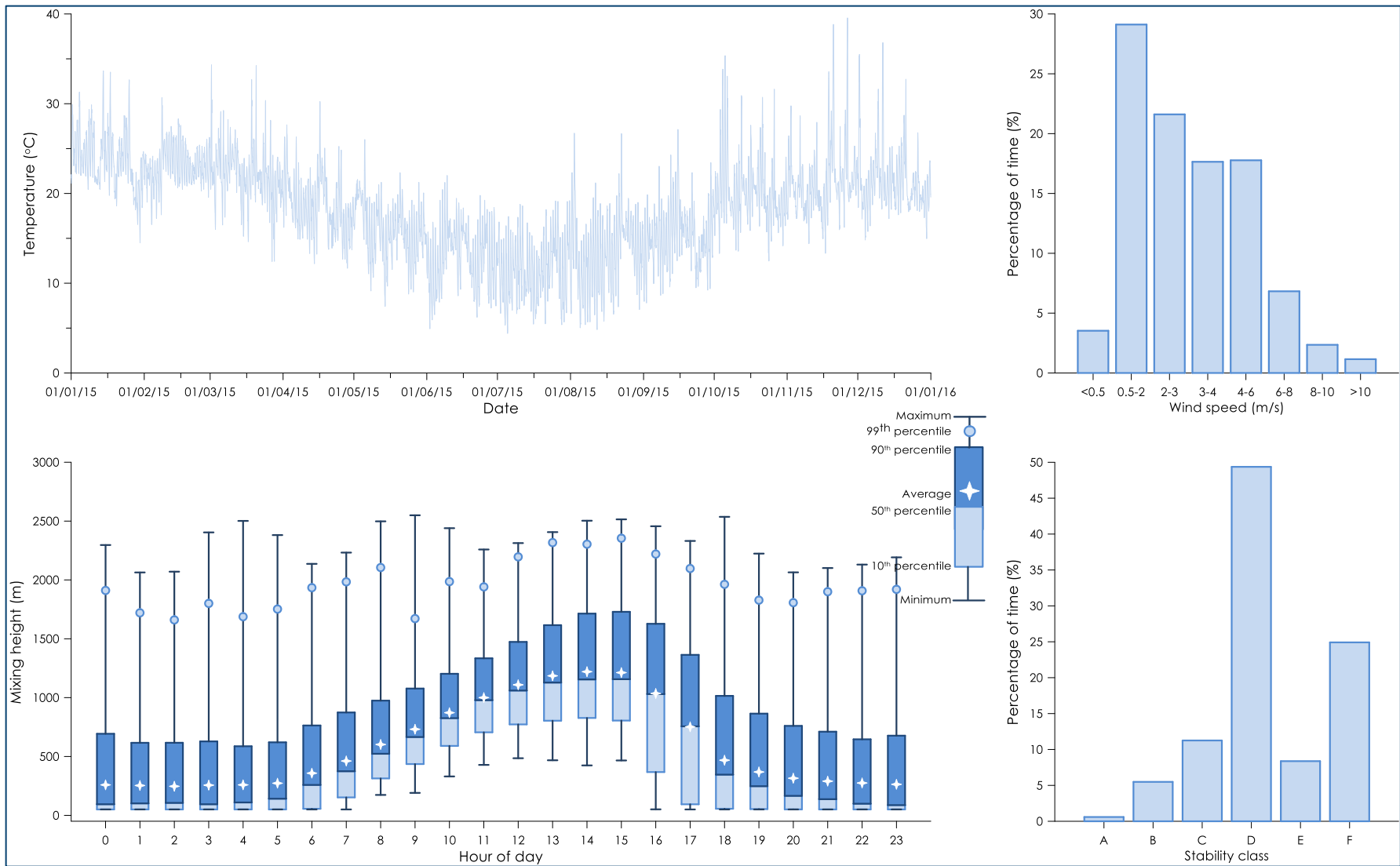


Figure 5-3: Meteorological analysis of CALMET extract (Cell ref 6557)

5.2.2 Dispersion modelling

Air dispersion modelling of the significant air emission sources associated with the NCIG CET incorporating the Optimisation Project was conducted to predict potential air quality impacts in the surrounding environment. The CALPUFF air dispersion model was used to predict the resulting pollutant levels in the ambient air in the wider area around the NCIG CET incorporating the Optimisation Project.

5.2.3 Discrete receptor locations

The model was also used to predict results at selected discrete receptor locations chosen to represent sensitive receptors. These locations were the residential receptors that are located closest to the site and are most likely to be impacted by the effect of site activities, as shown in **Figure 5-4**.

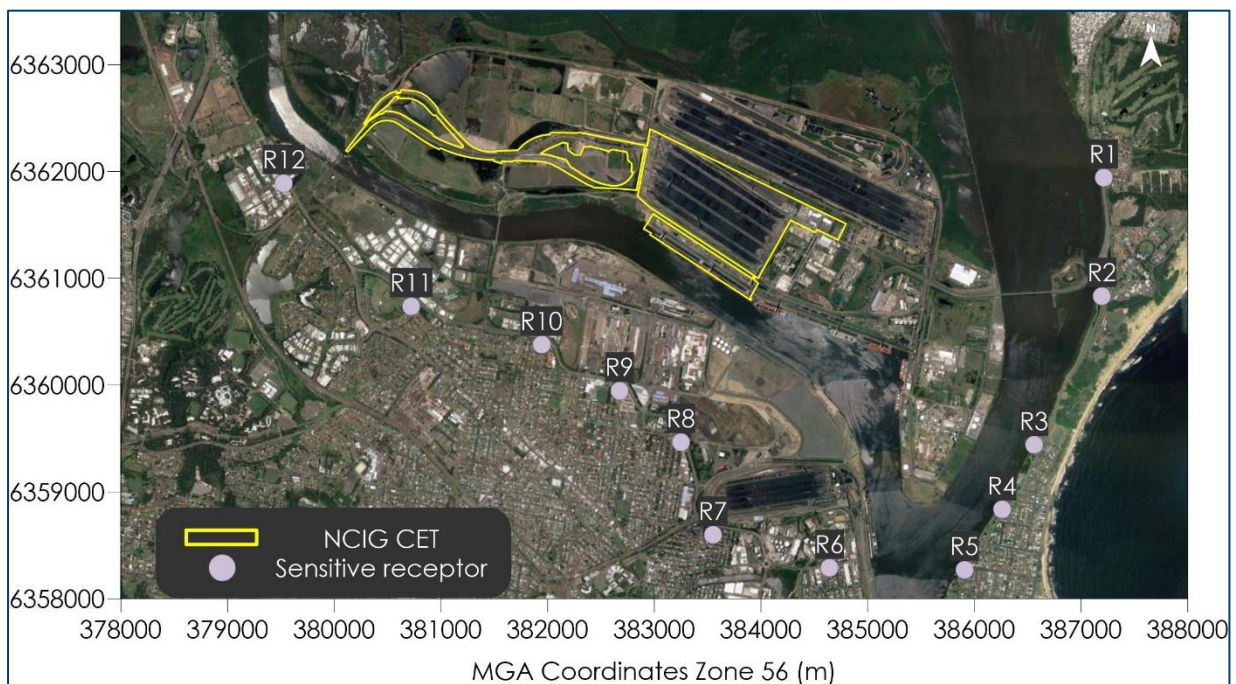


Figure 5-4: NCIG CET discrete sensitive receptor locations

6 EMISSION ESTIMATION

6.1 Operation activities

Activities associated with the NCIG CET incorporating the Optimisation Project have the potential to generate dust emissions. The emissions were calculated by analysing the various types of dust generating activities taking place during each stage of the NCIG CET incorporating the Optimisation Project and applying suitable emission factors to represent each component activity.

The estimated dust emissions from the key activities associated with the NCIG CET incorporating the Optimisation Project are summarised in **Table 6-1** and compared with estimated dust emissions for the existing NCIG CET operations. The results presented include the application of the dust control measures.

Full emission inventories for TSP, PM₁₀ and PM_{2.5} and associated calculations are presented in **Appendix B**.

Table 6-1: Estimated TSP emissions (kg/year)

Activity	Existing NCIG CET Operations ¹	Following Optimisation Project
Trains unloading to unloading station	9,930	11,886
Conveyor	178	178
1 st transfer between unloading station and stockpiles	5,958	7,132
Conveyor	66	66
2 nd transfer between unloading station and stockpiles	5,958	7,132
Conveyor	739	739
Stacking to coal stockpiles	9,930	11,886
Reclaiming coal from stockpiles	8,421	10,079
Conveyor	739	739
Transfer between stockpile and ship loader	5,052	6,047
Conveyor	113	113
Transfer to buffer bins	5,052	6,047
Conveyor	199	199
1 st transfer between buffer bin and ship loader	5,052	6,047
Conveyor	18	18
2 nd transfer between buffer bin and ship loader	5,052	6,047
Conveyor	409	409
3 rd transfer between buffer bin and ship loader	5,052	6,047
Loading coal to ships	5,052	6,047
Wind erosion from coal stockpiles	59,826	59,826
Dozer working on coal stockpiles	1,963	1,963
Total	134,761	148,649
Comparison to estimated dust emissions – Holmes Air Sciences, 2006 (307,103 kg of TSP per year)	44%	48%

¹ based on the approved capacity of 66 Mtpa.

kg/year – kilograms per year

To permit a like-to-like comparison, the estimated emissions for the existing operation were calculated on a similar basis as the estimated dust emissions presented in the previous air quality assessment (**Holmes Air Sciences, 2006**), with the exception that the results presented include the current mitigation measures such as water sprays, whereas the Holmes Air Sciences assessment presented uncontrolled emissions (i.e. without contemporary mitigation measures). The dust emissions provided by the Holmes Air Sciences assessment represent the level of terminal emissions outlined in the

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"Newcastle Coal Infrastructure Group Coal Export Terminal Environmental Assessment" (NCIG, 2006) and subsequently approved by the NSW Minister for Planning in April 2007.

Based on the inclusion of the current mitigation measures implemented at the NCIG CET (Section 7), the total TSP emissions from operational activities at the existing NCIG CET are approximately 44% of the emissions estimated in **Holmes Air Sciences (2006)**.

The emissions from NCIG CET incorporating the Optimisation Project were calculated on the same basis and are also predicted to emit less than half (48%) of the TSP than the emissions estimated in **Holmes Air Sciences (2006)** and approved by the Minister in 2007.

As the proposed Optimisation Project would achieve a 20% increase in throughput (i.e. 66 to 79 Mtpa) and only a 10% (relative) increase in dust emissions from the existing NCIG CET operations, the works would significantly reduce the quantity of dust being emitted per tonne of coal handled.

6.2 Emissions from trains and ships

Exhaust emissions from trains and ships used for transporting coal to and from the NCIG CET contain various air pollutants. The major pollutants emitted which may have the potential to cause impacts in the area are presented in **Table 6-2**.

Table 6-2: Estimated trains and ships emissions (kg/year)

Emission source	PM ₁₀	PM _{2.5}	NO _x	PM ₁₀	PM _{2.5}	NO _x
	Existing NCIG CET ¹			Following Optimisation Project		
Diesel train exhaust	894	867	39,088	894	867	39,088
Ship exhaust (auxiliary engines)	20,255	18,567	206,769	26,086	23,912	250,629
Ship exhaust (auxiliary boilers)	2,115	1,942	3,021	2,724	2,502	3,662
Total²	23,263	21,377	248,878	29,703	27,281	293,379

¹ based on the approved capacity of 66 Mtpa.

² totals may have minor discrepancies due to rounding.

The emissions from diesel trains were calculated on the assumption that a train, with three locomotives, is present on-site at all times for both the existing NCIG CET operations and following the Optimisation Project. In reality, a train would not be present on-site at all times and the actual emissions would be lower. As it is assumed that there would be a three locomotive train present in each hour of the year in the existing and future scenario, there is no relative difference in the conservatively assumed train emission rates for either the current 66 Mtpa or optimised 79 Mtpa terminal throughput case.

Detailed pollutant emission inventories and emission estimation calculations are presented **Appendix B**.

7 DUST MITIGATION MEASURES

Operational and physical mitigation measures are utilised on-site to ensure that dust generation is controlled and the potential for off-site impacts is reduced. The control measures include:

- ✦ monitoring of all conveyor, hopper, transfer and storage infrastructure to identify potential spill points and maintenance requirements;
- ✦ coal received is classified in terms of dust risk with high risk material planned for lower stockpile heights and positioned in locations to minimise dust emissions from the site;
- ✦ an integrated dust suppression control system, which includes active coal moisture monitoring in real-time and meteorological integration that automates fog and water sprays on conveyors and coal stockpiles;
- ✦ a dust suppression system in place at the grizzly level of the dump station;
- ✦ wind shielding on coal transfer conveyors (via roof and side wall);
- ✦ water sprays at the reclaim grizzly;
- ✦ fully enclosed transfer stations and buffer bin chutes, incorporating “soft flow” technology which ensures the coal stream is not separating and entraining excess air during the transfer; and
- ✦ water sprays on the output side of buffer bin chutes.

7.1 Continual improvement to dust mitigation

NCIG CET operations are continually investigating means to improve dust mitigation measures and overall reduce the total amount of dust generated at the site. This includes investigating the effect stockpile height can have on dust generation and developing systems to integrate ambient air quality monitoring in the wider region.

Real-time information from the NSW OEH Newcastle Air Quality Monitoring Network is being used to develop alarms which inform relevant site personal of elevated air quality in the local area. This information can then be used to determine the potential contribution from NCIG CET and to activate additional physical mitigation measures as required.

Further detail on other strategies applied by NCIG CET to manage dust emissions is outlined in the *Operation Dust and Air Quality Management Plan (NCIG, 2018)*.

7.2 Pollution studies and reduction programs

Under EPL 12693, the NSW EPA have required NCIG CET to conduct a Wagon Monitoring and Reporting Environmental Improvement Program and Train Condition Exception Reporting Program.

The Wagon Monitoring and Reporting Environmental Improvement Program required the implementation of a program of monitoring and reporting on the condition of loaded coal wagons received at the NCIG CET. All trains were assessed in terms of the likelihood that coal may have been spilt within the rail corridor. The Wagon Monitoring Program was undertaken from March to September 2016. The results of the program were presented to the NSW EPA and it was subsequently agreed that the monitoring would cease and be replaced with exception reporting.

The Train Condition Exception Reporting Program replaced the Wagon Monitoring and Reporting Environmental Improvement Program and required visual assessment of the condition of the wagons of trains arriving and unloading coal at the NCIG CET. The aim was to identify wagons that are consistently loading in a manner that clearly is likely to contribute to the spillage of coal in the rail corridor. A review of the monitoring process was conducted in May 2017 and it was subsequently agreed by NSW EPA in principle to remove this requirement from the NCIG CET EPL 12693.

8 MODELLING RESULTS AND ANALYSIS

This section presents the predicted impacts on air quality which may arise from air pollutants generated by the NCIG CET incorporating the Optimisation Project and a brief analysis of the results.

Table 8-1 and **Table 8-2** present the predicted dispersion modelling results at each discrete receptor shown in **Figure 5-4**. The sensitive receptors in the table are the residential receptors that are located closest to the site.

Table 8-1: Dispersion modelling results for discrete receptors – NCIG CET incorporating the Optimisation Project only

Receptor ID	PM _{2.5} (µg/m ³)		PM ₁₀ (µg/m ³)		TSP (µg/m ³)	DD (g/m ² /month)	NO ₂ (µg/m ³)	
	24-hour average	Annual average	24-hour average	Annual average	Annual average	Annual average	1-hour average	Annual average
	-	-	-	-	-	2	-	-
1	0.6	<0.1	1.4	<0.1	0.1	<0.1	29	0.2
2	0.4	<0.1	0.8	0.1	0.1	<0.1	35	0.2
3	0.7	<0.1	2.2	0.3	0.4	<0.1	24	0.5
4	1.0	0.1	2.9	0.4	0.6	<0.1	31	0.9
5	1.0	0.1	2.6	0.3	0.4	<0.1	22	0.6
6	0.3	<0.1	1.5	0.1	0.2	<0.1	22	0.3
7	0.3	<0.1	1.6	0.1	0.2	<0.1	37	0.2
8	0.4	<0.1	1.9	0.2	0.3	<0.1	63	0.3
9	0.5	<0.1	1.7	0.2	0.3	<0.1	23	0.3
10	1.0	<0.1	3.7	0.3	0.4	<0.1	32	0.5
11	0.6	<0.1	2.1	0.2	0.3	<0.1	27	0.4
12	0.5	<0.1	2.3	0.3	0.4	<0.1	39	0.4

DD - Dust deposition

Table 8-2: Dispersion modelling results for discrete receptors – NCIG CET incorporating the Optimisation Project and other sources (cumulative impact) ^a

Receptor ID	PM _{2.5} (µg/m ³)	PM ₁₀ (µg/m ³)	TSP (µg/m ³)	DD (g/m ² /month)	NO ₂ (µg/m ³)	
	Annual average	Annual average	Annual average	Annual average	1-hour average	Annual average
	8	25	90	4	246	62
1	7.5	22.2	34.7	1.4	117	40
2	7.5	22.2	34.7	1.4	124	40
3 ^b	7.6	22.6	35.3	1.5	112	40
4 ^b	7.7	22.8	35.6	1.5	119	41
5 ^b	7.6	22.5	35.2	1.5	110	41
6	7.6	22.3	34.8	1.4	110	40
7	7.6	22.3	34.8	1.4	125	40
8	7.6	22.5	35.1	1.4	151	40
9	7.6	22.6	35.2	1.4	111	40
10	7.6	22.7	35.4	1.4	120	40
11	7.6	22.6	35.3	1.4	115	40
12	7.7	22.9	35.8	1.4	127	40

^a Cumulative dust impacts include the contribution predicted for the T4 Project, the Incitec Pivot Ammonium Nitrate Facility Project and the Kooragang Island Recycling Facility Expansion; future cumulative NO₂ impacts including the proposed T4 Project and Incitec Pivot Ammonium Nitrate Facility Project are assessed below.

^b Note: Measured PM_{2.5} levels in this area indicate levels higher than predicted as this area is significantly influenced from sea spray (refer to **Section 4.3**).

The results in **Table 8-1** and **Table 8-2** indicate that the predicted air quality levels at the discrete receptor locations would be below the relevant criteria for all assessed air pollutants.

Therefore, these results indicate that predicted incremental impacts associated with the Optimisation Project only are minor, with predicted air quality levels at the receptor locations remaining below the relevant criteria for all assessed air pollutants for the NCIG CET incorporating the Optimisation Project.

The modelled future “background” dust levels explicitly include the potential effects of the approved T4 Project in order to provide a conservative estimate. Note that the proposed Newcastle Gas Terminal would be located on the same site as the approved T4 Project and, therefore, has not been included in the cumulative assessment as it could not operate concurrently with the modelled operation of the T4 Project.

The predicted cumulative results in **Table 8-2** also conservatively incorporate the approved Incitec Pivot Ammonium Nitrate Facility Project and the approved Kooragang Island Recycling Facility Expansion. The Incitec Project’s predicted maximum annual average PM₁₀ level of 0.2 µg/m³ at the most affected receptor (**URS, 2012**) was added to the maximum results at every receptor in **Table 8-2**.

Likewise, Kooragang Island Recycling Facility Expansion’s predicted maximum annual average PM_{2.5}, PM₁₀ and TSP level of 0.1 µg/m³ and deposited dust level of 0.1 g/m²/month at the most affected receptor (**SLR, 2015**) was added to the maximum results at every receptor in **Table 8-2**. This approach over estimates the results at most receptors.

The cumulative NO₂ impacts presented in **Table 8-2** do not include the potential NO₂ contribution from the T4 Project and Incitec Pivot Ammonium Nitrate Facility Project.

The proposed T4 Project predicted a maximum incremental 1-hour average and annual average NO₂ concentration at the most impacted sensitive receptors of 47 µg/m³ and 5 µg/m³, respectively (**ENVIRON, 2012**). The Incitec Pivot Ammonium Nitrate Facility Project predicted a maximum incremental 1-hour average and annual average NO₂ concentration at the most impacted sensitive receptors of 27.8 µg/m³ and 0.4 µg/m³, respectively (**URS, 2012**).

Adding these results with the maximum predicted cumulative impacts at any sensitive receptor due to the NCIG CET incorporating the Optimisation Project and the maximum measured NO₂ level would result in a maximum cumulative 1-hour average and annual average NO₂ concentration of 226.1 µg/m³ and 46.2 µg/m³, respectively.

The estimated cumulative total would be well above any likely actual effect that may occur as these maximum calculated cumulative levels are the sum of:

- ✦ the maximum measured level (including any contribution from the existing NCIG CET);
- ✦ the maximum level due to the NCIG CET incorporating the Optimisation Project (conservatively assuming that 100% of the NO_x emissions are NO₂ emissions); and
- ✦ the maximum predicted level from the T4 Project and the Incitec Pivot Ammonium Nitrate Facility Project.

As the levels are below the relevant criteria for NO₂, the NCIG CET incorporating the Optimisation Project is not predicted to result in any adverse cumulative levels of NO₂.



Figure 8-1 and **Figure 8-2** present isopleths of the spatial distribution of predicted impacts associated with the NCIG CET incorporating the Optimisation Project for maximum 24-hour average PM₁₀ in isolation and for annual average PM₁₀ including contribution from other sources.

Other associated isopleth diagrams of the dispersion modelling results are presented in **Appendix C**.

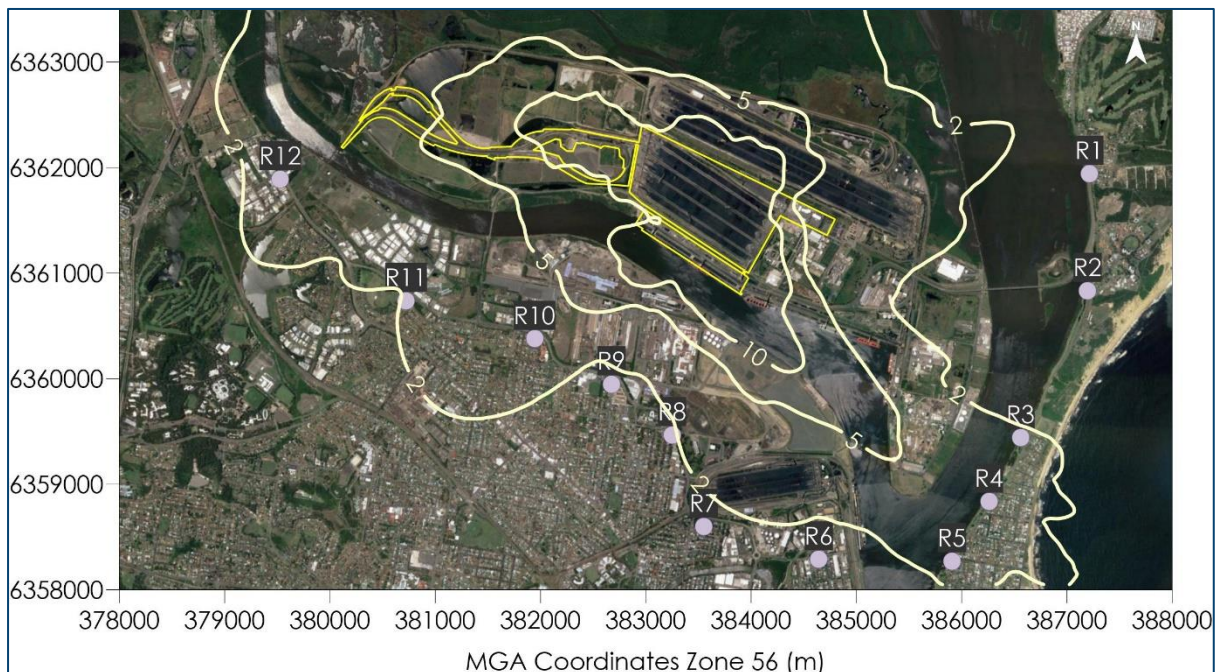


Figure 8-1: Predicted maximum 24-hour average PM₁₀ concentrations from NCIG CET incorporating the Optimisation Project ($\mu\text{g}/\text{m}^3$)

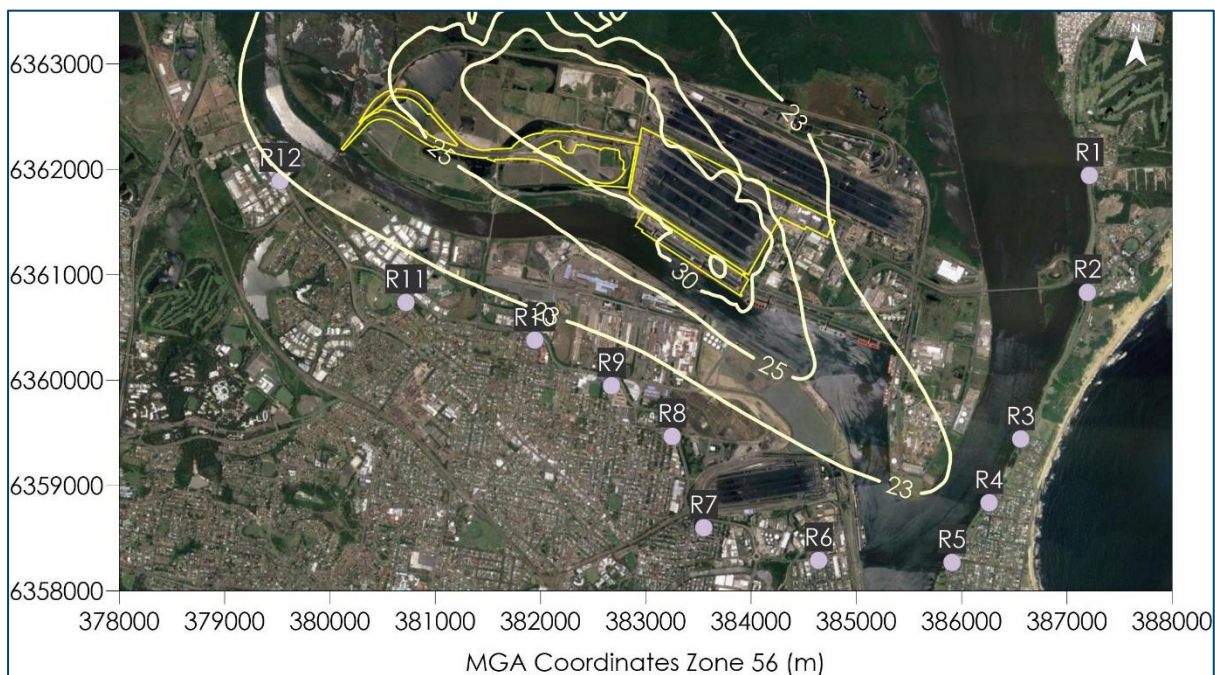


Figure 8-2: Predicted annual average PM₁₀ concentrations from NCIG CET incorporating the Optimisation Project and other sources ($\mu\text{g}/\text{m}^3$)

8.1 Assessment of total (cumulative) 24-hour average PM_{2.5} and PM₁₀ concentrations

This section presents a detailed assessment of cumulative 24-hour average PM_{2.5} and PM₁₀ impacts including analysis of background conditions and the projected incremental impacts due to the NCIG CET incorporating the Optimisation Project. A Level 2 assessment per the NSW EPA contemporaneous assessment method as outlined in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales (NSW EPA, 2017)* has been applied.

The Level 2 assessment involves adding the predicted incremental change in impact due to the NCIG CET incorporating the Optimisation Project to each day's measured background levels. This method accounts for the highly varying background dust level on any given day, and also the effects of the weather conditions on each day in regard to the emissions from the NCIG CET incorporating the Optimisation Project.

The contributions from the T4 Project, the Incitec Pivot Ammonium Nitrate Facility Project and the Kooragang Island Recycling Facility Expansion are also added to better consider the potential future background levels which may increase due to these projects. The T4 Project was explicitly modelled as it is a similar nearby source of dust emissions. This is a conservative measure as PWCS has stated that they do not intend to construct the T4 facility. However, the Incitec Pivot Ammonium Nitrate Facility Project and the Kooragang Island Recycling Facility Expansion are relatively small, well separated from the Optimisation Project and would have a localised effect. It was thus considered conservative to add the Incitec Pivot Ammonium Nitrate Facility maximum predicted 24-hour PM₁₀ result (2 µg/m³) and Kooragang Island Recycling Facility Expansion's maximum predicted 24-hour PM_{2.5} result (0.1 µg/m³) and 24-hour PM₁₀ result (0.6 µg/m³) to each of the highest ten modelled results, at the three most affected locations near the Incitec Pivot Ammonium Nitrate Facility Project and the Kooragang Island Recycling Facility Expansion (i.e. receptors at Stockton).

Monitoring data corresponding with the year of modelling (2015) from the NSW OEH monitoring site at Mayfield were used in the PM_{2.5} and PM₁₀ assessments, as they are the closest monitoring stations to the NCIG CET with available data.

The assessment was conducted at each individual receptor location. The background data are comprised of the measured levels at the nearest NSW OEH monitoring stations and predicted incremental contributions from the T4 Project which were added to the predicted incremental change in future levels due to the NCIG CET incorporating the Optimisation Project to determine the total. This was done for each day of a full year (from January 2015 to December 2015). Detailed tables of the full assessment results are provided in **Appendix D** and **Appendix E**.

Table 8-3 provides a summary of the findings from the Level 2 assessment and presents the maximum number of additional days on which the 24-hour average PM_{2.5} and PM₁₀ criteria might be exceeded at the surrounding closest receptors due to cumulative 24-hour average PM_{2.5} and PM₁₀ levels as a result of the Optimisation Project.

The assessment shows that the NCIG CET incorporating the Optimisation Project is unlikely to lead to any additional day of short-term PM_{2.5} and PM₁₀ impact for all the assessed locations.

Table 8-3: Summary of NSW EPA contemporaneous assessment

Receptor ID	Number of additional days above 24-hour average PM _{2.5} criterion	Number of additional days above 24-hour average PM ₁₀ criterion
1	0	0
2	0	0
3	0	0
4	0	0
5	0	0
6	0	0
7	0	0
8	0	0
9	0	0
10	0	0
11	0	0
12	0	0



9 GREENHOUSE GAS ASSESSMENT

9.1 Introduction

This assessment aims to estimate the predicted emissions of greenhouse gases (GHG) to the atmosphere due to the NCIG CET incorporating the Optimisation Project and to provide a comparison of the direct emissions from the NCIG CET incorporating the Optimisation Project at the state and national level.

9.2 Greenhouse gas inventory

The National Greenhouse Accounts (NGA) Factors document published by the Department of the Environment and Energy (DEE) defines three scopes (Scopes 1, 2 and 3) for different emission categories based on whether the emissions generated are from "direct" or "indirect" sources.

Scope 1 emissions encompass the direct sources from a project defined as:

"...from sources within the boundary of an organisation as a result of that organisation's activities" (DEE, 2019c).

Scope 2 and 3 emissions occur due to the indirect sources from a project as:

"...emissions generated in the wider economy as a consequence of an organisation's activities (particularly from its demand for goods and services), but which are physically produced by the activities of another organisation" (DEE, 2019c).

Scope 2 emissions are associated with the generation of purchased and consumed electricity, while Scope 3 emissions involve other indirect GHG emissions.

For the purpose of this assessment, emissions generated in Scopes 1 and 2 defined above provide a suitable approximation of the total GHG emissions generated from the NCIG CET incorporating the Optimisation Project.

Scope 3 emissions can often result in a significant component of the total emissions inventory; however, these emissions are often not directly controlled by a project. These emissions are understood to be considered in the Scope 1 emissions from other various organisations related to the project. The primary contribution of the Scope 3 emissions from the NCIG CET occurs from the mining of coal, transportation of the product coal and from the end use of the product coal.

There are significant practical difficulties and anomalies in accounting for Scope 3 emissions for a node development such as the NCIG CET especially for the downstream use of coal. Also, the GHG Protocol (WBCSD & WRI, 2004) considers Scope 3 reporting as optional and can result in double counting of emissions among organisations and/or projects. Notwithstanding, Scope 3 emissions have been estimated for the Optimisation Project (Section 9.4). In particular, all Scope 3 emissions from coal handled at the NCIG CET would have already been considered as Scope 3 emissions from the mining developments during their respective approvals processes.

9.2.1 Estimation of greenhouse gas emissions

The reported NCIG CET GHG emissions for July 2012 to June 2018 are presented in **Table 9-1**.

Table 9-1: Annual greenhouse gas emissions of the NCIG CET

	2012 – 2013	2013 – 2014	2014 – 2015	2015 – 2016	2016-2017	2017-2018
Coal throughput (Mtpa)	34.5	45.6	49.5	50.1	54	53.4
Scope 1 (t CO ₂ -e/year)	3,064*	2,274*	2,156*	273	223	368
Scope 2 (t CO ₂ -e/year)	49,877	64,862	63,697	66,091	66,950	67,749
Total	52,941	67,136	65,853	66,364	67,173	68,117

*The Scope 1 emissions include diesel consumption during construction work.

The relationships between the NCIG CET's GHG emissions with coal throughputs were examined and are presented in **Figure 9-1** and **Figure 9-2**, along with the estimated emissions in **Holmes Air Sciences (2006)**. A number of simple linear relationships were applied to the data with the intercept set to zero.

Due to construction work occurring at the NCIG CET during the 2013 to 2015 period, additional diesel was consumed on-site which is reflected in the reported Scope 1 emissions. It has been estimated that approximately 99.5 kilolitres (kL) and 118.1 kL were required for operational activities only during the 2012-2013 and 2013-2014 reporting periods (**NCIG communication dated 27 January 2015**). The amount of diesel required for operational activities during the 2014-2015 period is unknown and has not been included in the analysis in **Figure 9-1**.

For Scope 1 emissions, a linear trend between the estimated emissions in **Holmes Air Sciences (2006)** provides an overly conservative assessment (the orange trend line in **Figure 9-1**) compared to the reported emissions (the purple trend line in **Figure 9-1**). Thus the linear trend for the reported emissions has been applied in this assessment.

For the estimation of the Scope 2 emissions, a linear trend between the reported Scope 2 emissions from the NCIG CET (the purple trend line in **Figure 9-2**) was applied in the assessment as it is the most conservative trend line.

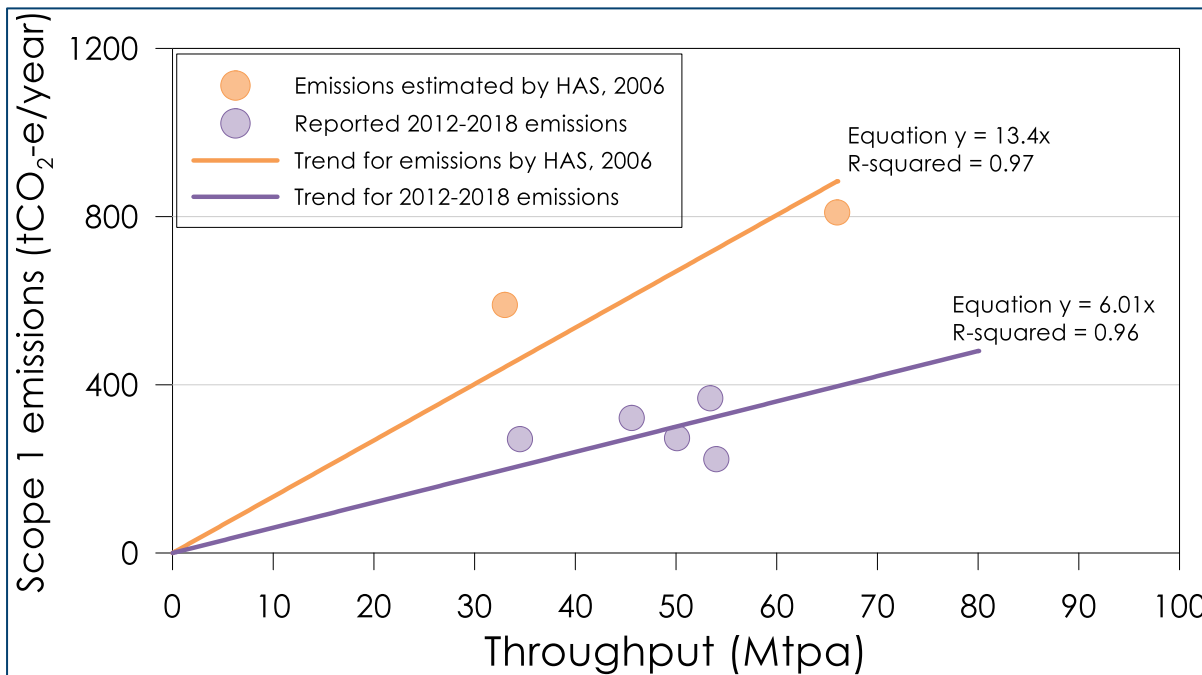


Figure 9-1: Linear trend of the NCIG CET's estimated Scope 1 emissions vs throughputs

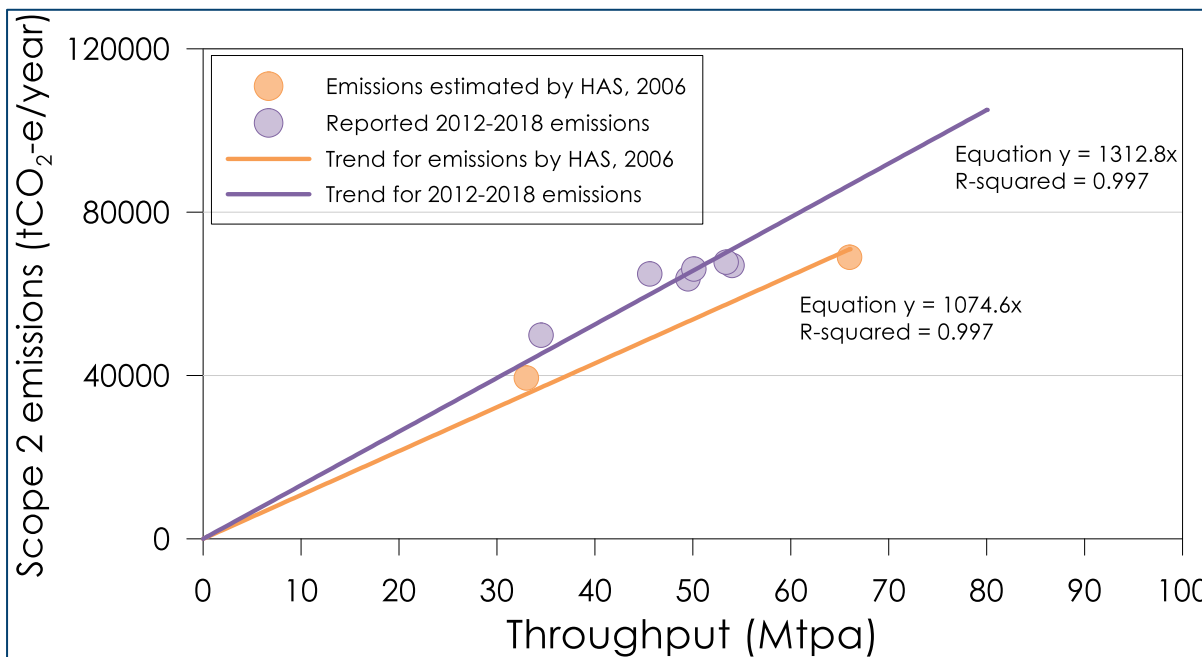


Figure 9-2: Linear trend of the NCIG CET's estimated Scope 2 emissions vs throughputs

9.3 Summary of greenhouse gas emissions

Table 9-2 summarises the estimated annual CO₂-e emissions due to the existing NCIG CET and the NCIG CET incorporating the Optimisation Project using the relationships in **Figure 9-1** and **Figure 9-2**.

The estimated annual CO₂-e emissions have been estimated based on the maximum approved capacity of 66 Mtpa for the NCIG CET, and the proposed increase in throughput to 79 Mtpa for the NCIG CET incorporating the Optimisation Project.

Table 9-2: Summary of CO₂-e emissions for the NCIG CET (t CO₂-e)

	Existing	Following Optimisation Project	Incremental change
Coal throughput (Mtpa)	66	79	13
Scope 1 (t CO ₂ -e/year)	397	475	78
Scope 2 (t CO ₂ -e/year)	86,645	103,711	17,066
Total (Scope 1 & 2)	87,041	104,186	17,145

It can be inferred from the estimation presented in **Table 9-2** that Scope 2 emissions account for the majority of the GHG emissions from the NCIG CET incorporating the Optimisation Project. Scope 1 emissions are insignificant (<1%) compared to Scope 2 emissions.

9.4 Contribution of greenhouse gas emissions

The estimated annual GHG emissions for Australia for the year to December 2018 period was 538.2 Mt CO₂-e (**DEE, 2019a**). In comparison, the conservative estimated annual average GHG emission of the NCIG CET incorporating the Optimisation Project is 0.104 Mt CO₂-e (Scope 1 and 2). The increase in direct annual GHG emission from the Optimisation Project would be 0.017 Mt CO₂-e (Scope 1 and 2) compared to existing operations. Therefore, the annual contribution of GHG emissions from the existing NCIG CET in comparison to the Australian GHG emissions for the year to December 2018 period is conservatively estimated to be approximately 0.02%. The increase of direct GHG emissions from the Optimisation Project would be 0.003% in comparison to the Australian GHG emissions for the year to December 2018 period.

At a state level, the estimated GHG emissions for NSW in the 2017 period was 131.5 Mt CO₂-e (**DEE, 2019b**). The annual contribution of GHG emissions from the NCIG CET incorporating the Optimisation Project in comparison to the NSW GHG emissions for the 2017 period is conservatively estimated to be approximately 0.08% while the increase from the Optimisation Project would be 0.013%.

Notwithstanding the difficulty in estimating Scope 3 emissions, the GHG emissions from the burning of coal exported by the NCIG CET incorporating the Optimisation Project is estimated to be 192.5 Mt CO₂-e on an annual basis, an increase of 31.7 Mt CO₂-e for the existing operations on an annual basis. Emission estimation calculations are presented **Appendix B**. Scope 3 emissions from coal handled at the NCIG CET would occur overseas and would have already been considered as Scope 3 emissions for the mining developments during their respective approvals processes. As the Optimisation Project is not linked to any specific increase in total export through the Port of Newcastle, these Scope 3 emissions would occur regardless of the Optimisation Project.

9.5 GHG Policy considerations

9.5.1 International Policy

The United Nations Framework Convention on Climate Change (UNFCCC) is the main global forum for climate change negotiations that aims to stabilise GHG concentrations in the atmosphere to prevent dangerous climate impacts.

The Kyoto Protocol is an international agreement under the UNFCCC that commits developed countries to setting internationally binding GHG reduction targets. The first commitment period of the Kyoto Protocol started in 2008 and ended in 2012 and saw a number of countries committed to reduce GHG emissions to an average of 5% of 1990 levels of GHG emissions to the atmosphere. The second commitment period started in 2013, which extends to 2020, and saw countries commit to reduce GHG emissions by at least 18% below the 1990 level of GHG emissions to the atmosphere.

A historical global climate agreement (the Paris Agreement) was signed at the UNFCCC 21st Conference of the Parties (COP21) in Paris in November and December 2015. The Paris Agreement sets in place a framework for all countries to take climate action from 2020, building on existing international efforts in the period up to 2020. The key aspects of the Paris Agreement include:

- ✦ A global goal to hold average temperature increase to well below 2°C and pursue efforts to keep warming below 1.5°C above pre-industrial levels.
- ✦ All countries to set mitigation targets from 2020 and review targets every five years to build ambition over time, informed by a global stocktake.
- ✦ Robust transparency and accountability rules to provide confidence in countries' actions and track progress towards targets.
- ✦ Promoting action to adapt and build resilience to climate impacts.
- ✦ Financial, technological and capacity building support to help developing countries implement the Paris Agreement.

9.5.2 Australian Policy

Australia has an active role in global action for GHG emission reduction and adaptation to the impacts of climate change in the context of coordinated global action. Australia is a party to the UNFCCC, is a signatory to the Kyoto Protocol and the Paris Agreement and has committed to reduce GHG emissions to 26-28% of 2005 levels by 2030.

The Australian Government is implementing national policies to reduce emissions and adapt to the impacts of climate change in the context of coordinated global action. The Direct Action Plan as announced by the Government outlines the framework to achieve the reduction targets with the Emissions Reduction Fund as the primary means.



The Emissions Reduction Fund commits to reduce GHG emissions to 5% below 2000 levels by 2020. The fund offers incentives for businesses that seek out actions to reduce GHG emissions. This approach applies a carbon credit scheme which allows businesses to create credited emissions reductions which can then be exchanged between other businesses. A safeguard mechanism of the Emissions Reduction Fund includes establishing an emissions baseline for large emissions facilities to ensure that emissions reductions are not overtaken by a rise in emissions elsewhere in the country.

9.5.3 New South Wales Policy

The NSW Climate Change Policy Framework (NCCPF) contains an aspirational long-term objective to achieve net-zero emissions by 2050 and outlines a range of policy, government operations and advocacy roles to achieve emissions savings and to reduce impacts and promote greater understanding for climate change adaptation.

The NCCPF outlines that to save emissions and enable climate change adaptation, NSW will develop policy to achieve emissions savings, consistent with Commonwealth action and to enable adaptation to climate change. The NCCPF outlines that the NSW Government, as a major purchaser, will lead by example in delivering government services and managing assets, and in advocacy consistent with the Paris agreement.

Advocacy at a national level would include support for reforms of the national energy market, building standards and climate modelling.

The NCCPF outlines general policy directions to:

- ✦ create a stable policy environment supportive of private investment in emerging energy, transport, carbon farming and environmental services;
- ✦ boost energy productivity and reduce (rising) energy costs;
- ✦ capture benefits and manage unintended impacts of external policies;
- ✦ take advantage of opportunities to grow new industries in NSW;
- ✦ reduce risks of extreme weather on assets, and impacts on health and wellbeing; and
- ✦ manage impacts and resilience of natural resources, ecosystems and communities.

The NCCPF would be delivered via the Climate Change Fund Strategic Plan, developing a value for emissions savings for use in economic appraisals, embedding climate change considerations into government decision making, developing actions and strategies encompassing advanced energy, efficiency and adaptation, and review mechanisms.

The policy framework is to be reviewed in 2020.

9.5.4 National Greenhouse and Energy Reporting Scheme

The National Greenhouse and Energy Reporting Act 2007 (NGER Act) introduced a single national framework for reporting and disseminating company information about greenhouse gas emissions via the NGER scheme. The main objectives of the NGER scheme is to inform government policy and the general public and to help meet Australia's international reporting obligations.



The NGA Factors have been designed for use by companies and individuals to estimate greenhouse gas emissions for their operations. The NGA Factors apply default emission factors and promote consistency between the GHG inventories at a facility and company level, and those presented in the NGA. The factors are determined simultaneously with the production of the NGA. In effect the NGA Factors are calculated based on the performance of facilities operating in Australia and reporting via the NGER scheme, and subject to international expert review each year.

9.6 Discussion

The Paris Agreement that Australia has adopted affects National policy, which in turn affects NSW Policy on GHG emissions, as set out in the NCCPF. The Paris Agreement requires government actions to take effect from 2020, as such it is reasonable to expect that the NCIG CET would monitor any changes in State and National government policy in the lead up to 2020 and accordingly adjust its GHG emission calculations for reporting per any new policy, and potentially adjust operations if required by any new policy.

Greenhouse gas management at the NCIG CET would be undertaken in accordance with their Air Quality Management Plan (AQMP) which describes a number of greenhouse gas abatement and efficiency improvements, including:

- ✦ Regular servicing of vehicles and equipment; and,
- ✦ Ongoing operational improvements to increase the efficiency of the plant and reduce power demand.

In addition, NCIG would continue to account for and report greenhouse gas and energy data in accordance with the National Greenhouse Gas and Energy Reporting Scheme.

It should be noted that the Optimisation Project is only a modification of an existing operation in the area. It does not produce nor consume coal but is a means of coal transportation. The Optimisation Project is not linked to any specific increase in total export through the Port of Newcastle.

The Scope 3 emissions from the Optimisation Project include the use of coal by other parties. These Scope 3 emissions are accounted for in the Scope 1 and 2 emissions in other countries and Scope 3 emissions from coal handled at the NCIG CET would have already been considered as Scope 3 emissions from the mining developments during their respective approvals processes. In broad terms, the NCIG CET incorporating the Optimisation Project does not materially alter the estimated quantity of coal to be used in NSW/Australia and are not expected to affect the ability of NSW or Australia to meet emissions reduction targets.

It is reasonable to expect that there may be future policy changes in the countries which receive Australian coal due to the Paris agreement or other influencing factors. As such it is also reasonable to expect that Australian coal exporters, including NCIG CET, would monitor such changes and adjust according to any new policy, guidelines, carbon pricing, coal demand and trade contracts.

10 CONCLUSIONS

This report has assessed the potential air quality impacts associated with the proposed Optimisation Project of the NCIG CET.

Dispersion modelling conducted with the CALPUFF model was used to predict the potential of off-site dust and NO₂ impacts in the surrounding area due to the operation of the NCIG CET incorporating the Optimisation Project, and also the cumulative impacts of the NCIG CET incorporating the Optimisation Project, background levels and other approved projects such as the T4 Project, Incitec Pivot Ammonium Nitrate Facility Project and Kooragang Island Recycling Facility Expansion.

The results show that all assessable emissions would comply with all of the applicable incremental and cumulative assessment criteria at all sensitive receptors, and thus that the approval of the Optimisation Project would not lead to any unacceptable level of environmental harm or impact in the surrounding area.

Nevertheless, the site would continue to apply appropriate dust management measures to minimise the dust emissions from the site.

Overall, the assessment demonstrates that even using conservative assumptions, the NCIG CET incorporating the Optimisation Project can operate without causing any significant air quality impact at sensitive receptors in the surrounding environment.

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Appendix A

Selection of Meteorological Year



Selection of Meteorological Year

A statistical analysis of the latest five contiguous years of meteorological data from the nearest BoM weather station with suitable available data, Williamstown RAAF weather station, is presented in **Table A-1**.

The standard deviation of the latest five years of meteorological data spanning 2014 to 2018 was analysed against the long-term measured wind speed, temperature and relative humidity spanning an approximate 59 to 69-year period recorded at the station.

The analysis indicates that 2014, 2016 and 2018 are closest to the long-term average for wind speed. 2014 and 2015 are closest for temperature and 2015 is closest to the long-term average for relative humidity.

This analysis indicates that considering all three variables, the 2015 period is most representative on the long-term average and was selected for modelling.

Table A-1: Statistical analysis results for Williamstown RAAF

Year	Wind speed	Temperature	Relative humidity
2014	0.5	0.6	4.0
2015	0.7	0.6	2.6
2016	0.5	0.8	4.4
2017	0.6	1.0	4.9
2018	0.5	0.8	5.1

Figure A-1 shows the frequency distributions for wind speed, temperature and relative humidity for the 2015 year compared with the mean of the 2014 to 2018 data set. The 2015 year data appear to be well aligned with the mean data, particularly wind direction which is one the most critical parameters for dispersion.



Figure A-1: Frequency distributions for wind speed, wind direction, temperature and relative humidity

Appendix B
Emission Calculation

Emission Calculation

Emission factors and associated controls have been sourced from the National Pollutant Inventory (NPI) document "Emission Estimation Technique Manual for Mining, Version 3.1" (**NPI, 2012**) and the NSW EPA document, "NSW Coal Mining Benchmarking Study: International Best Practice Measures to Prevent and/or Minimise Emissions of Particulate Matter from Coal Mining" (**Katestone, 2010**).

The emission factor equations used for each dust and NO_x generating activity are outlined in below, detailed emission inventories for each stage are presented in **Table B-1** to **Table B-2**.

Handling of coal including loading/unloading, transferring, stacking and reclaiming

$$EF_{TSP} = 0.74 \times 0.0016 \times \left(\left(\frac{U}{2.2} \right)^{1.3} / \left(\frac{M}{2} \right)^{1.4} \right) \text{ kg/tonne}$$

$$EF_{PM_{10}} = 0.35 \times 0.0016 \times \left(\left(\frac{U}{2.2} \right)^{1.3} / \left(\frac{M}{2} \right)^{1.4} \right) \text{ kg/tonne}$$

$$EF_{PM_{2.5}} = 0.053 \times 0.0016 \times \left(\left(\frac{U}{2.2} \right)^{1.3} / \left(\frac{M}{2} \right)^{1.4} \right) \text{ kg/tonne}$$

Where U = wind speed (m/s) and M = moisture content (%)

Wind erosion from coal on conveyor

$$EF_{TSP} = 0.4 \text{ kg/ha /hour}$$

$$EF_{PM_{10}} = EF_{TSP} \times 0.5$$

$$EF_{PM_{2.5}} = EF_{TSP} \times 0.075$$

Wind erosion from coal stockpiles

$$EF_{TSP} = 1.9 \times \left(\frac{s}{1.5} \right) \times 365 \times \left(\frac{365 - p}{235} \right) \times \left(\frac{f}{15} \right) \text{ kg/ha/hour}$$

$$EF_{PM_{10}} = EF_{TSP} \times 0.5$$

$$EF_{PM_{2.5}} = EF_{TSP} \times 0.075$$

Where s = silt content (% by weight), p = number of days per year when rainfall is greater than 0.25mm, and f = percentage of time that wind speed is greater than 5.4m/s at the mean height of the stockpile

Dozers on coal

$$EF_{TSP} = 35.6 \times \frac{(s)^{1.2}}{(M)^{1.3}} \text{ kg/h/vehicle}$$

$$EF_{PM_{10}} = 8.44 \times \frac{(s)^{1.5}}{(M)^{1.4}} \times 0.75 \text{ kg/h/vehicle}$$

$$EF_{PM_{2.5}} = 35.6 \times \frac{(s)^{1.2}}{(M)^{1.3}} \times 0.022 \text{ kg/h/vehicle}$$

Where s = silt content (% by weight) and M = moisture content (%)

Diesel train exhaust

$$EF_{PM_{10}} = 0.034 \text{ kg/h}$$

The emission factor was taken to be 0.034 kg/h for a locomotive in notch 1 (**Lilley, 1996**). The diesel exhaust PM_{2.5} is 0.97 of the PM₁₀ emission (**US EPA, 2009**).

$$EF_{NO_x} = 17.92 \text{ g/bhp-hr}$$

The emission factor was taken to be 17.92 g/bhp-hr and a power of 83 bhp for a locomotive in notch 1 (**ICF, 2009**).

Ship exhaust (auxiliary engines)

$$EF_{PM_{10}} = 1.44 \text{ g/kWh}$$

$$EF_{PM_{2.5}} = 1.32 \text{ g/kWh}$$

$$EF_{NO_x} = 14.7 \text{ g/kWh}$$

The emission factors used are for fuel type of residual oil which has the highest emission factor among other oils (**ICF, 2009**). The average total auxiliary engine power for bulk carrier of 1776kW was used (**ICF, 2009**). An average load factor of 0.6 was used.

Ship exhaust (auxiliary boilers)

$$EF_{PM_{10}} = 1.47 \text{ g/kWh}$$

$$EF_{PM_{2.5}} = 1.35 \text{ g/kWh}$$

$$EF_{NO_x} = 2.1 \text{ g/kWh}$$

The emission factors used are for fuel type of residual oil which has the highest emission factor among other oils (**ICF, 2009**). The auxiliary boiler energy default for bulk carrier of 109kW was used (**ICF, 2009**).

Greenhouse Gas Emission Calculation

The emission factor used to estimate the greenhouse gas emission from the burning of coal exported by the NCIG CET has been sourced from the document "National Greenhouse Accounts Factors" (**DEE, 2019c**).

$$EF_{CO_2} = 90 \text{ kg CO}_2\text{-e/GJ}$$

$$EF_{CH_4} = 0.03 \text{ kg CO}_2\text{-e/GJ}$$

$$EF_{N_2O} = 0.2 \text{ kg CO}_2\text{-e/GJ}$$



The emission factors used are for bituminous coal. The energy content factor used is 27.0GJ/t (**DEE, 2018**).



Table B-1: Emission inventory –NCIG CET Existing operation

ACTIVITY	TSP emission (kg/y)	PM10 emission (kg/y)	PM25 emission (kg/y)	Intensity (kg/y)	Units	Emission Factor - TSP	Emission Factor - PM10	Emission Factor - PM25	Units	Var. 1	Units	Var. 2	Units	Var. 3	Units	Var. 4	Units
Trains unloading to unloading station	9,930	4,697	711	66,000,000	t/yr	0.00030	0.00014	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	8	M.C. (%)			50	% Control
Conveyor	178	89	13	0.17	ha	3,504	1,752	263	kg/ha/yr							70	% Control
1st transfer between unloading station and stockpiles	5,958	2,818	427	66,000,000	t/yr	0.00030	0.00014	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	8	M.C. (%)			70	% Control
Conveyor	66	33	5	0.06	ha	3,504	1,752	263	kg/ha/yr							70	% Control
2nd transfer between unloading station and stockpiles	5,958	2,818	427	66,000,000	t/yr	0.00030	0.00014	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	8	M.C. (%)			70	% Control
Conveyor	739	369	55	0.21	ha	3,504	1,752	263	kg/ha/yr								% Control
Stacking to coal stockpiles	9,930	4,697	711	66,000,000	t/yr	0.00030	0.00014	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	8	M.C. (%)			50	% Control
Reclaiming coal from stockpiles	8,421	3,983	603	66,000,000	t/yr	0.00026	0.00012	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	9	M.C. (%)			50	% Control
Conveyor	739	369	55	0.21	ha	3,504	1,752	263	kg/ha/yr								% Control
Transfer between stockpile and shiploader	5,052	2,390	362	66,000,000	t/yr	0.00026	0.00012	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	9	M.C. (%)			70	% Control
Conveyor	113	56	8	0.11	ha	3,504	1,752	263	kg/ha/yr							70	% Control
Transfer to buffer bins	5,052	2,390	362	66,000,000	t/yr	0.00026	0.00012	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	9	M.C. (%)			70	% Control
Conveyor	199	99	15	0.19	ha	3,504	1,752	263	kg/ha/yr							70	% Control
1st transfer between buffer bin and shiploader	5,052	2,390	362	66,000,000	t/yr	0.00026	0.00012	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	9	M.C. (%)			70	% Control
Conveyor	18	9	1	0.02	ha	3,504	1,752	263	kg/ha/yr							70	% Control
2nd transfer between buffer bin and shiploader	5,052	2,390	362	66,000,000	t/yr	0.00026	0.00012	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	9	M.C. (%)			70	% Control
Conveyor	409	204	31	0.12	ha	3,504	1,752	263	kg/ha/yr								% Control
3rd transfer between buffer bin and shiploader	5,052	2,390	362	66,000,000	t/yr	0.00026	0.00012	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	9	M.C. (%)			70	% Control
Loading coal to ships	5,052	2,390	362	66,000,000	t/yr	0.00026	0.00012	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	9	M.C. (%)			70	% Control
Wind erosion from coal stockpiles	59,826	29,913	4,487	62.13	ha	1,926	963	144	kg/ha/yr	4.00	S.C. (%)	99	number of rain da	13.8	% of time	50	% Control
Dozers working on coal stockpiles	1,963	430	43	156	hrs/yr	12.6	2.8	0.3	kg/h	4.00	S.C. (%)	8	M.C. (%)				
Diesel train exhaust	894	894	867	8,760	hrs/yr		0.034	0.033	kg/h	3.0	No. of locos						
Ship exhaust (auxiliary engines)	20,255	20,255	18,567	660	hrs/yr		0.00144	0.00132	kg/kWh	1776.0	kW	20	hrs/ship	0.6	Load factor		
Ship exhaust (auxiliary boilers)	2,115	2,115	1,942	660	hrs/yr		0.00147	0.00135	kg/kWh	109.0	kW	20	hrs/ship				
Total emissions (kg/yr.-)	134,761	64,923	9,765														
Total emissions (kg/yr.) - including Train & Ship	158,024	88,186	31,141														
ACTIVITY	NOx emission (kg/y)	Intensity	Units	Emission Factor	Units	Var. 1	Units	Var. 2	Units	Var. 3	Units						
Diesel train exhaust	39,088	8,760	hrs/yr	17.92	g/bhp-hr	3.0	No. of locos	83	hp/loco (Notch 1)								
Ship exhaust (auxiliary engines)	206,769	660	ships/yr	0.01470	kg/kWh	1776.0	kW	20	hrs/ship	0.6	Load factor						
Ship exhaust (auxiliary boilers)	3,021	660	ships/yr	0.002	kg/kWh	109.0	kW	20	hrs/ship								
Total NOX emissions (kg/yr)	248,878																

Table B-2: Emission inventory –NCIG CET incorporating the Optimisation Project

ACTIVITY	TSP emission (kg/y)	PM10 emission (kg/y)	PM25 emission (kg/y)	Intensity (kg/y)	Units	Emission Factor - TSP	Emission Factor - PM10	Emission Factor - PM25	Units	Var. 1	Units	Var. 2	Units	Var. 3	Units	Var. 4	Units		
Trains unloading to unloading station	11,886	5,622	851	79,000,000	t/yr	0.00030	0.00014	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	8	M.C. (%)				50	% Control	
Conveyor	178	89	13	0.17	ha	3,504	1,752	263	kg/ha/yr									70	% Control
1st transfer between unloading station and stockpiles	7,132	3,373	511	79,000,000	t/yr	0.00030	0.00014	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	8	M.C. (%)					70	% Control
Conveyor	66	33	5	0.06	ha	3,504	1,752	263	kg/ha/yr									70	% Control
2nd transfer between unloading station and stockpiles	7,132	3,373	511	79,000,000	t/yr	0.00030	0.00014	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	8	M.C. (%)					70	% Control
Conveyor	739	369	55	0.21	ha	3,504	1,752	263	kg/ha/yr										% Control
Stacking to coal stockpiles	11,886	5,622	851	79,000,000	t/yr	0.00030	0.00014	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	8	M.C. (%)					50	% Control
Reclaiming coal from stockpiles	10,079	4,767	722	79,000,000	t/yr	0.00026	0.00012	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	9	M.C. (%)					50	% Control
Conveyor	739	369	55	0.21	ha	3,504	1,752	263	kg/ha/yr										% Control
Transfer between stockpile and shiploader	6,047	2,860	433	79,000,000	t/yr	0.00026	0.00012	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	9	M.C. (%)					70	% Control
Conveyor	113	56	8	0.11	ha	3,504	1,752	263	kg/ha/yr										% Control
Transfer to buffer bins	6,047	2,860	433	79,000,000	t/yr	0.00026	0.00012	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	9	M.C. (%)					70	% Control
Conveyor	199	99	15	0.19	ha	3,504	1,752	263	kg/ha/yr										% Control
1st transfer between buffer bin and shiploader	6,047	2,860	433	79,000,000	t/yr	0.00026	0.00012	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	9	M.C. (%)					70	% Control
Conveyor	18	9	1	0.02	ha	3,504	1,752	263	kg/ha/yr										% Control
2nd transfer between buffer bin and shiploader	6,047	2,860	433	79,000,000	t/yr	0.00026	0.00012	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	9	M.C. (%)					70	% Control
Conveyor	409	204	31	0.12	ha	3,504	1,752	263	kg/ha/yr										% Control
3rd transfer between buffer bin and shiploader	6,047	2,860	433	79,000,000	t/yr	0.00026	0.00012	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	9	M.C. (%)					70	% Control
Loading coal to ships	6,047	2,860	433	79,000,000	t/yr	0.00026	0.00012	0.00002	kg/t	1.770	ave. of (wind speed/2.2)^1.3 in m/s	9	M.C. (%)					70	% Control
Wind erosion from coal stockpiles	59,826	29,913	4,487	62.13	ha	1,926	963	144	kg/ha/yr	4.00	S.C. (%)	99	number of rain da	13.8	% of time			50	% Control
Dozers working on coal stockpiles	1,963	430	43	156	hrs/yr	12.6		2.8	0.3	kg/h	4.00	S.C. (%)	8	M.C. (%)					
Diesel train exhaust	894	894	867	8,760	hrs/yr		0.034	0.033	kg/h	3.0	No. of locos								
Ship exhaust (auxiliary engines)	26,086	26,086	23,912	850	hrs/yr		0.00144	0.00132	kg/kWh	1776.0	kW	20	hrs/ship	0.6	Load factor				
Ship exhaust (auxiliary boilers)	2,724	2,724	2,502	850	hrs/yr		0.00147	0.00135	kg/kWh	109.0	kW	20	hrs/ship						
Total emissions (kg/yr.)	148,649	71,492	10,760																
Total emissions (kg/yr.) - including Train & Ship	178,353	101,195	38,040																
ACTIVITY	NOx emission (kg/y)	Intensity	Units	Emission Factor	Units	Var. 1	Units	Var. 2	Units	Var. 3	Units								
Diesel train exhaust	39,088	8,760	hrs/yr	17.920	g/bhp-hr	3.0	No. of locos	83	hp/loco (Notch 1)										
Ship exhaust (auxiliary engines)	250,629	800	ships/yr	0.01470	kg/kWh	1776.0	kW	20	hrs/ship	0.6	Load factor								
Ship exhaust (auxiliary boilers)	3,662	800	ships/yr	0.002	kg/kWh	109.0	kW	20	hrs/ship										
Total NOx emissions (kg/yr)	293,379																		

Appendix C

Isoleth Diagrams

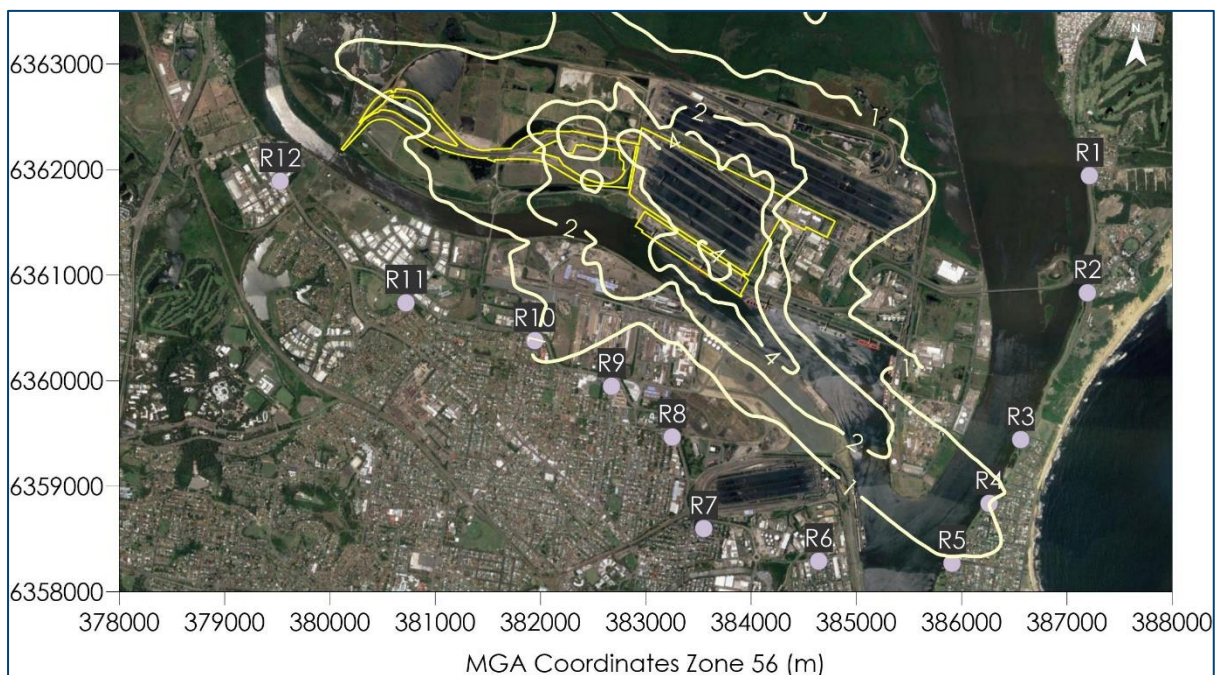


Figure C-1: Predicted maximum 24-hour average PM_{2.5} concentration from the NCIG CET incorporating the Optimisation Project ($\mu\text{g}/\text{m}^3$)

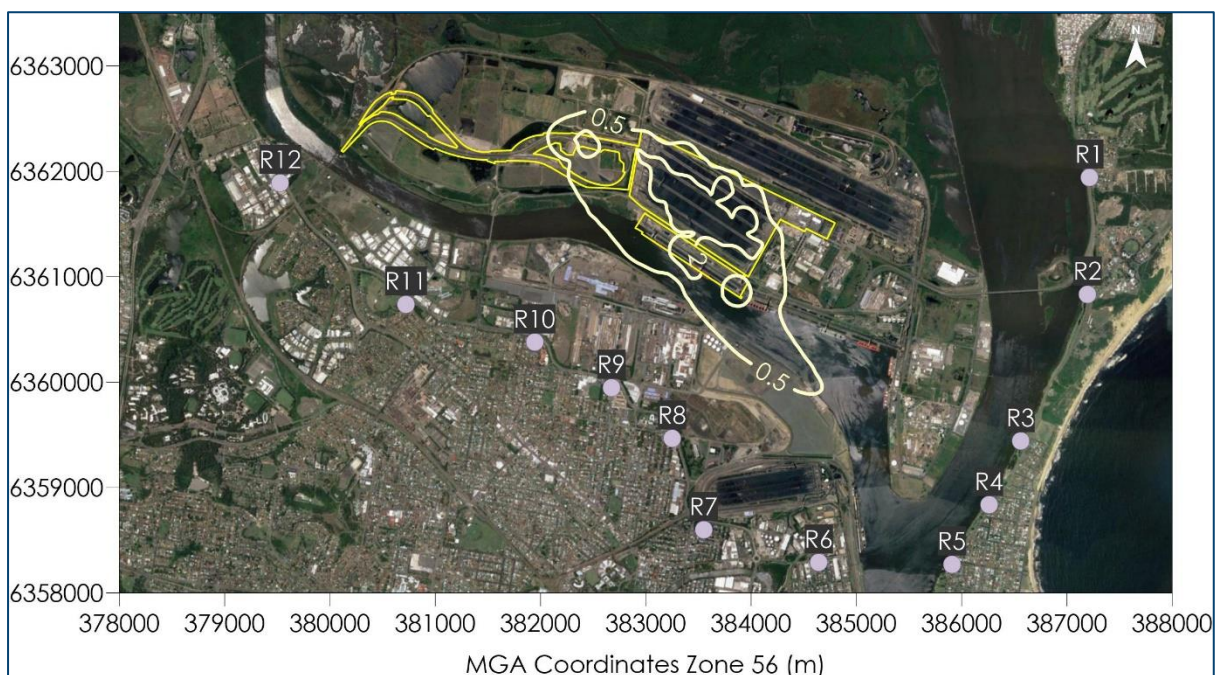


Figure C-2: Predicted annual average PM_{2.5} concentration from the NCIG CET incorporating the Optimisation Project ($\mu\text{g}/\text{m}^3$)

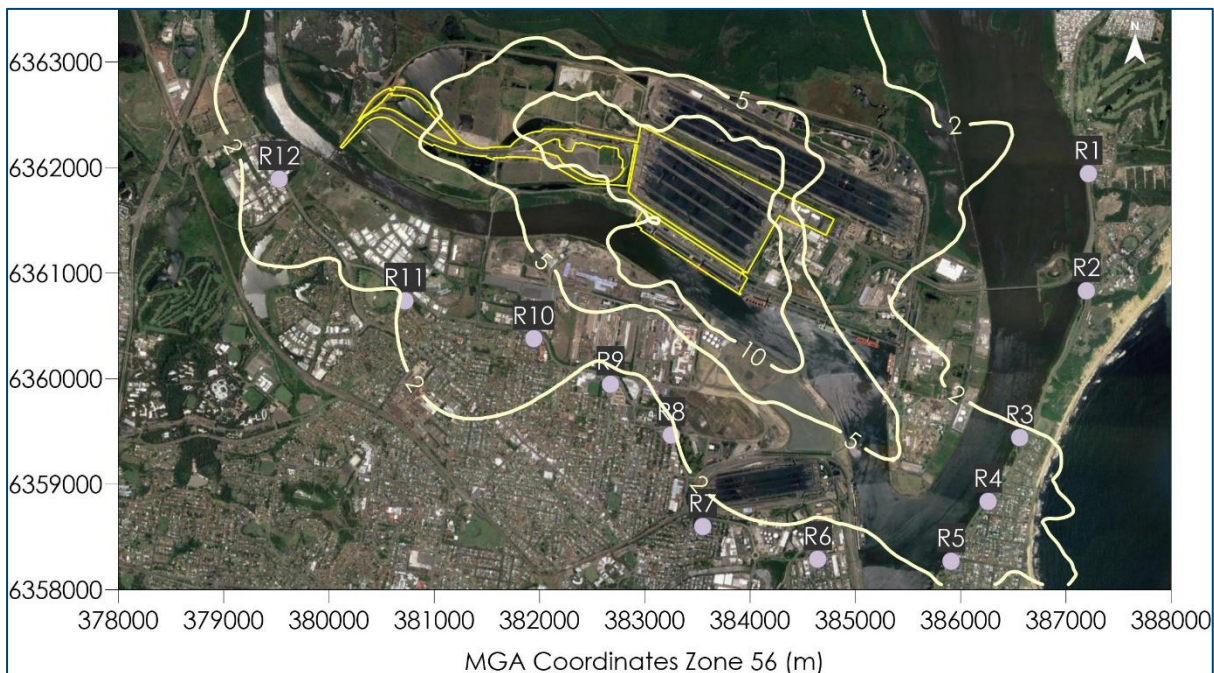


Figure C-3: Predicted maximum 24-hour average PM₁₀ concentration from the NCIG CET incorporating the Optimisation Project ($\mu\text{g}/\text{m}^3$)

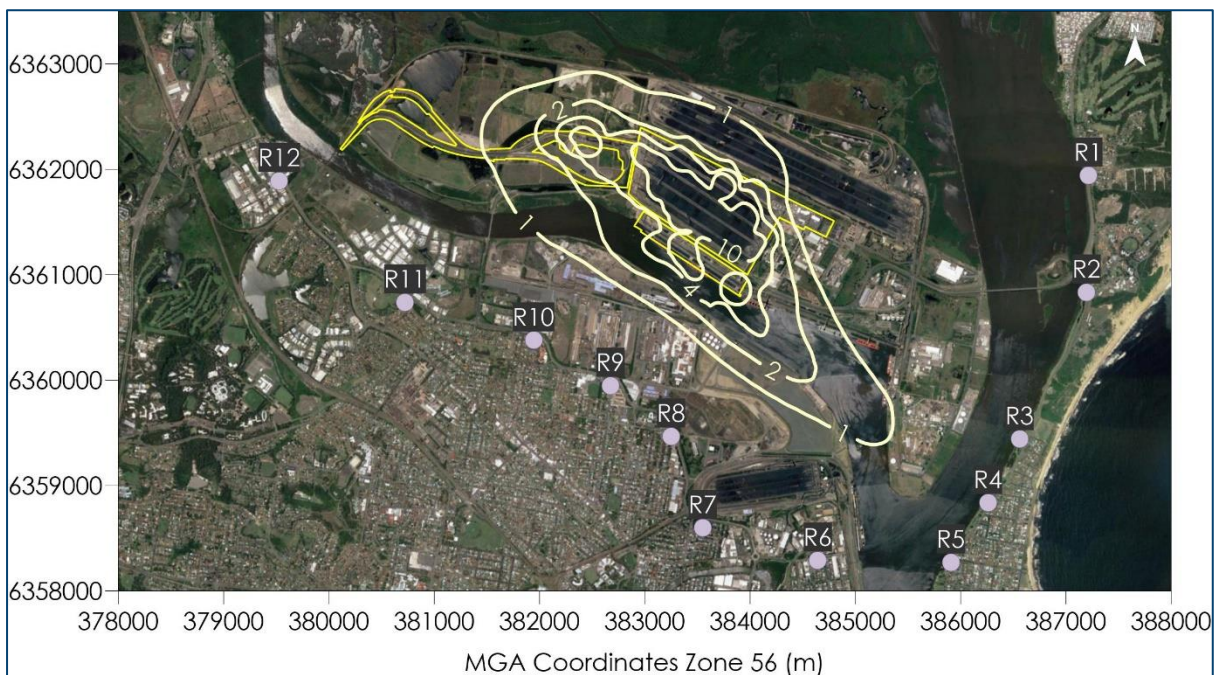


Figure C-4: Predicted annual average PM₁₀ concentration from the NCIG CET incorporating the Optimisation Project ($\mu\text{g}/\text{m}^3$)

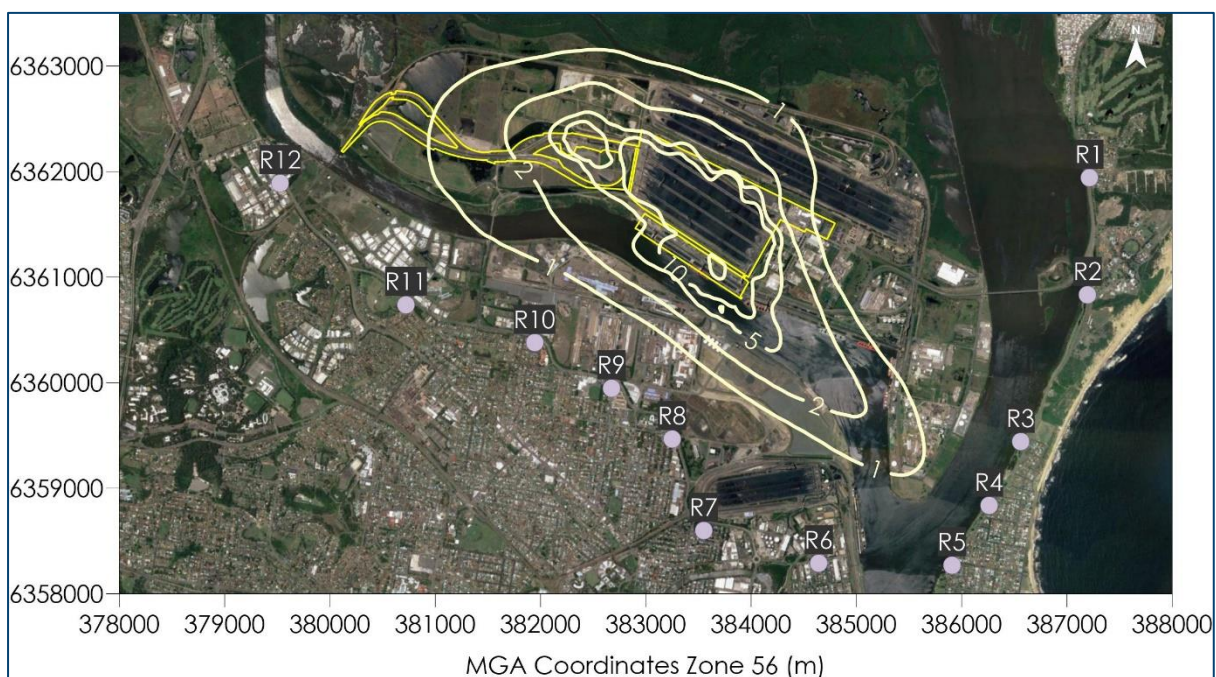


Figure C-5: Predicted annual average TSP concentration from the NCIG CET incorporating the Optimisation Project ($\mu\text{g}/\text{m}^3$)

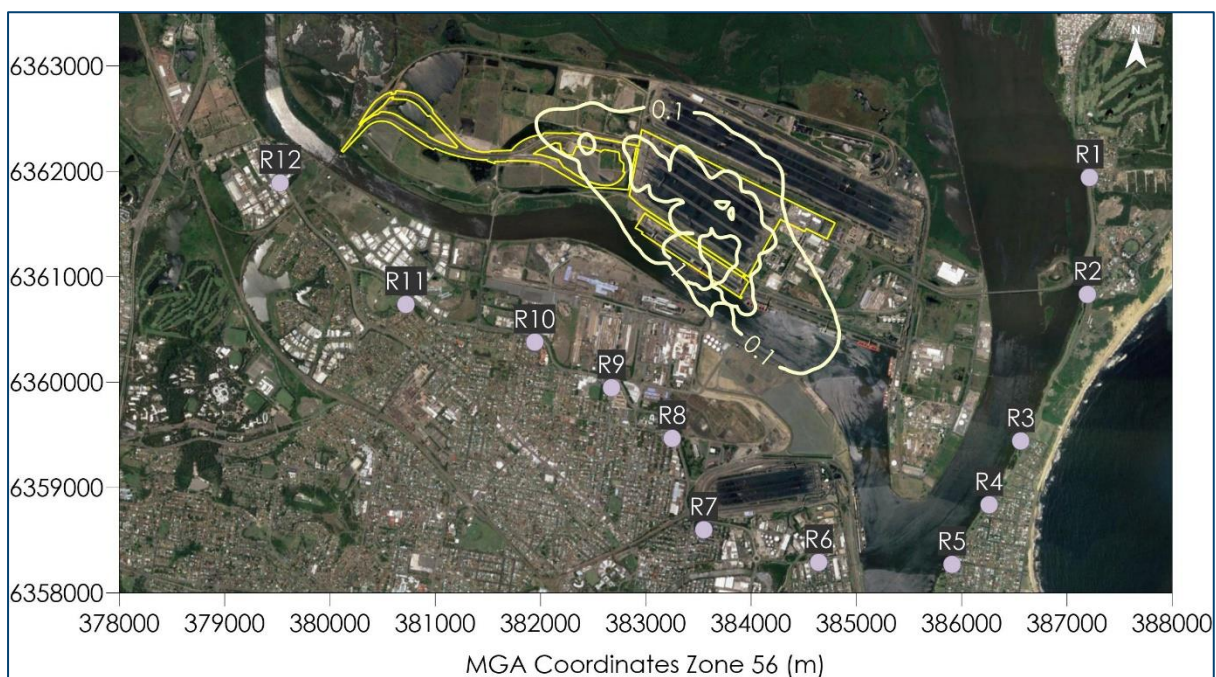


Figure C-6: Predicted annual average dust deposition levels from the NCIG CET incorporating the Optimisation Project ($\text{g}/\text{m}^2/\text{month}$)

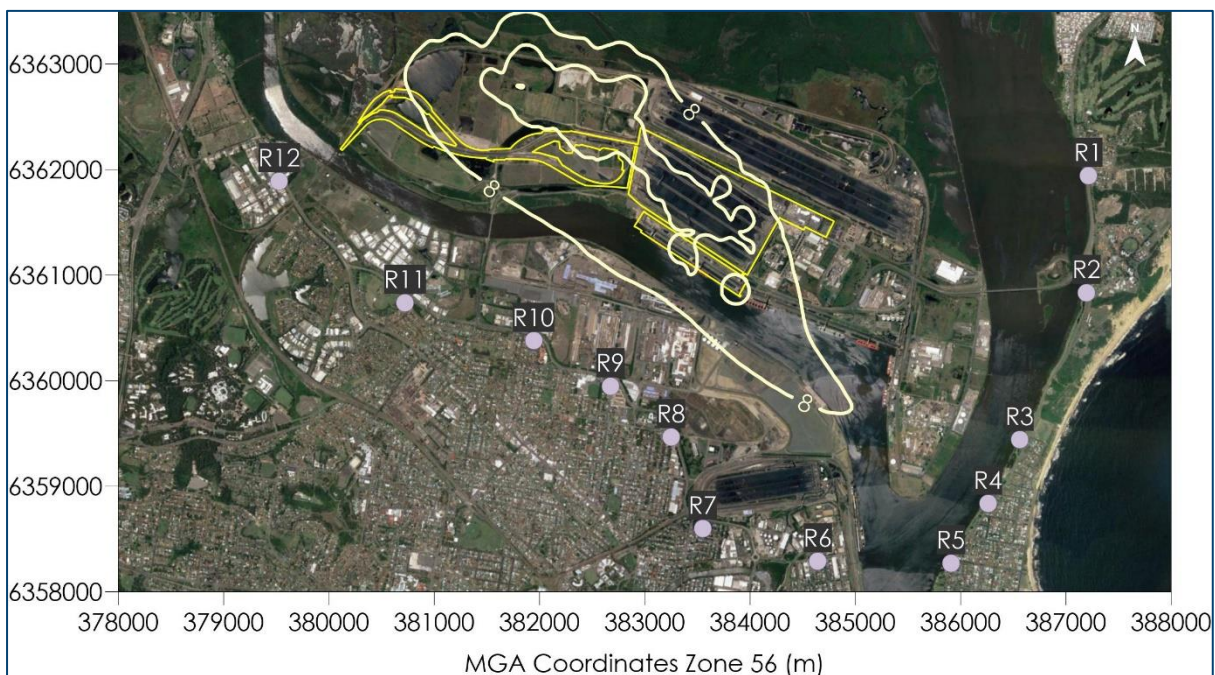


Figure C-7: Predicted annual average PM_{2.5} concentration from the NCIG CET incorporating the Optimisation Project and other sources (µg/m³)

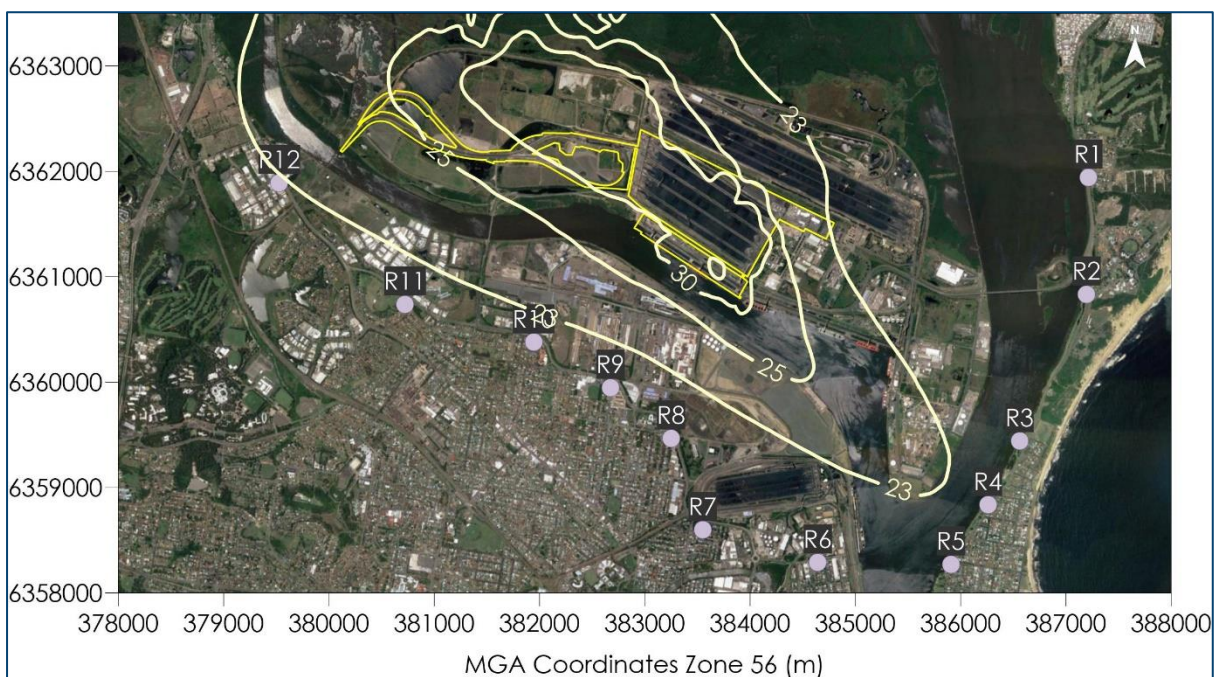


Figure C-8: Predicted annual average PM₁₀ concentration from the NCIG CET incorporating the Optimisation Project and other sources (µg/m³)

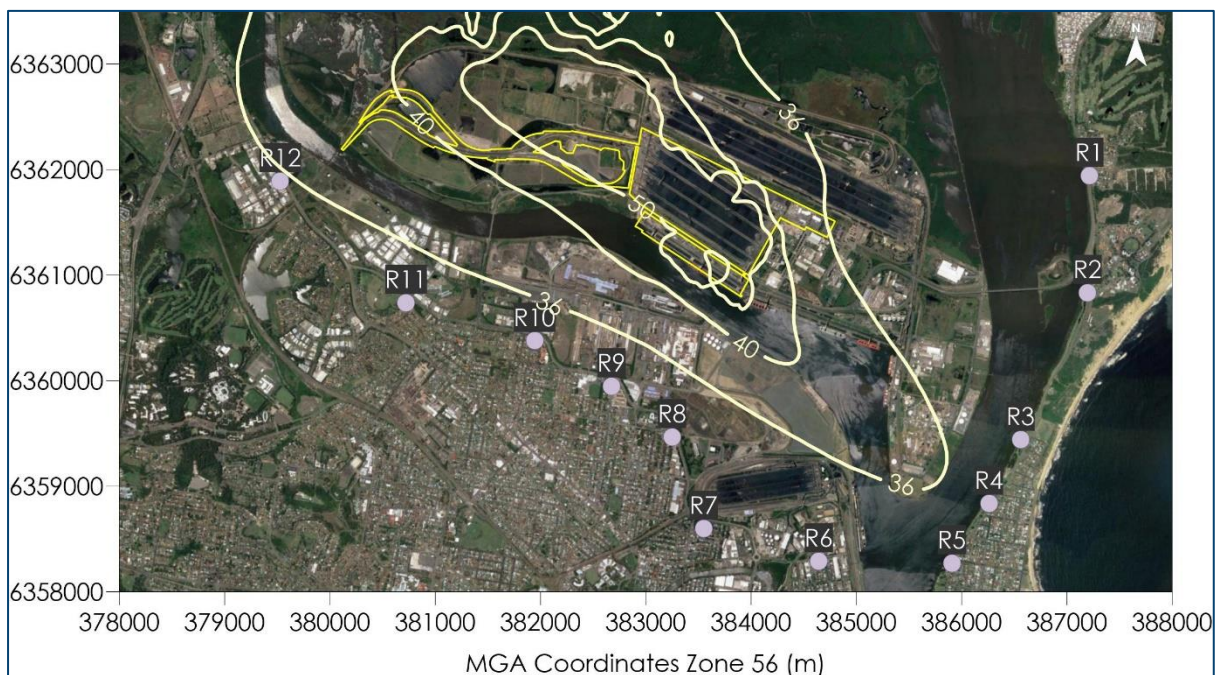


Figure C-9: Predicted annual average TSP concentration from the NCIG CET incorporating the Optimisation Project and other sources ($\mu\text{g}/\text{m}^3$)

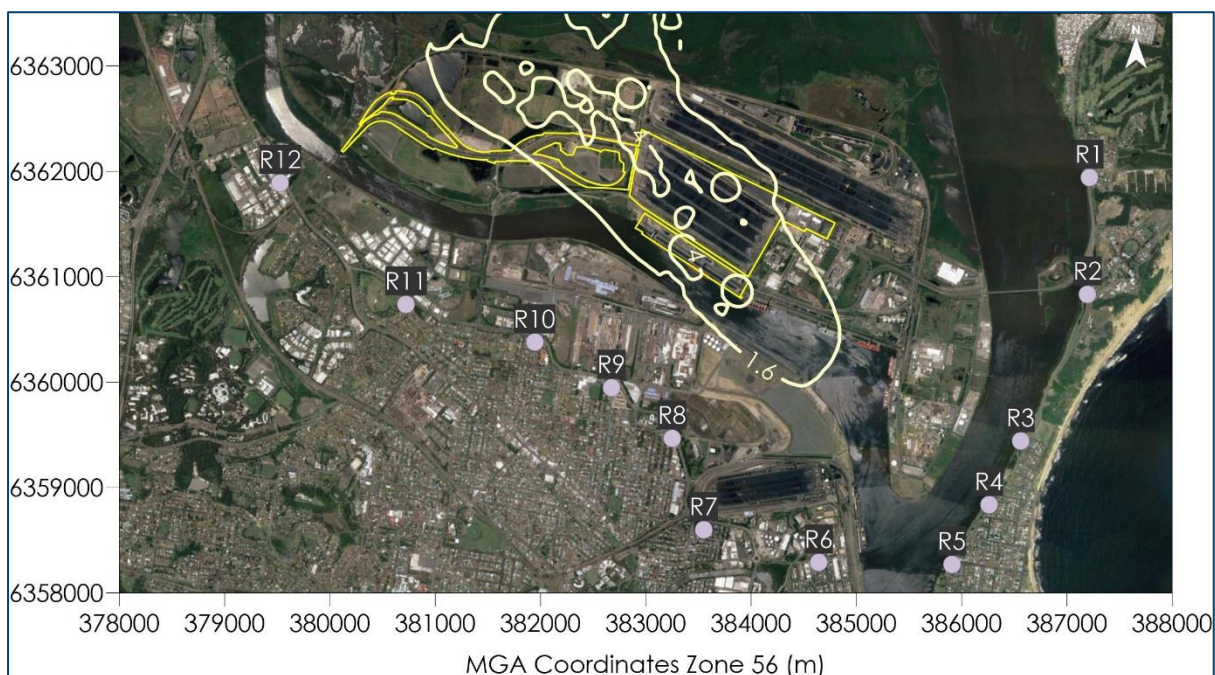


Figure C-10: Predicted annual average dust deposition levels from the NCIG CET incorporating the Optimisation Project and other sources ($\text{g}/\text{m}^2/\text{month}$)

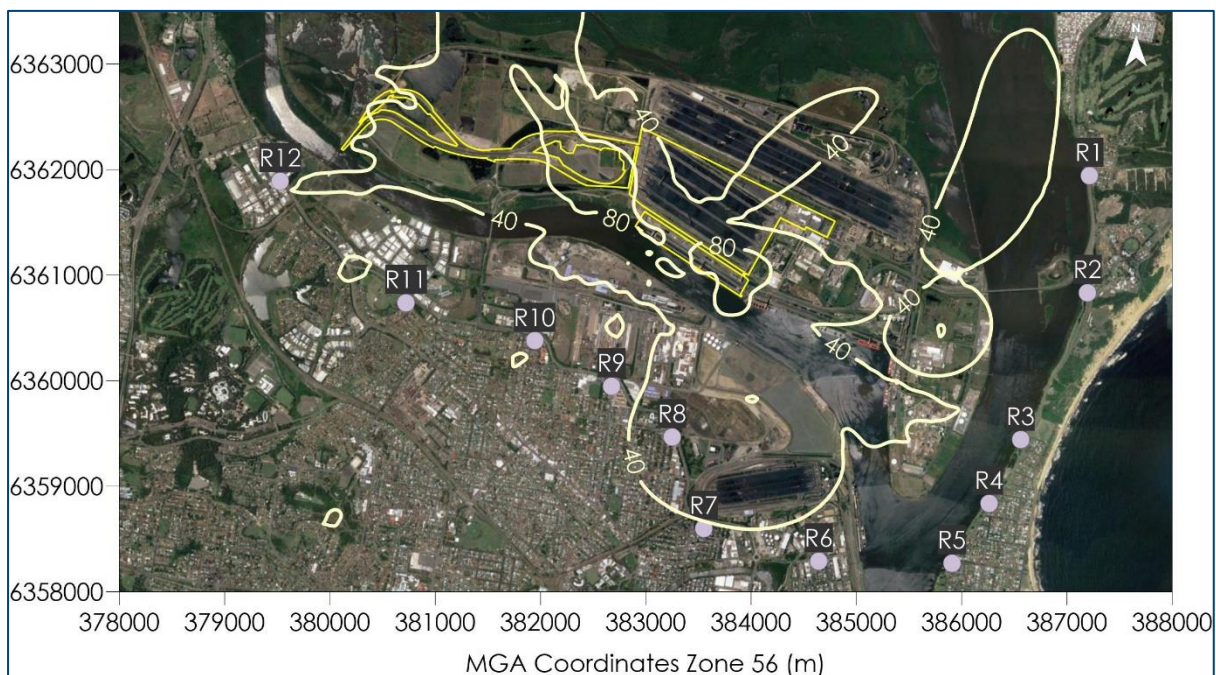


Figure C-11: Predicted 1-hour average NO₂ concentration from the NCIG CET incorporating the Optimisation Project (µg/m³)

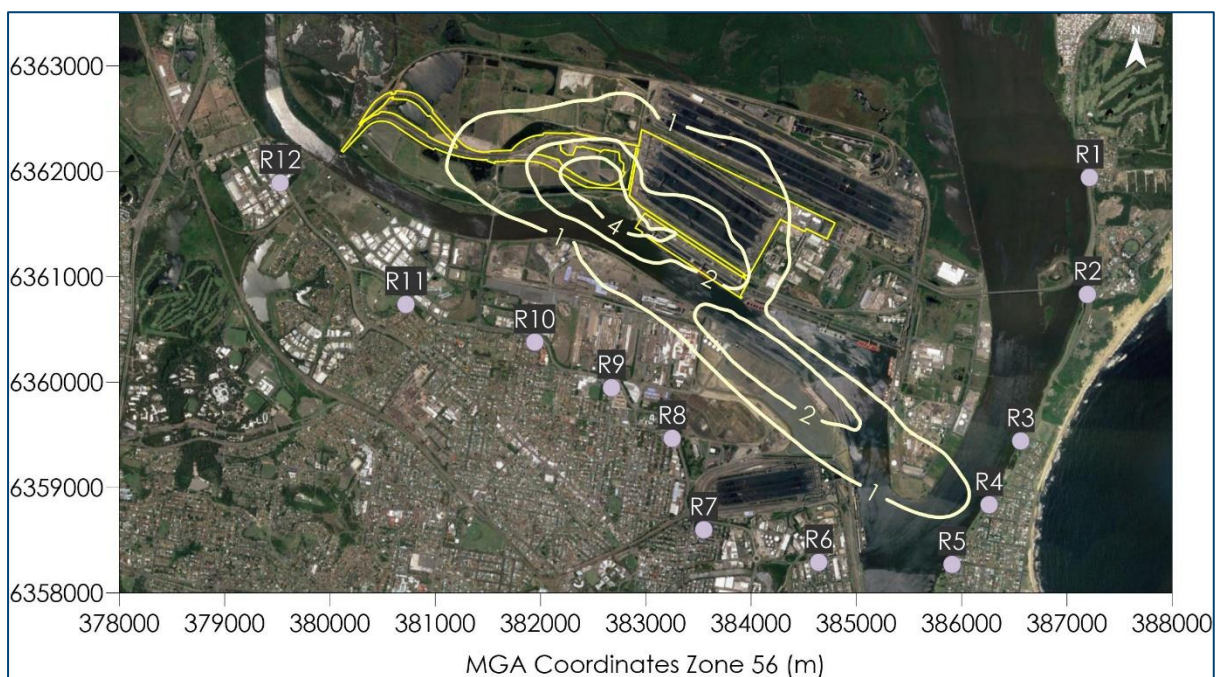


Figure C-12: Predicted annual average NO₂ concentration from the NCIG CET incorporating the Optimisation Project (µg/m³)

Appendix D

Further Detail Regarding 24-hour PM_{2.5} Analysis



The analysis below provides a cumulative 24-hour PM_{2.5} impact assessment per the NSW EPA Approved Methods; refer to the worked example on Page 47 of the Approved Methods.

The background level is the sum of the total ambient measured level at the nearest monitoring station to the receptor assessed in each table and the potential contribution due to the T4 Project.

The predicted increment is the change in level predicted to occur at the receptor due to the NCIG CET incorporating the Optimisation Project.

The total is the sum of the background level and the predicted level. The totals may have minor discrepancies due to rounding.

Each table assesses one receptor. The left hand half of the table examines the cumulative impact during the periods of highest background levels and the right hand half of the table examines the cumulative impact during the periods of highest contribution from the NCIG CET incorporating the Optimisation Project.

The predicted impacts from the Kooragang Island Recycling Facility Expansion (**SLR, 2015**) have been added to the predicted impacts for the Optimisation Project and future background levels incorporating the measured background levels and the future contributions due to the T4 Project in order to provide detailed assessment of the potential cumulative 24-hour PM_{2.5} impacts.

The potential maximum 24-hour average PM₁₀ contribution of 0.1 µg/m³ due to the Kooragang Island Recycling Facility Expansion has been considered for the most impacted receptors near the Project under conditions of maximum cumulative impact with emissions from the NCIG CET (and the Optimisation Project).

The **orange** shading represents days where the existing background level is already above the criteria. This can be the result of bushfire events and dust storms, and is included for completeness.

The **green** shading represents days ranked per the highest background level but below the criteria.

The **blue** shading represents days ranked per the highest predicted increment level but below the criteria.

The values in **bold red** are above the criteria.

Tables D-1 to D-12 show the predicted maximum cumulative levels at each receptors surrounding the proposed facility. There are no days in the year assessed that have higher total levels than those shown in the tables.

The results show that:

1. No exceedance is predicted to arise due to NCIG CET incorporating the Optimisation Project; and
2. The contribution to dust levels from the NCIG CET incorporating the Optimisation Project are low on the days with the highest background level.



Table D-1: Receptor 1 – PM_{2.5} 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
20/12/2015	30.2	<0.1	30.2				
22/08/2015	27.7	<0.1	27.7				
19/12/2015	22.5	<0.1	22.5	8/07/2015	5.2	0.1	5.3
21/08/2015	21.8	<0.1	21.8	4/09/2015	7.0	<0.1	7.1
9/03/2015	16.8	<0.1	16.8	3/07/2015	9.7	<0.1	9.7
7/06/2015	16.7	<0.1	16.7	5/04/2015	5.5	<0.1	5.5
19/11/2015	15.4	<0.1	15.4	23/05/2015	6.2	<0.1	6.3
17/10/2015	15.2	<0.1	15.2	11/01/2015	4.4	<0.1	4.5
6/05/2015	14.7	<0.1	14.8	20/06/2015	7.4	<0.1	7.4
12/03/2015	14.4	<0.1	14.4	2/01/2015	10.7	<0.1	10.8
29/06/2015	14.1	<0.1	14.1	24/09/2015	4.3	<0.1	4.3
28/06/2015	13.8	<0.1	13.8	18/07/2015	3.9	<0.1	3.9

Table D-2: Receptor 2 – PM_{2.5} 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
20/12/2015	30.2	<0.1	30.2				
22/08/2015	27.7	<0.1	27.7				
19/12/2015	22.5	<0.1	22.5	20/06/2015	7.3	<0.1	7.4
21/08/2015	21.8	<0.1	21.8	22/05/2015	6.3	<0.1	6.3
9/03/2015	16.8	<0.1	16.8	3/07/2015	9.6	<0.1	9.7
7/06/2015	16.7	<0.1	16.7	19/06/2015	3.5	<0.1	3.5
19/11/2015	15.4	<0.1	15.4	13/01/2015	5.8	<0.1	5.9
17/10/2015	15.2	<0.1	15.2	5/04/2015	5.4	<0.1	5.5
6/05/2015	14.8	<0.1	14.8	31/08/2015	5.4	<0.1	5.4
12/03/2015	14.4	<0.1	14.4	2/06/2015	5.9	<0.1	5.9
29/06/2015	14.1	<0.1	14.1	26/04/2015	3.3	<0.1	3.3
28/06/2015	13.9	<0.1	13.9	24/05/2015	11.6	<0.1	11.7

Table D-3: Receptor 3 – PM_{2.5} 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
20/12/2015	30.3	<0.1	30.3				
22/08/2015	27.8	<0.1	27.8				
19/12/2015	22.6	<0.1	22.6	6/06/2015	10.2	0.1	10.3
21/08/2015	21.9	<0.1	21.9	18/06/2015	3.9	<0.1	4.0
9/03/2015	16.9	<0.1	17.0	21/06/2015	9.1	<0.1	9.1
7/06/2015	16.9	<0.1	16.9	18/07/2015	4.1	<0.1	4.2
19/11/2015	15.5	<0.1	15.5	9/04/2015	7.4	<0.1	7.5
17/10/2015	15.3	<0.1	15.3	2/06/2015	6.0	<0.1	6.0
6/05/2015	14.9	<0.1	15.0	28/09/2015	7.4	<0.1	7.4
12/03/2015	14.5	<0.1	14.5	5/06/2015	7.1	<0.1	7.2
29/06/2015	14.3	<0.1	14.3	29/07/2015	9.1	<0.1	9.2
28/06/2015	14.1	<0.1	14.1	31/05/2015	5.2	<0.1	5.2

Table D-4: Receptor 4 – PM_{2.5} 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
20/12/2015	30.3	<0.1	30.3				
22/08/2015	27.8	<0.1	27.8				
19/12/2015	22.6	<0.1	22.6	18/06/2015	4.0	0.2	4.1
21/08/2015	21.9	<0.1	21.9	23/04/2015	5.3	0.2	5.4
7/06/2015	16.9	<0.1	16.9	5/08/2015	0.3	0.2	0.5
9/03/2015	16.9	<0.1	16.9	22/04/2015	3.9	0.2	4.0
19/11/2015	15.5	<0.1	15.5	11/05/2015	4.4	0.1	4.6
17/10/2015	15.3	<0.1	15.3	2/07/2015	7.4	0.1	7.5
6/05/2015	14.9	<0.1	15.0	28/07/2015	5.0	0.1	5.2
12/03/2015	14.5	<0.1	14.5	3/06/2015	9.6	0.1	9.8
29/06/2015	14.3	<0.1	14.4	7/07/2015	5.7	0.1	5.9
28/06/2015	14.0	<0.1	14.1	4/06/2015	9.1	0.1	9.2

Table D-5: Receptor 5 – PM_{2.5} 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
20/12/2015	30.3	<0.1	30.3				
22/08/2015	27.8	<0.1	27.8				
19/12/2015	22.6	<0.1	22.6	25/08/2015	5.1	0.2	5.2
21/08/2015	21.9	<0.1	22.0	24/07/2015	6.4	0.1	6.5
7/06/2015	16.9	<0.1	17.0	20/05/2015	4.6	0.1	4.7
9/03/2015	16.9	<0.1	16.9	8/06/2015	8.5	<0.1	8.5
19/11/2015	15.5	<0.1	15.5	14/07/2015	3.0	<0.1	3.1
17/10/2015	15.3	<0.1	15.3	1/08/2015	9.3	<0.1	9.4
6/05/2015	14.8	<0.1	14.9	26/08/2015	3.7	<0.1	3.8
12/03/2015	14.5	<0.1	14.6	16/07/2015	5.7	<0.1	5.7
29/06/2015	14.3	<0.1	14.3	4/06/2015	9.0	<0.1	9.1
28/06/2015	14.0	<0.1	14.0	25/01/2015	8.6	<0.1	8.7

Table D-6: Receptor 6 – PM_{2.5} 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
20/12/2015	30.2	<0.1	30.2				
22/08/2015	27.7	<0.1	27.8				
19/12/2015	22.5	<0.1	22.5	24/06/2015	10.5	<0.1	10.6
21/08/2015	21.9	<0.1	21.9	10/07/2015	9.2	<0.1	9.2
7/06/2015	16.8	<0.1	16.9	28/05/2015	9.0	<0.1	9.1
9/03/2015	16.8	<0.1	16.8	14/04/2015	10.0	<0.1	10.1
19/11/2015	15.4	<0.1	15.4	24/07/2015	6.3	<0.1	6.3
17/10/2015	15.2	<0.1	15.2	13/11/2015	5.6	<0.1	5.7
6/05/2015	14.7	<0.1	14.7	23/07/2015	10.0	<0.1	10.1
12/03/2015	14.4	<0.1	14.5	30/06/2015	11.9	<0.1	12.0
29/06/2015	14.1	<0.1	14.1	15/06/2015	9.8	<0.1	9.8
20/03/2015	13.8	<0.1	13.9	22/06/2015	10.6	<0.1	10.6



Table D-7: Receptor 7 – PM_{2.5} 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
20/12/2015	30.2	<0.1	30.2				
22/08/2015	27.8	<0.1	27.8				
19/12/2015	22.5	<0.1	22.5	15/06/2015	9.8	<0.1	9.9
21/08/2015	21.9	<0.1	21.9	22/07/2015	10.6	<0.1	10.7
9/03/2015	16.8	<0.1	16.8	19/05/2015	5.8	<0.1	5.8
7/06/2015	16.8	<0.1	16.8	17/06/2015	4.9	<0.1	5.0
19/11/2015	15.4	<0.1	15.4	29/04/2015	5.1	<0.1	5.1
17/10/2015	15.2	<0.1	15.2	27/06/2015	11.5	<0.1	11.5
6/05/2015	14.7	<0.1	14.7	14/12/2015	12.9	<0.1	12.9
12/03/2015	14.4	<0.1	14.4	18/03/2015	10.6	<0.1	10.7
29/06/2015	14.1	<0.1	14.1	20/12/2015	30.2	<0.1	30.2
20/03/2015	13.9	<0.1	13.9	21/12/2015	9.9	<0.1	10.0

Table D-8: Receptor 8 – PM_{2.5} 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
20/12/2015	30.2	<0.1	30.3				
22/08/2015	27.8	<0.1	27.9				
19/12/2015	22.5	<0.1	22.5	15/06/2015	9.9	<0.1	10.0
21/08/2015	22.0	<0.1	22.0	22/07/2015	10.7	<0.1	10.8
7/06/2015	16.8	<0.1	16.9	19/05/2015	5.9	<0.1	5.9
9/03/2015	16.8	<0.1	16.8	7/02/2015	5.2	<0.1	5.3
19/11/2015	15.4	<0.1	15.4	29/04/2015	5.1	<0.1	5.2
17/10/2015	15.2	<0.1	15.2	18/03/2015	10.6	<0.1	10.7
6/05/2015	14.7	<0.1	14.7	18/04/2015	9.9	<0.1	10.0
12/03/2015	14.5	<0.1	14.5	14/12/2015	12.9	<0.1	13.0
29/06/2015	14.1	<0.1	14.1	13/06/2015	9.2	<0.1	9.3
20/03/2015	13.9	<0.1	13.9	16/06/2015	0.7	<0.1	0.7

Table D-9: Receptor 9 – PM_{2.5} 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
20/12/2015	30.2	<0.1	30.3				
22/08/2015	28.0	<0.1	28.0				
19/12/2015	22.5	<0.1	22.5	26/12/2015	4.0	0.1	4.1
21/08/2015	21.9	<0.1	22.0	16/06/2015	0.7	<0.1	0.8
7/06/2015	16.9	<0.1	16.9	18/04/2015	10.0	<0.1	10.1
9/03/2015	16.8	<0.1	16.8	13/12/2015	8.3	<0.1	8.4
19/11/2015	15.4	<0.1	15.4	15/02/2015	8.7	<0.1	8.8
17/10/2015	15.2	<0.1	15.3	17/03/2015	11.8	<0.1	11.8
6/05/2015	14.7	<0.1	14.7	14/12/2015	12.9	<0.1	13.0
12/03/2015	14.5	<0.1	14.5	1/04/2015	4.0	<0.1	4.1
29/06/2015	14.2	<0.1	14.2	10/01/2015	7.6	<0.1	7.7
20/03/2015	14.0	<0.1	14.0	16/12/2015	7.1	<0.1	7.1

Table D-10: Receptor 10 – PM_{2.5} 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
20/12/2015	30.2	<0.1	30.3				
22/08/2015	28.2	<0.1	28.3				
19/12/2015	22.5	<0.1	22.6	13/12/2015	8.3	0.2	8.5
21/08/2015	22.0	<0.1	22.0	5/11/2015	3.3	<0.1	3.4
7/06/2015	16.9	<0.1	16.9	26/12/2015	4.1	<0.1	4.2
9/03/2015	16.8	<0.1	16.8	23/03/2015	5.1	<0.1	5.2
19/11/2015	15.4	<0.1	15.4	8/01/2015	6.6	<0.1	6.7
17/10/2015	15.3	<0.1	15.3	9/10/2015	7.4	<0.1	7.5
6/05/2015	14.7	<0.1	14.7	1/04/2015	4.1	<0.1	4.1
12/03/2015	14.5	<0.1	14.5	1/01/2015	9.9	<0.1	10.0
29/06/2015	14.2	<0.1	14.2	23/01/2015	7.2	<0.1	7.3
20/03/2015	14.0	<0.1	14.0	18/12/2015	8.8	<0.1	8.9

Table D-11: Receptor 11 – PM_{2.5} 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
20/12/2015	30.3	<0.1	30.4				
22/08/2015	28.0	<0.1	28.0				
19/12/2015	22.5	<0.1	22.6	1/01/2015	9.9	<0.1	10.0
21/08/2015	22.0	<0.1	22.0	29/11/2015	5.3	<0.1	5.4
9/03/2015	16.8	<0.1	16.8	19/02/2015	9.5	<0.1	9.6
7/06/2015	16.7	<0.1	16.7	5/11/2015	3.3	<0.1	3.4
19/11/2015	15.5	<0.1	15.5	20/01/2015	8.2	<0.1	8.3
17/10/2015	15.3	<0.1	15.3	18/12/2015	8.9	<0.1	9.0
6/05/2015	14.7	<0.1	14.7	15/06/2015	10.1	<0.1	10.2
12/03/2015	14.5	<0.1	14.5	20/12/2015	30.3	<0.1	30.4
29/06/2015	14.2	<0.1	14.2	19/12/2015	22.5	<0.1	22.6
20/03/2015	13.9	<0.1	13.9	11/02/2015	7.5	<0.1	7.6

Table D-12: Receptor 12 – PM_{2.5} 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
20/12/2015	31.0	<0.1	31.0				
22/08/2015	27.7	<0.1	27.7				
19/12/2015	23.2	<0.1	23.3	21/02/2015	4.7	<0.1	4.8
21/08/2015	21.9	<0.1	21.9	19/02/2015	9.5	<0.1	9.6
9/03/2015	16.8	<0.1	16.8	10/02/2015	3.2	<0.1	3.3
7/06/2015	16.7	<0.1	16.7	29/10/2015	7.1	<0.1	7.2
19/11/2015	15.5	<0.1	15.5	7/01/2015	3.3	<0.1	3.3
17/10/2015	15.2	<0.1	15.2	20/09/2015	2.8	<0.1	2.9
6/05/2015	14.7	<0.1	14.7	11/02/2015	7.8	<0.1	7.9
12/03/2015	14.4	<0.1	14.4	22/11/2015	6.7	<0.1	6.7
29/06/2015	14.3	<0.1	14.3	18/02/2015	7.9	<0.1	8.0
10/03/2015	13.9	<0.1	13.9	6/01/2015	4.8	<0.1	4.9

Appendix E

Further Detail Regarding 24-hour PM₁₀ Analysis



The analysis below provides a cumulative 24-hour PM₁₀ impact assessment per the NSW EPA Approved Methods; refer to the worked example on Page 47 of the Approved Methods.

The background level is the sum of the total ambient measured level at the nearest monitoring station to the receptor assessed in each table and the potential contribution due to the T4 Project.

The predicted increment is the change in level predicted to occur at the receptor due to the NCIG CET incorporating the Optimisation Project.

The total is the sum of the background level and the predicted level. The totals may have minor discrepancies due to rounding.

Each table assesses one receptor. The left hand half of the table examines the cumulative impact during the periods of highest background levels and the right hand half of the table examines the cumulative impact during the periods of highest contribution from the NCIG CET incorporating the Optimisation Project.

The predicted impacts from the Incitec Pivot Ammonium Nitrate Facility Project (**URS, 2012**) and Kooragang Island Recycling Facility Expansion (**SLR, 2015**) have been added to the predicted impacts for the Optimisation Project and future background levels incorporating the measured background levels and the future contributions due to the T4 Project in order to provide detailed assessment of the potential cumulative 24-hour PM₁₀ impacts.

The potential maximum 24-hour average PM₁₀ contribution of 2.0 µg/m³ due to the Incitec Pivot Ammonium Nitrate Facility Project and 0.6 µg/m³ due to the Kooragang Island Recycling Facility Expansion has been considered for the most impacted receptors near the Optimisation Project under conditions of maximum cumulative impact with emissions from the NCIG CET (and the Optimisation Project).

The **orange** shading represents days where the existing background level is already above the criteria. This can be the result of bushfire events and dust storms, and is included for completeness.

The **green** shading represents days ranked per the highest background level but below the criteria.

The **blue** shading represents days ranked per the highest predicted increment level but below the criteria.

The values in **bold red** are above the criteria.

Tables E-1 to E-12 show the predicted maximum cumulative levels at each receptors surrounding the proposed facility. There are no days in the year assessed that have higher total levels than those shown in the tables.

The results show that:

1. No exceedance is predicted to arise due to NCIG CET incorporating the Optimisation Project; and
2. The contribution to dust levels from the NCIG CET incorporating the Optimisation Project are low on the days with the highest background level.



Table E-1: Receptor 1 – PM₁₀ 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
6/05/2015	85.1	<0.1	85.1				
27/11/2015	53.8	<0.1	53.8				
19/11/2015	52.8	<0.1	52.8				
26/11/2015	51.3	<0.1	51.3				
20/12/2015	47.5	0.1	47.5	13/12/2015	36.9	0.5	36.9
20/11/2015	45.8	<0.1	45.8	22/08/2015	42.4	0.2	42.4
6/03/2015	45.7	<0.1	45.7	18/03/2015	29.9	0.2	29.9
7/10/2015	45.4	<0.1	45.4	26/12/2015	17.3	0.2	17.3
14/12/2015	44.7	0.1	44.7	20/10/2015	34.5	0.2	34.5
9/03/2015	42.8	<0.1	42.8	1/04/2015	10.3	0.2	10.3
22/08/2015	42.4	0.2	42.4	15/02/2015	24.6	0.2	24.6
19/12/2015	42.0	<0.1	42.0	23/03/2015	17.4	0.2	17.4
6/10/2015	41.8	<0.1	41.8	31/10/2015	17.2	0.2	17.2
20/03/2015	40.5	<0.1	40.5	1/11/2015	18.5	0.2	18.5

Table E-2: Receptor 2 – PM₁₀ 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
6/05/2015	85.2	<0.1	85.3				
27/11/2015	53.8	<0.1	53.8				
19/11/2015	52.8	<0.1	52.8				
26/11/2015	51.3	<0.1	51.3				
20/12/2015	47.5	0.2	47.5	13/12/2015	36.9	0.3	36.9
20/11/2015	45.8	<0.1	45.9	1/01/2015	37.5	0.2	37.5
6/03/2015	45.8	<0.1	45.8	29/11/2015	26.4	0.2	26.4
7/10/2015	45.5	<0.1	45.5	20/12/2015	47.5	0.2	47.5
14/12/2015	44.7	<0.1	44.7	9/10/2015	31.3	0.2	31.3
9/03/2015	42.7	<0.1	42.8	5/11/2015	9.5	0.2	9.5
22/08/2015	42.4	<0.1	42.4	15/10/2015	28.7	0.2	28.7
19/12/2015	42.0	0.1	42.0	23/01/2015	28.4	0.2	28.4
6/10/2015	41.8	<0.1	41.8	8/01/2015	32.3	0.1	32.3
20/03/2015	40.5	<0.1	40.5	18/12/2015	28.1	0.1	28.1

Table E-3: Receptor 3 – PM₁₀ 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
6/05/2015	88.2	<0.1	88.4				
27/11/2015	56.4	<0.1	56.4				
19/11/2015	55.3	<0.1	55.4				
26/11/2015	54.2	<0.1	54.2				
20/12/2015	50.1	<0.1	50.1				
6/03/2015	48.8	<0.1	48.8	7/01/2015	20.3	0.3	20.3
20/11/2015	48.7	<0.1	48.7	29/10/2015	41.2	0.3	41.2
7/10/2015	48.2	<0.1	48.2	19/12/2015	44.6	0.3	44.6
14/12/2015	47.3	<0.1	47.3	19/02/2015	40.5	0.2	40.5
9/03/2015	45.3	<0.1	45.4	6/01/2015	19.8	0.2	19.8
22/08/2015	45.0	<0.1	45.0	20/09/2015	14.5	0.2	14.5
19/12/2015	44.6	0.3	44.6	19/10/2015	29.1	0.2	29.1
6/10/2015	44.5	<0.1	44.5	29/11/2015	29.0	0.2	29.0
20/03/2015	43.1	<0.1	43.1	18/02/2015	36.4	0.2	36.4
25/11/2015	42.6	<0.1	42.6	24/01/2015	33.2	0.2	33.2

Table E-4: Receptor 4 – PM₁₀ 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
6/05/2015	88.2	0.2	88.4				
27/11/2015	56.4	<0.1	56.4				
19/11/2015	55.3	<0.1	55.4				
26/11/2015	54.3	<0.1	54.4				
20/12/2015	50.1	<0.1	50.1				
20/11/2015	48.8	<0.1	48.9	23/04/2015	15.5	0.3	15.9
6/03/2015	48.7	<0.1	48.8	18/06/2015	11.4	0.3	11.7
7/10/2015	48.3	<0.1	48.3	5/08/2015	16.3	0.3	16.6
14/12/2015	47.3	<0.1	47.3	3/06/2015	21.1	0.3	21.3
9/03/2015	45.2	<0.1	45.3	29/08/2015	14.6	0.3	14.9
22/08/2015	45.0	<0.1	45.0	2/07/2015	16.4	0.3	16.7
6/10/2015	44.8	<0.1	44.9	21/06/2015	19.8	0.3	20.0
19/12/2015	44.6	<0.1	44.6	22/04/2015	10.2	0.3	10.4
20/03/2015	43.2	<0.1	43.2	27/05/2015	27.2	0.3	27.5
25/11/2015	42.6	<0.1	42.6	4/06/2015	22.4	0.3	22.7

Table E-5: Receptor 5 – PM₁₀ 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
6/05/2015	87.6	<0.1	87.6				
27/11/2015	56.4	<0.1	56.4				
19/11/2015	55.3	<0.1	55.3				
26/11/2015	54.2	<0.1	54.2				
20/12/2015	50.1	<0.1	50.1				
20/11/2015	49.0	<0.1	49.1	25/08/2015	12.9	0.3	13.2
6/03/2015	48.5	<0.1	48.5	24/07/2015	15.6	0.3	15.9
7/10/2015	48.3	<0.1	48.4	20/05/2015	15.8	0.3	16.1
14/12/2015	47.3	<0.1	47.3	30/07/2015	25.5	0.2	25.7
9/03/2015	45.1	<0.1	45.2	27/05/2015	26.9	0.2	27.2
22/08/2015	45.1	<0.1	45.1	1/08/2015	24.3	0.2	24.5
6/10/2015	45.1	0.1	45.2	14/06/2015	23.4	0.2	23.6
19/12/2015	44.6	<0.1	44.6	4/06/2015	22.4	0.2	22.6
20/03/2015	43.2	<0.1	43.2	8/06/2015	18.4	0.2	18.6
25/11/2015	42.7	<0.1	42.7	30/06/2015	23.6	0.2	23.8

Table E-6: Receptor 6 – PM₁₀ 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
6/05/2015	84.7	<0.1	84.7				
27/11/2015	53.8	<0.1	53.8				
19/11/2015	52.7	<0.1	52.7				
26/11/2015	51.5	<0.1	51.6				
20/12/2015	47.5	<0.1	47.5	24/06/2015	23.5	0.2	23.7
20/11/2015	46.4	<0.1	46.4	15/06/2015	19.4	0.2	19.6
7/10/2015	45.7	<0.1	45.7	23/07/2015	20.2	0.2	20.3
6/03/2015	45.7	<0.1	45.7	28/05/2015	22.9	0.2	23.1
14/12/2015	44.7	<0.1	44.7	14/04/2015	32.9	0.1	33.0
22/08/2015	42.7	<0.1	42.8	14/06/2015	20.8	0.1	21.0
9/03/2015	42.5	<0.1	42.5	27/05/2015	24.1	0.1	24.2
6/10/2015	42.2	<0.1	42.3	24/07/2015	13.0	0.1	13.1
19/12/2015	42.0	<0.1	42.0	10/07/2015	16.4	0.1	16.6
20/03/2015	40.8	<0.1	40.9	30/06/2015	21.1	0.1	21.2

Table E-7: Receptor 7 – PM₁₀ 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
6/05/2015	84.7	<0.1	84.7				
27/11/2015	53.8	<0.1	53.8				
19/11/2015	52.7	<0.1	52.7				
26/11/2015	51.8	<0.1	51.8				
20/12/2015	47.6	<0.1	47.7	15/06/2015	19.7	0.2	19.9
20/11/2015	46.4	<0.1	46.5	22/07/2015	20.6	0.2	20.7
7/10/2015	45.6	<0.1	45.6	27/06/2015	18.4	0.1	18.5
6/03/2015	45.6	<0.1	45.6	10/07/2015	17.1	0.1	17.2
14/12/2015	44.8	<0.1	44.8	19/05/2015	12.3	0.1	12.4
22/08/2015	43.1	<0.1	43.2	24/10/2015	17.7	0.1	17.8
9/03/2015	42.5	<0.1	42.5	30/06/2015	21.2	<0.1	21.3
19/12/2015	42.0	<0.1	42.0	22/08/2015	43.1	<0.1	43.2
6/10/2015	42.0	<0.1	42.0	23/07/2015	20.7	<0.1	20.8
20/03/2015	41.1	<0.1	41.2	27/05/2015	24.2	<0.1	24.3

Table E-8: Receptor 8 – PM₁₀ 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
6/05/2015	84.7	<0.1	84.7				
27/11/2015	53.8	<0.1	53.8				
19/11/2015	52.8	<0.1	52.8				
26/11/2015	52.2	<0.1	52.2				
20/12/2015	47.7	<0.1	47.7	15/06/2015	20.4	0.3	20.7
20/11/2015	46.6	0.1	46.8	7/02/2015	17.5	0.2	17.8
7/10/2015	45.8	<0.1	45.8	22/07/2015	21.2	0.2	21.5
6/03/2015	45.6	<0.1	45.6	19/05/2015	12.9	0.2	13.1
14/12/2015	44.8	0.1	44.9	17/05/2015	12.9	0.2	13.1
22/08/2015	43.5	0.1	43.6	10/07/2015	17.8	0.2	17.9
9/03/2015	42.5	<0.1	42.5	18/04/2015	17.6	0.1	17.7
6/10/2015	42.2	<0.1	42.2	24/10/2015	18.1	0.1	18.2
19/12/2015	42.0	<0.1	42.1	22/08/2015	43.5	0.1	43.6
20/03/2015	41.3	0.1	41.5	20/11/2015	46.6	0.1	46.8

Table E-9: Receptor 9 – PM₁₀ 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
6/05/2015	84.7	<0.1	84.7				
27/11/2015	53.8	<0.1	53.8				
19/11/2015	52.8	<0.1	52.8				
26/11/2015	52.7	<0.1	52.7				
20/12/2015	47.8	<0.1	47.9	18/04/2015	18.6	0.2	18.8
20/11/2015	47.0	0.1	47.2	22/08/2015	44.5	0.2	44.7
7/10/2015	45.7	<0.1	45.7	26/12/2015	17.4	0.2	17.6
6/03/2015	45.6	<0.1	45.6	19/05/2015	14.0	0.2	14.2
14/12/2015	44.9	0.2	45.1	14/12/2015	44.9	0.2	45.1
22/08/2015	44.5	0.2	44.7	22/07/2015	22.6	0.2	22.8
9/03/2015	42.5	<0.1	42.6	18/03/2015	30.3	0.2	30.5
6/10/2015	42.2	<0.1	42.2	7/02/2015	18.8	0.2	19.0
19/12/2015	42.1	<0.1	42.1	15/02/2015	24.7	0.1	24.8
20/03/2015	41.7	0.1	41.8	15/06/2015	21.1	0.1	21.3

Table E-10: Receptor 10 – PM₁₀ 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
6/05/2015	84.7	<0.1	84.7				
27/11/2015	53.8	<0.1	53.8				
19/11/2015	52.9	<0.1	53.0				
26/11/2015	52.7	<0.1	52.7				
20/12/2015	47.8	0.1	47.9	13/12/2015	37.0	0.5	37.5
20/11/2015	47.8	<0.1	47.8	22/08/2015	46.4	0.2	46.6
22/08/2015	46.4	0.2	46.6	18/03/2015	30.5	0.2	30.7
14/12/2015	45.8	<0.1	45.9	26/12/2015	18.1	0.2	18.2
6/03/2015	45.6	<0.1	45.6	20/10/2015	36.1	0.2	36.2
7/10/2015	45.5	<0.1	45.5	1/04/2015	10.7	0.2	10.9
9/03/2015	42.5	<0.1	42.6	15/02/2015	24.9	0.2	25.0
6/10/2015	42.2	<0.1	42.2	23/03/2015	18.0	0.2	18.2
19/12/2015	42.2	<0.1	42.2	31/10/2015	17.2	0.2	17.4
20/03/2015	41.8	<0.1	41.9	1/11/2015	19.2	0.2	19.3



Table E-11: Receptor 11 – PM₁₀ 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
6/05/2015	84.7	<0.1	84.7				
27/11/2015	53.8	<0.1	53.8				
19/11/2015	53.1	<0.1	53.2				
26/11/2015	51.3	<0.1	51.3				
20/12/2015	48.2	0.2	48.4	13/12/2015	40.1	0.3	40.3
14/12/2015	47.0	<0.1	47.1	1/01/2015	37.5	0.2	37.7
20/11/2015	46.5	<0.1	46.5	29/11/2015	26.4	0.2	26.6
6/03/2015	45.6	<0.1	45.6	20/12/2015	48.2	0.2	48.4
7/10/2015	45.4	<0.1	45.4	9/10/2015	31.5	0.2	31.7
22/08/2015	44.7	<0.1	44.7	5/11/2015	9.5	0.2	9.7
9/03/2015	42.5	<0.1	42.6	15/10/2015	29.3	0.2	29.5
19/12/2015	42.3	0.1	42.5	23/01/2015	28.5	0.2	28.6
6/10/2015	42.1	<0.1	42.1	8/01/2015	32.4	0.1	32.5
25/11/2015	41.4	<0.1	41.5	18/12/2015	28.9	0.1	29.1

Table E-12: Receptor 12 – PM₁₀ 24-hr average concentration (µg/m³)

Ranked by Highest to Lowest Background Concentration				Ranked by Highest to Lowest Predicted Incremental Concentration			
Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level	Date	Measured background level	Predicted increment due to CET	Total cumulative 24-hr average level
6/05/2015	84.7	<0.1	84.7				
20/12/2015	54.2	<0.1	54.3				
27/11/2015	53.8	<0.1	53.9				
19/11/2015	53.4	<0.1	53.4				
26/11/2015	51.3	<0.1	51.3				
19/12/2015	47.9	0.3	48.2	7/01/2015	19.7	0.3	20.0
20/11/2015	45.8	<0.1	45.8	29/10/2015	40.0	0.3	40.2
6/03/2015	45.6	<0.1	45.6	19/12/2015	47.9	0.3	48.2
14/12/2015	45.4	<0.1	45.5	19/02/2015	38.1	0.2	38.3
7/10/2015	45.4	<0.1	45.4	6/01/2015	17.3	0.2	17.5
9/03/2015	42.6	<0.1	42.6	20/09/2015	15.1	0.2	15.3
6/10/2015	42.5	<0.1	42.6	19/10/2015	28.9	0.2	29.1
12/12/2015	42.4	0.2	42.6	29/11/2015	27.5	0.2	27.7
22/08/2015	42.4	<0.1	42.4	18/02/2015	36.3	0.2	36.5
13/12/2015	41.7	<0.1	41.7	24/01/2015	34.1	0.2	34.3



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