NSW GOVERNMENT
Department of Planning

Major Development Assessment

Contact: Georgia Ivancevic
Phone: (02) 9228 6457
Fax: (02) 9228 6466
Email: georgia.ivancevic@planning.nsw.gov.au
Level 4 Western Gallery
23-33 Bridge Street
GPO Box 39
SYDNEY NSW 2001

Our ref: 9041530

Ms Debra Murphy
Port Kembla Port Terminal
PO Box 823
Wollongong NSW 2520

Dear Ms Murphy

Director-General's Requirements
Port Kembla Coal Terminal Project
Project Application 08_0009

The Department has received your application for the Port Kembla Coal Terminal Project in the Wollongong local government area.

I have attached a copy of the Director-General's requirements for the project. These requirements have been prepared in consultation with the relevant public authorities, and are based on the information you have provided to date. I have also attached a copy of the public authorities' comments for your information.

Please note that under section 75F(3) of the *Environmental Planning and Assessment Act 1979*, the Director-General may alter these requirements at any time.

As you are aware, the Department prefers operations like the coal terminal to operate under a single, modern planning approval; and consequently encourages you to develop the project with this express purpose in mind.

If your proposal is likely to have a significant impact on matters of National Environmental Significance, it will require an approval under the Commonwealth *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act). This approval is in addition to any approvals required under NSW legislation. It is your responsibility to contact the Department of Environment, Water, Heritage and the Arts in Canberra (6274 1111 or http://www.environment.gov.au) to determine if the proposal requires an approval under the EPBC Act. The Commonwealth Government has accredited the NSW environmental assessment process for assessing any impacts on matters of National Environmental Significance. As a result, if it is determined that an approval is required under the EPBC Act, please contact the Department immediately as supplementary Director-General's requirements may need to be issued.

I would appreciate it if you would contact the Department at least two weeks before you propose to submit your Environmental Assessment for the project to determine the:

- applicable fees (see Division 1A, Part 15 of the *Environmental Planning and Assessment Regulation 2000*);
- consultation and public exhibition arrangements; and
- number of copies (hard-copy or CD-ROM) of the Environmental Assessment that will be required for exhibition purposes.

The Department will review the Environmental Assessment in consultation with the relevant authorities to determine if it adequately addresses the Director-General's requirements. If the Director-General considers the Environmental Assessment to be inadequate, you will be required to revise it prior to public exhibition.

The Director-General's requirements will be placed on the Department's website along with other relevant information which becomes available during the assessment of the project. As a result, I would appreciate it if all the documents subsequently submitted to the Department are in a suitable format for the web, and if you would arrange for an electronic version of the Environmental Assessment to be hosted on a suitable website with a link to the Department's website.

If you have any enquiries about these requirements, please contact Georgia Ivancevic on 9228 6457 or Georgia.Ivancevic@planning.nsw.gov.au

Yours sincerely

26.2.08

Chris Wilson
Executive Director
Major Project Assessment
As delegate for the Director-General

Director-General's Requirements

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

Application number	08_0009
Project	The continued use of existing and approved infrastructure at the Port Kembla Coal Terminal, allowing products to be received by road 24 hours a day, 7 days a week.
Location	Lot 100 DP 643687 / DP 647408 and PT Lot 1 DP 261720, Port Kembla Road, Port Kembla
Proponent	Port Kembla Coal Terminal
Date of Issue	26 February 2008
Date of Expiration	26 February 2010

General Requirements	The Environmental Assessment must include:
	• an executive summary;
	• a historical overview of the terminal's operations, including a detailed description of the existing and approved operations, all relevant statutory approvals, and the current regime for environmental management and monitoring on site;
	• a detailed description of the project, including the:
	  ▪ need for the project;
	  ▪ alternatives considered;
	  ▪ plans for any building works;
	  ▪ various components and stages of the project; and
	• consideration of any relevant statutory provisions, including whether the project is consistent with the objects of the *Environmental Planning & Assessment Act 1979*;
	• a general overview of the environmental impacts of the proposal, identifying the key issues for further assessment, and taking into consideration the issues raised during consultation;
	• a detailed assessment of the key issues specified below, and any other significant issues identified in the general overview of environmental impacts of the proposal (see above), which includes:
	  ▪ a description of the existing environment;
	  ▪ a description of the proposed changes to current operations and equipment (if any);
	  ▪ an assessment of the potential impacts of the proposal including any potential cumulative impacts;
	  ▪ a description of the measures that would be implemented to avoid, minimise, mitigate, offset, manage and/or monitor the impacts of the proposal;
	• a Statement of Commitments, outlining the proposed environmental management, mitigation and monitoring measures;
	• a conclusion justifying the project, taking into consideration the environmental, social and economic benefits of the project; and
	• a signed statement from the author of the Environmental Assessment certifying that the information in the report is neither false nor misleading.

Key Issues	• **Air Quality** – including dust and other emissions from the site; • **Traffic** – including the rationale for the use of road transport, details of traffic types and volumes likely to be generated; assessment of predicted impacts on road safety and the capacity of the road network, and a report on the extent and impacts of traffic during any road transport trial or during previous use of the "emergency provisions" under the repealed *State Environmental Planning Policy No 7 - Port Kembla Coal Terminal*;

	• **Noise** – including site and traffic noise; • **Water** – including site water management, stormwater management, the operational requirements of the site's environment protection licence and discharges from the project site; and • **Greenhouse Gas & Energy Efficiency** – including quantified assessment of greenhouse gases likely to be generated by the proposal, and a description of the measures that would be implemented to ensure the terminal is energy efficient.
References	The Environmental Assessment must take into account relevant State government technical and policy guidelines. While not exhaustive, guidelines which may be relevant to the project are included in the attached list.
Consultation	During the preparation of the Environmental Assessment, you should consult with the relevant local, State or Commonwealth government authorities, service providers, community groups or affected landowners. The consultation process and the issues raised must be described in the Environmental Assessment. In particular you should consult with: • Department of Environment and Climate Change; • Department of Primary Industries (Fisheries); • Roads and Traffic Authority; and • Wollongong City Council. The consultation process and the issues raised must be described in the Environmental Assessment.
Deemed refusal period	60 days

State Government Technical and Policy Guidelines - For Reference

Aspect	Policy /Methodology
Air Quality	
	Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (DEC, 2005);
	Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (DECC, 2007)
	Protection of the Environment Operations (Clean Air) Regulation 2002
Traffic and Transport	
	Guide to Traffic Generating Development (RTA, 2002)
	RTAs Road Design Guide (RTA)
	Illawarra and South Coast Freight Study (DoP)
Noise	
	NSW Industrial Noise Policy (DEC, 2000);
	Environmental Criteria for Road Traffic Noise (DEC, 1999);
	Environmental Noise Control Manual (DEC, 1994);
Water Quality	
	Managing Urban Stormwater: Treatment Techniques (EPA, 1997)
	Managing Urban Stormwater: Strategic Framework. Draft (EPA, 1996)
	Managing Urban Stormwater: Source Control. Draft (EPA, 1998)
Greenhouse Gas and Energy Efficiency	
	AGO Factors and Methods Workbook (AGO, 2006)
	Guidelines for Energy Savings Action Plans (DEUS, 2005)

Our reference : FIL08/332:DOC08/948:PW
Contact : Paul Wearne, (02) 4224 4100

Received
18 JAN 2008
Major Development Assessment
OSDAA

Department of Planning
(Attention: Georgia Ivancevic)
GPO BOX 39
SYDNEY NSW 2001

Dear Madam

PORT KEMBLA COAL TERMINAL
REQUEST FOR ENVIRONMENTAL ASSESSMENT REQUIREMENTS

We refer to your request for the Department of Environment and Climate Change (DECC) to identify key issues and requirements for the Environmental Assessment (EA) in regard to the above proposal. This proposal provides for the extension of public road receival capacity for 24 hours per day, seven days per week.

DECC has met with Port Kembla Coal Terminal on 1 November 2007 and discussed operational requirements under the Environment Protection Licence. Based on this meeting and information provided to date, the above proposed changes in operations do not appear to require any changes to the current licence. We will continue to seek ongoing environmental improvements, where required, through our ongoing regulation of the premises under this licence, for example by way of Pollution Reduction Programs.

On the basis of a review of the information provided to date, there are a number of environmental issues that should be assessed in the EA. These are outlined in Attachment A. These issues include:

- Noise and vibration
- Transport planning
- Air quality

These should be assessed in accordance with the relevant guidelines listed in Attachment A.

Should you require any further information please contact the officer listed above.

Yours sincerely

William Dove 15/01/2008

WILLIAM DOVE
Acting Manager Illawarra
Climate Change and Environment Protection

Att: Attachment A –EA Requirements

(N:Part 3A/EARs/DOC08/948PKCT INCREASE RECEIVAL HOURS.doc)

The Department of Environment and Conservation NSW is now known as
the Department of Environment and Climate Change NSW

PO Box 513, Wollongong NSW 2520
Level 3, 84 Crown Street, Wollongong NSW
Tel: (02) 4224 4100 Fax: (02) 4224 4110
ABN 30 841 387 271
www.environment.nsw.gov.au

Department of **Environment and Conservation** NSW

Attachment A

ENVIRONMENTAL ASSESSMENT REQUIREMENTS

The following environmental requirements should be addressed in the Environmental Assessment (EA) for the proposed development.

- Noise and vibration
- Transport planning; and
- Air quality

Details are required on the location of the proposed development including the affected environment to place the proposal in its local and regional environmental context including surrounding landuses, planning zonings, potential sensitive receptors, surface and sub-surface area/ features of conservation significance and environmental sensitivity. These should include areas containing natural and cultural heritage values.

Mitigation and management options that will be used to prevent, control, abate or mitigate identified environmental impacts associated with the project and to reduce risks to human health and prevent the degradation of the environment, should be described. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

Impacts of Traffic Noise and Vibration

An assessment of impacts associated with facility operations and associated road activities should be undertaken in accordance with the recommended guidelines detailed in Attachment B.

The approach should reflect strategies to reduce the impact of traffic noise. These include, but are not necessarily limited to:

- governing maximum noise levels from individual vehicles
- best noise management practices
- developing programs to monitor and control noisy vehicles on the roads
- controlling noise from heavy vehicle exhaust and engine brakes
- implementing traffic management policies (such as the use of dedicated truck routes, enforcement of quiet zones, movement scheduling, and restricted access in residential areas during sleeping hours); and
- community consultation and complaint handling.

Transport Planning

The EA should take into account the Illawarra and South Coast Freight study prepared by the Department of Planning (DoP). The purpose of this study is to improve the detail and quality of freight related data for the Illawarra and South Coast regions and provide the foundation for the identification and development of potential options for the effective management of regional transport tasks. In addition the EA should document the model split between materials transported by truck and rail. Further information can be obtained by contacting DoP (Wollongong) on 4224 9459.

We also support the approach adopted for the Port Kembla Cargo Handling Facilty approval (MP 05-0073) which required the proponent to develop and implement all reasonable options, over time, to maximize the use of rail to transport coal to and from the coal loader.

Impacts on Air Quality

The environmental outcome for the project in relation to air quality is to ensure sensitive receptors are protected from any adverse impacts from dust. In addition, the development should ensure:

- National Environment Protection Measures (NEPM) ambient air quality goals should not be compromised
- dust emissions from material handling, storage, processing, haul roads, transport and material transfer systems are minimised; and
- vehicular kilometres travelled are minimised.

In this regard the EA should document that the proposed development would not result in any increased impacts relative to the current operations.

In relation to haulage, handling and transfer of coal, the EA will also need to document dust management and mitigation controls.

GUIDANCE MATERIAL

Noise and Vibration

- NSW Industrial Noise Policy (EPA, 1999)
- NSW Environmental Criteria for Road Traffic Noise (EPA, 1999)
- Environmental Noise Management Manual (RTA, Dec 2001)

Air Quality

- Legislative requirements under the Protection of the Environment Operations Act 1997 and its associated Regulation.
- Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in New South Wales (August 2001)
- Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (July 2001).

NSW GOVERNMENT
Department of Planning

REQUEST FOR INPUT INTO DIRECTOR-GENERAL'S REQUIREMENTS

Development Proposal: Increased road receiving hours – Port Kembla Coal Terminal

From: Mr Neil McGaffin **Date:** 29 January 2008

Major Project Assessments - Contact Officer: **Name:** Georgia Ivancevic

Georgia Ivancevic **Phone No:** 9228 6457

Director-Generals Requirements or relevant information has been requested for the preparation of the following (tick applicable):

[ ] Environmental Impact Statement [ ] Statement of Environmental Effects [X] Review of Environmental Factors

Date Information Required By: **31 January 2008**

1. LEGISLATIVE FRAMEWORK

Please provide advice on whether the proposed development requires approval/concurrence under one or more of the following:

X	E P & A Act Part 3A Consent		Plantations & Reafforestation Act
	E P & A Act Part 4 Consent		Native Vegetation Conservation Act
	E P & A Act Part 5 Approval		Water Act
	Rivers & Foreshores Improvement Act		EPBC Act (Cwth)
	Water Management Act		Roads Act
	Coastal Protection Act		Mining Act
	Hunter Water (Special Areas) Regs		Crown Lands Act

2. PLANNING INSTRUMENTS, POLICIES & STRATEGIES

2.1. List applicable State, Regional & Local EPIs, DCPs, Policies, or Strategies (including drafts), Water Sharing Plans, Regional Vegetation Management Plans that apply and any particularly relevant provisions

- Wollongong LEP 1990
- Illawarra Regional Environmental Plan No. 1
- Illawarra Regional Strategy
- State Environmental Planning Policy (Infrastructure) 2007

2.2. Is the proposal permissible?

[X] Yes [ ] No

Provide details on the relevant zoning provisions or permissibility. Also, where a project is not clearly in one category, please provide details:

- The Port Kembla Coal Terminal is zoned 5(a) Special Uses – Port, whilst the F6 Southern Freeway and Northern Distributor Corridor along which the majority of trucks travel is zoned 5(c) Main Roads under the Wollongong LEP 1990.

2.3. List any relevant concurrence / consultation requirements? (If yes, please identify the instrument and provisions):

- Before being repealed by SEPP Infrastructure (2007), concurrence was required under SEPP 7 (Port Kembla Coal Loader) for an increase in road receiving hours.

2.4. List any relevant Planning Strategies / Studies or relevant current work items:

- N/A

3. NATURAL RESOURCE STRATEGIES & PLANS

3.1. List applicable NSW State Natural Resource Management Policies, Strategies, & Plans (eg Catchment BluePrints, Estuary Management Plans, Coastal Management Plans & Flood Prone Risk Management Plans), NSW Coastal Policy & Flood Prone Land Policy that may apply to the proposal or any relevant provisions:

- N/A

4. KEY ISSUES

4.1. What are likely to be the key issues? Prioritise – high, important, other, and list any specific information including modelling, maps, plans and data collection, that should be considered to address the issue. Information may be attached to this form.

Note: Major Project Assessments has prepared a number of EIS Guidelines for certain types of proposals, activities and issues. A list of the current EIS Guidelines is provided at the end of this Form. If this Form relates to a type of proposal, activity or issue that has an EIS Guideline, it is not necessary for your requirements to duplicate the information covered in the Guideline. However you may still provide a list of the key issues you consider as being important for the proposal or activity to address.

- Noise – High
- Air Quality – High
- Road/Motorist Safety - Important
- Limitations on the Coal Terminal - Important
- Alternatives to road haulage – Important
- Cumulative impact of other port based operations

4.2. In your opinion, is the proposal likely to be of local, regional or State interest? Please provide details.

- State Interest – The efficient export of coal from Port Kembla is important to New South Wales as the Port Kembla Coal Terminal exports all coal sourced from the Southern and Western coalfields.

4.3. For Part 5, where DoP is a determining authority, has it considered the need for an EIS

☐ Yes ☒ No

If yes, please detail:

- N/A

4.4. Does the site have a history that is of relevance to this proposal?

☒ Yes ☐ No

If yes, please detail:

- The transport of coal by road to the Port Kembla Coal Terminal has been regulated since the introduction of SEPP 7 (Port Kembla Coal Loader) in 1982.

•	Local road upgrades and improvements over the past 25 years have meant that coal truck haulage routes are now largely isolated along main roads such as the F6 Southern Freeway and Northern Distributor.
•	In addition to road transport, the Port Kembla Coal Terminal receives an average of eight coal trains per day, delivering approximately 57 percent of total coal to the site.

5. CONSULTATION

5.1. Please list any agencies, councils, community group, or other interested parties with whom the proponent should consult.

•	Residents surrounding main haulage routes
•	Wollongong City Council
•	Roads and Traffic Authority
•	Department of Environment and Climate Change
•	Australian Trucking Association – NSW Branch
•	Australian Coal Association

6. CONTACT

6.1. Please provide the name and contact details of a nominated officer for ongoing liaison with your office.

Name	Julia Kaul	Contact No.	4224 9472
Position	Environmental Planning Officer	Date	29 January 2008

EIS GUIDELINES

Section A: Chemical, Petroleum, Manufacturing and Materials Processing

- Chemical facilities
- Bitumen works
- Concrete works

Section B: Extractive Industries, Mining and Mineral Processing

- Extractive industries – Quarries
- Extractive industries – Dredging and other extraction in riparian and coastal areas
- Coal Mines and Associated Infrastructure

Section C: Livestock, Agriculture, Aquaculture and Forestry Industries

- Cattle feedlots
- Piggeries
- Poultry farms
- Large Scale Irrigation in the Murray, Murrumbidgee and Darling Basin (Draft)

Section D: Transport and Energy

- Roads and related facilities
- Marinas and related facilities
- NSW Wind Energy (Draft)
- Network Electricity Systems and Related Facilities
- Railway Facilities (Draft)

Section E: Water and Waste

- Landfilling
- Composting and related facilities
- Sewerage systems
- Irrigation of sewage effluent
- Aquatic Ecology
- Aquaculture in Natural Waterbodies
- Aquaculture in Land-based Activities

Georgia Ivancevic - Port Kembla Coal Terminal

From: "Chris Lacey" <Chris.Lacey@dpc.nsw.gov.au>
To: <georgia.ivancevic@planning.nsw.gov.au>
Date: 23/01/2008 14:21
Subject: Port Kembla Coal Terminal

Dear Ms Ivancevic

Re Port Kembla Coal Terminal

I refer to your email to Mark Roberts, Illawarra Regional Coordinator, dated 9 January, requesting details of key issues and assessment requirements associated with a proposal to increase the road receival hours at the Port Kembla Coal Terminal. Mr Roberts has requested that I respond on his behalf.

I can confirm that the Department received a copy of the Preliminary Environmental Assessment (October 2007), which outlines the key issues associated with the proposal.

As you would be aware, the NSW Government has recently committed $140M to upgrade the Port of Port Kembla as part of the NSW Ports Growth Strategy, and therefore has a strong interest in ensuring the port precinct generally is operating efficiently to maximise its productive capacity for the benefit of the Illawarra and NSW economy. It would appear the current restrictions operate to limit the productive capacity of the Port and, as such, should only remain if there are strong grounds to justify them.

On the basis of the information provided, it would also appear that the circumstances which led to the introduction of road haulage restrictions on the Port Kembla Coal Terminal have changed sufficiently to warrant a prima facie re-examination of the need for, and effects of, such restrictions.

The Preliminary Environmental Assessment provides a useful overview of the main issues associated with the proposal, and I trust the key technical landuse, transport and environmental assessment requirements will be identified in detail by the responsible agencies and addressed by the applicants.

The potential noise impacts generated by the proposal, particularly in the evenings to adjacent residents along Mt Ousley Road, would warrant deliberate efforts by the applicant to consult and inform the community about the proposal and to provide opportunities for early feedback. The assessment should also take into account any effects on the likely future community that will reside in the Horizon Seaside Links aged care complex (currently under construction) at the southern end of the Wollongong Golf Course.

I trust this information is of assistance, and if you require further information please contact me on the number below.

Sincerely,
Chris Lacey
23.1.08

Chris Lacey
Assistant Regional Coordinator, Illawarra
Strategic Projects Division
Department of Premier & Cabinet

Ph. 02 42276931
Fax. 02 42249901
M. 0409 044 487

Georgia Ivancevic

From: <judith.egan@dpi.nsw.gov.au>
To: <Georgia.Ivancevic@planning.nsw.gov.au>
Date: 30/01/2008 10:18

Georgia

Department of Primary Industries-Mineral Resources have no concerns with the proposal to extend the receiving hours for the Port Kembla Coal Terminal. The Port Kembla Coal Terminal does not operate within a Mining Lease and DPI does not have a statutory responsiblity for the site. However, an increase in the amount of coal being delivered to the terminal will be reflected in the Mining Operations Plans which are a DPI requirement for all mines.

Regards

Judith Egan
Team Leader, Environment
Environmental Sustainability Branch
Southern Region (Wollongong)
Department of Primary Industries

Phone: 02 4222 8310
Mobile: 0429 082 258

WOLLONGONG CITY COUNCIL
DEVELOPMENT CONSENT

Local Government Act, 1919 (as amended)
and Illawarra Planning Scheme Ordinance

Application Number: D79/44

This is to certify that the Council of the City of Wollongong consents under Part XIIA of the Local Government Act, 1919 (as amended) to the following development

On Lot 4 Sec D.P. 578275

Port Kembla Inner Harbour

Description of development: Construction and operation of a coal loader involving reclamation and general siteworks; rail receival facility; road receival facility of 2 mtpa capacity; conveyor system and structures; coal stockyard for cargo assembly; stacking and reclamation machinery; shiploaders; berth and channel dredging; and administrative, amenities and workshop buildings, as set out in the Environmental Impact Statement (Report No. PWD 78011) and as amended by the location of the stockpiles 25 metres further south.

This consent is subject to the following conditions:

1) Rail wagons used for the transport of coal shall be kept clear of spilled coal at all times by incorporating appropriate facilities into the rail unloading station such that the wagons are cleaned each time they pass through the Port Kembla Coal Loader.

~~2) No coal in excess of 2 mtpa shall be received at the road unloading facility.~~

~~3) Coal shall be received only between the hours of 7am and 6pm Mondays to Saturdays inclusive. Coal shall not be received on Sundays or Public Holidays unless the occupier has first demonstrated that an emergency exists and has first obtained the Council's written consent for a specified time period.~~

4) The road receival hopper shall be designed with a maximum capacity of 3,000 tonnes.

5) Transfer of coal from the road receival hopper to the stockpiles shall be kept to a minimum to ensure the immediate handling of rail delievered coal.

6) Truck washing facilities shall be designed in such a way as to effectively remove all coal particles form the exterior, under-body and tyres of the vehicle and so that no vehicle may by-pass the washer.

7) Agglomerating chemical shall be applied to all coal received at the Loader.

8) No coal trucks shall be permitted within the stockpiles area and vehicle movement upon the stockpiles, apart form those required for essential maintenance, shall be prohibited.

9) All coal shall be transported within the stockpile area by means of the conveyor system except where it is necessary to do otherwise for the purpose of cleaning up the stockpile floor area and all road vehicles used during this operation are to pass through the truck washing facility before leaving the site.

10) The area between the northern end of the stockpiles and the northern boundary of the Port area shall be landscaped to the satisfaction of Council, and a landscaping plan shall be submitted prior to the commissioning of the coal loader to, and approved by Council and that, should any dispute arise between the parties, the matter be referred to the Planning and Environment Commission for determination.

11) All sand within the reclamation area shall be removed to a base level of high water mark and a quantity of sand equivalent to the volume situated between low water mark, ordinary spring tide and the above base level, shall be removed form the area behind the foredune and placed upon Coniston Beach,

12) No dredged material shall be deposited in any other area than the agreed ocean disposal site. The Department of Public Works shall negotiate with the New South Wales State Fisheries and the National Parks and Wildlife Service to determine the precise boundaries for the ocean dumping area in consultation with Council and if any dispute arises between the parties the matter shall be referred and if any dispute arises between the parties the matter shall be referred to the State Pollution Control Commission for arbitration.

13) A sampling programme shall be instituted in consultation with Council to monitor any migration of dredged material from the disposal site during the construction of the new installation and for a period of two years after the deposition of dredged material.

14) The facility shall be operated at all times in such a way as to ensure that all equipment and procedures provided for the reduction of environmental pollution shall be maintained and employed.

15) A monitoring system including dust deposit gauges and other methods as deemed appropriate by the State Pollution Control Commission shall be established for the whole installation. Measurements, analysis and/or readings shall be taken at regular intervals and at other times if found necessary and the results shall be kept on the premises for up to three years and be available to Council or its accredited representative on request.

16) Compliance with all conditions attached to any approvals granted under the Clean Air Act, 1961, the Clean Waters Act, 1970 and the Noise Control Act, 1975 for the Port Kembla Coal Loader.

~~17) Road hauled coal shall only be received at the loader from Avon, Yellow Rock and Westcliff Collieries, but in no case shall the amount exceed the 2 mtpa limitation.~~

R. J. Eggins
Town Clerk

Date 25th June, 1979

per:
Town Planner

Australian Government

Department of the Environment, Water, Heritage and the Arts

Referral of proposed action

What is a referral?

The *Environment Protection and Biodiversity Conservation Act 1999* (the EPBC Act) protects matters of national environmental significance (NES), and the environment, in relation to Commonwealth actions, and actions on (or impacting upon) Commonwealth land. The purpose of a referral is to determine whether your proposed action will need formal assessment and approval under the EPBC Act.

Your referral will be the principal basis for the Minister for the Environment, Heritage and the Arts' decision as to whether approval is necessary and, if so, the type of assessment that will be taken. These decisions are made within 20 business days.

When do I need to make a referral?

A referral must be made for actions that are likely to have a significant impact on matters protected by Part 3 of the EPBC Act:

- World Heritage (sections 12 and 15A)
- National Heritage places (sections 15B and 15C)
- Wetlands of international importance (sections 16 and 17B)
- Listed threatened species and communities (sections 18 and 18A)
- Listed migratory species (sections 20 and 20A)
- Protection of the environment from nuclear actions (sections 21 and 22A)
- Marine environment (sections 23 and 24A)
- Protection of the environment from actions involving Commonwealth land (sections 26 and 27A)
- Protection of the environment from Commonwealth actions (section 28

OR

- actions that may have a significant impact on the environment of Commonwealth land (even if taken outside Commonwealth land)
- actions taken on Commonwealth land that may have a significant impact on the environment generally
- actions by Commonwealth Authorities that are likely have a significant impact on the environment require approval.

You may still make a referral if you believe your action is not going to have a significant impact, or if you are unsure.

To help you decide whether or not your proposed action requires approval (and, therefore, if you should make a referral), read the following documents, available from the Department web site:

- the Policy Statement titled *Principle Significance Guidelines 1.1 – Matters of National Environmental Significance* . Additional sectoral guidelines are also available.
- the Policy Statement titled *Principle Significance Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies*.
- the interactive map on the web site–enter a location to obtain a report on what matters of NES may occur in that location.

A staged or component action

An action that is a component of a larger action may not be accepted separately and may require referral of the larger action for consideration under the EPBC Act. Refer to *Fact Sheet 6: Staged Developments/Split Referrals*.

If you want to make a referral for a staged or component referral, contact the EPBC Act Referrals Section (1800 803 772).

Permits

Some activities may also require a permit under other sections of the EPBC Act, whether or not approval is required. Information is available on the Department web site.

Completing the referral form

Completing this form will help ensure that you submit the information required by the EPBC Regulations.

All referrals MUST be published on the Department's web site for public comment (the Department will arrange this) and should generally be:

- readily understood by the public
- no longer than 25 A4-sized, single-sided pages
- typed (main text no smaller than 11 points)
- have clearly legible maps and diagrams
- supplied unbound or electronically.

Provide supporting documentation, such as environmental reports or surveys, as attachments. However, the referral form must contain the core information, so that it provides an adequate basis for public comment and decision-making.

Provide coloured maps, figures or photographs to help explain the project and its location. Aerial photographs, in particular, can provide a useful perspective and context. Figures should be good quality as they may be scanned and viewed electronically as black and white documents. Maps should be of a scale that clearly shows the location of the proposed action and any environmental aspects of interest.

Using the MS Word file to enter your information

You can complete your referral by entering your information into this Word file.

Instructions are provided in green text. If you do not see the instructions you need to reveal 'hidden' text. A toolbar with buttons to turn the instructions on and off should be visible when you open the file.

Normally the instruction text will not print. (If you wish to print a copy of the form with the instructions you will need to select the Options button in the Print dialog and select Hidden text.)

Submitting the referral form

By mail to

EPBC Act Referrals Section
Environment Assessment Branch
Department of the Environment,
Water, Heritage and the Arts
GPO Box 787
CANBERRA ACT 2601

By fax to 02 6274 1789

- Referrals must be of sufficiently clear quality to be scanned into electronic format.
- Address the fax to the mailing address, and clearly mark it as a 'Referral under the EPBC Act'.
- Follow up with a mailed hardcopy including copies of any attachments or supporting reports.

By email to epbc.referrals@environment.gov.au.

- Clearly mark the email as a 'Referral under the EPBC Act'.
- Attach the referral as a Microsoft Word file and, if possible, a PDF file.
- To ensure file sizes are not too large (below two megabytes), enclose maps and figures as separate files if necessary. If unsure, send a question to the email address.
- Follow up with a mailed hardcopy including copies of any attachments or supporting reports.

What happens next?

The Department will write to you at the end of the 20 business day period to advise you of the outcome of your referral and whether or not formal assessment and approval under the EPBC Act is needed. There are three types of decisions about the referral.

The proposed action is NOT LIKELY to be significant and does NOT NEED approval

No further consideration is required under the environmental assessment provisions of the EPBC Act and the action can proceed (subject to any state or local government requirements).

The proposed action is NOT LIKELY to be significant IF undertaken in specified manner

The specified manner in which you must carry out the action will be identified as part of the final decision. You must report your compliance with the specified manner to the Department.

The proposed action is LIKELY to be significant and does NEED approval

The proposed action is subject to a public assessment process before it can be considered for approval. The level of assessment will be decided at the same time. (Further information about the levels of assessment and basis for deciding the approach are available on the web site.)

If the action is likely to be significant it is called a *controlled action* and the particular matters upon which the action may have a significant impact (such as World Heritage or threatened species) are known as the *controlling provisions*.

Compliance audits

The Department may audit your project at any time to ensure that it was completed in accordance with the information provided in the referral or the stated particular manner. If the project changes, such that the degree of significance could vary, you should write to the Department to advise of the changes, and likely significance, or discuss with the EPBC Act Referrals Section (1800 803 772).

For more information

- call the Department of the Environment, Water, Heritage and the Arts Community Information Unit on 1800 803 772 or
- visit the web site www.environment.gov.au/epbc

All the information you need to make a referral, including documents referenced in this form, can be accessed from this web page.

Referral of proposed action

Project title	The continued use of existing and approved infrastructure at the Port Kembla Coal Terminal, allowing products to be received by road 24 hours a day, 7 days a week.

1 Contacts

1.1 **Referring party**

Name	Philip Paton
Title	Town Planner
Organisation	Cardno Forbes Rigby
Postal address	278 Keira Street, Wollongong, NSW 2500
Telephone	(02) 4228 4133
Email	philip.paton@cardno.com.au

1.2 **Responsible party**

Name	Peter Green
Title	General Manager
Organisation	Port Kembla Coal Terminal
Postal address	PO Box 823, Wollongong, NSW 2500
Telephone	(02) 4228 0288
Email	peter.green@pkct.com.au

1.3 **Proponent** Same as 1.2

Name

Title

Organisation

Postal address

Email

2 Summary of proposed action

NOTE: You must attach an A4 size map/plan(s) showing the location and approximate boundaries of the area in which the project is to occur. The summary below should encompass any alternative locations, timeframes or activities that are listed in Section 3.2.

2.1	**Short description** Use 2 or 3 sentences to uniquely identify the proposed action and its location.	Continued existing uses of Port Kembla Coal Terminal and delivery of product by public road 24 hours a day, seven days a week up to a maximum of 10 million tonnes per anum (mtpa). PKCT location and coal haulage routes are as identified in the attached Preliminary Environmental Assessment (PEA).
2.2	**Latitude and longitude** If area less than 5 hectares, provide the location as a single pair of latitude and longitude references. If area greater than 5 hectares, provide bounding location points. Do not use AMG coordinates.	(see table below)

	Latitude			Longitude		
location point	degrees	minutes	seconds	degrees	minutes	seconds
Administration building	-34	27	11	150	53	52

2.3	**Locality** Provide a brief physical description of the project location (proximity to major towns etc).	PKCT is located approximately 3.5km south of Wollongong city centre. Refer to Section 1 of the PEA.	
2.4	**Size of the development footprint or work area (hectares)**	No physical development is proposed.	
2.5	**Street address of the site**	PKCT, Port Kembla Road, Inner Harbour, Wollongong, NSW 2500.	
2.6	**Lot description** Describe the lot numbers and title description, if known.	Lot 2005 DP 1030233	
2.7	**Local Government Area and Council contact (if known)**	Wollongong City Council. There is no Council contact as the proposal will be determined by DoP under Part 3A of the EP&A Act 1979. Howard Reed is the DoP contact – (02) 9228 6308.	
2.8	**Project life** Specify the estimated start date of construction/operation and the operational life of the project.	No construction is proposed. The commencement of 24 hour deliveries via public road is likely to commence immediately following approval. It is expected that road deliveries will take 10 years to reach 10mtpa.	
2.9	**Alternatives** Does the proposed action include alternatives?	☐	No
		☐	
2.10	**State assessment** Is the action subject to a state or territory environmental impact assessment?	☐	
		☐	Yes, complete Section 3.5
2.11	**Component of larger action** Is the proposed action a component of a larger action?	☐	No
		☐	

3 Detailed project description

NOTE: The proposal described here is the action(s) on which ALL subsequent decisions under the EPBC Act will be made, including decisions on significance, level of assessment (if needed) and approval (if needed). It is therefore important that the description is complete and includes all components and activities associated with the action, as well as any specific alternatives to be assessed. If certain related components are not intended to be included within the scope of the referral, this should be clearly explained in Section 3.6.

3.1 Description of proposal

You *must* provide a description of all the activities you propose to carry out as part of your action. This should be a detailed description outlining all aspects of the proposal and referencing figures, as appropriate.

Port Kembla Coal Terminal (PKCT) is the major coal intermodal facility in southern NSW for the transfer of coal from rail and road to ship. The terminal is responsible for receiving, assembling and loading coal from the Southern and Western New South Wales coal fields, which is to be transported by ship to international and domestic markets. PKCT has two bulk handling facilities; a high capacity Coal Berth that handles the loading of coal, and a Bulk Products Berth that loads and unloads a range of bulk products.

PKCT is serviced by extensive road and rail infrastructure. Currently, PKCT receives and transfers to ship approximately 11.7 million tonnes of coal per annum, with approximately 43% delivered by road and the remaining 57% by rail. All of the coal received is loaded onto ships with 93% destined for export and 7% for the domestic market.

The Port is a key link in the coal supply chain for the Illawarra and Lithgow areas. PKCT is seeking to have the restriction under State Environmental Planning Policy (Infrastructure) 2007 associated with public road deliveries removed, to allow the Coal Terminal to receive freight by public road at all existing operational times, and in line with other operations in the Port Kembla Port Corporation precinct.

Approval is being sought for PKCT to receive product by public road 24 hours a day, 7 days a week up to a maximum amount of 10 million tonnes per annum.

NSW Department of Planning (DoP) has advised that the application under Part 3A NSW Environmental Planning & Assessment Act 1979 for the activity described in 3.1 above should include an assessment of impacts from all PKCT current activities. The approval of the Part 3A application will constitute a ‘contemporary’ development consent for the ongoing operation of PKCT.

The Preliminary Environmental Assessment for this project provides further information and is attached to this submission.

3.2 Alternative locations, time frames or activities that form part of the referred action

Describe any alternatives related to the physical location of the action, time-frames within which the action is to be taken and alternative methods or activities for achieving the action. Please note, if the action that you propose to take is determined to be a controlled action, any alternative locations, timeframes or activities that are identified here will be subject to environmental assessment and a decision on whether to approve the alternative.

None.

3.3 Previously considered alternatives and the ‘do nothing’ case

Describe any previously considered alternatives and the reasons why referred action is preferred (e.g. projects affecting heritage values of the built environment where several alternatives may have been considered). Briefly describe the consequences of the ‘do nothing’ alternative, if relevant.

There are no alternatives to the proposal given it is an existing operation. PKCT has no short term plans to extend its operations or to make substantial changes to its existing infrastructure.

There is no opportunity to develop a rail line and associated loading facilities at West Cliff, and NRE No.1 Collieries. These mines are limited to road haulage by a combination of terrain, land constraints and economic viability issues.

PKCT is ultimately a service provider to the coal industry and is therefore subject to external market influences. Coal that is received by rail from the Lithgow coalfields is predominantly thermal coal, which is exported for use in energy production. The three key mines that deliver coal by road to PKCT predominantly supply coking coal, which is used in steel production. As the thermal and coking coal are destined for different markets, it is imperative to have an intermodal facility, which allows both markets to be flexibly serviced.

Significant potential economic benefit may be lost to the region and NSW, should PKCT constrain the export of coal from the region. These would be far-reaching, in terms of potential jobs and revenue extending from PKCT to the mining industry and Port Kembla Port Corporation, as well as to the State Government in terms of coal production royalties and payroll tax.

3.4 Context, planning framework and state/local government requirements

You *must* explain the context in which the action is proposed, including any relevant planning framework at the state and/or local government level (e.g. within scope of a management plan, planning initiative or policy framework). Describe any Australian Government or state legislation or policies under which approvals are required or will be considered against.

The proposal to permit 24/7 road deliveries to PKCT are viewed as State level in context. This is due to the importance of coal mining and exports to NSW. DoP has also confirmed this proposal is a 'Major Project' under SEPP Major Projects 2005 via notification in the NSW Government Gazette dated 21 December 2007. This development will be assessed under Part 3A of the NSW Environmental Planning and Assessment Act 1979. DoP are the consent authority.

The DoP have issued the Director General Requirements (DGR) for this project dated 20 February 2008. The Environmental Assessment is yet to be submitted to DoP and the statutory consultation period has not commenced.

The Gazettal and DGR are attached to this submission.

3.5 Environmental impact assessments under Commonwealth, state or territory legislation

Describe any environmental assessment of the relevant impacts of the project that has been, is being, or will be carried out under state or territory legislation prior to this referral. Specify the type and nature of the assessment, the relevant legislation and the current status of any assessments or approvals.
You *must* describe or summarise any public consultation undertaken, or to be undertaken, during the assessment. Attach copies of relevant assessment documentation and outcomes of public consultations (if available).

An Environmental Assessment under Part 3A of the NSW Environmental Planning & Assessment Act 1979 is being prepared. This includes assessment of:

- Road safety and traffic congestion due to increased coal truck movements
- Air quality due to escape of dust from PKCT operations
- Noise impacts from coal truck movements and PKCT on site operations
- Impact on climate change due to green house gas emissions from PKCT operations and involvement in the coal industry
- Waste production due to PKCT activities
- Stormwater and surface water management and cleaning prior to release into natural water courses.

DoP have given permission for a 24/7 trial delivery of coal by road to be undertaken to allow expected impacts to be assessed. This trial is operational between 3 March and 14 April 2008. During this time the Illawarra Regional Information Service is conducting telephone surveys of approximately 300 households which are located in proximity to the roads used by coal trucks travelling to PKCT.

PKCT will also advertise the Part 3A application in a local newspaper and on their web site. Letters advising of the Part 3A application will be sent to over 1000 residential properties by PKCT. If this consultation process demonstrates a public interest PKCT will consider meeting with community representatives. The results from this consultation will be detailed within the Environmental Assessment prior to submission to DoP.

Once the Environmental Assessment is submitted to DoP a statutory consultation will be undertaken and managed by DoP allowing further time for community consultation.

3.6 A staged development or component of a larger project

This project relates directly to PKCT operations only.

You *must* provide information about the larger action and details of any interdependency between the stages/components and the larger action. You may also provide justification as to why you believe it is reasonable for the referred action to be considered separately from the larger proposal (e.g. the referred action is 'stand-alone' and viable in its own right, there are separate responsibilities for component actions or approvals have been split in a similar way at the state or local government levels).

4 Affected environment

NOTE: You must attach a map(s)/plan(s) clearly showing the location of the action in relation to any matters of national environmental significance

Describe the affected area, emphasising the relevant matters protected by the EPBC Act. Your maps and plans should specify the location and boundaries of the project area, and where relevant the affected area in respect to any:

- World Heritage properties
- National Heritage places
- Ramsar wetlands
- listed threatened species or communities and/or known habitat for these species or communities
- listed migratory species and/or known habitat for these species
- Commonwealth Heritage Places
- places on the Register of the National Estate or other environmental features (eg conservation reserves/parks and areas of remnant native vegetation).

If the action will affect Commonwealth land or is being undertaken by a Commonwealth agency, also describe the more general environment. The Policy Statement titled *Principle Significance Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* provides further details on the type of information needed.

4.1 Matters of national environmental significance

4.1 (a) World Heritage Properties

Confirmation from the Department of the Environment, Water, Heritage and the Arts is requested regarding the requirement for permission under the EPBC Act for the PKCT project based on a potential impact on the Great Barrier Reef due to a possible increase in ocean temperature from climate change brought about by green house gas (GHG) emissions from the PKCT involvement in the emission of GHG from the coal industry.

4.1 (b) National Heritage Places

Not known to be applicable to the PKCT project.

4.1 (c) Wetlands of International Significance (Ramsar)

Not known to be applicable to the PKCT project.

4.1 (d) Listed threatened species and ecological communities

Not known to be applicable to the PKCT project.

4.1 (e) Listed migratory species

Not known to be applicable to the PKCT project.

4.1 (f) Nuclear actions

Not known to be applicable to the PKCT project.

4.1 (g) Commonwealth marine areas

Confirmation from the Department of the Environment, Water, Heritage and the Arts is requested regarding the requirement for permission under the EPBC Act for the PKCT project based on a potential impact on a commonwealth marine area due to a possible increase in ocean temperature from climate change brought about by green house gas (GHG) emissions from the PKCT involvement in the emission of GHG from the coal industry.

4.2 Important or unique aspects of the environment, if relevant

4.2 (a) Soil and vegetation characteristics

The soil and vegetation at the PKCT site and adjoining areas has been highly disturbed over many decades of industrial land uses. Impacts to soil or vegetation from off site activities related to PKCT will have no impact on soil or vegetation as deliveries to PKCT take place along established transportation corridors. There are no important or unique aspects impacted by the onsite or off site operations related to PKCT.

4.2 (b) Water flows, including rivers, creeks and impoundments

PKCT hold Environmental Protection Licence (EPL) 1625. An aspect of this is the cleaning and monitoring of surface water discharge. PKCT comply with the requirements of this EPL. There will be no alteration to the control cleaning or monitoring of onsite surface water due to this proposal. There are no natural water flows, rivers or creeks across the PKCT property. Off site activities associated with PKCT are related to the transportation of coal. These deliveries will not impact on water flows.

4.2 (c) Outstanding natural features, including caves

There are no natural features effected by on site PKCT operations or the delivery of coal.

4.2 (d) Gradient

This PKCT project will not have any impact on gradient.

4.2 (e) Buildings or other infrastructure

There are no buildings affected by the ongoing operations of PKCT or the increase in road delivery of coal or approval to deliver 24/7.

4.2 (f) Marine areas

PKCT is located adjacent to the coast. The location is highly disturbed due to the creation and maintenance of the harbour area. There are no known important or unique marine areas close to PKCT.

4.2 (g) Kinds of fauna

Due to the highly disturbed and industrialised nature of the PKCT site and adjoining land and marine areas there are not any important or unique fauna species which are, or will be, affected by the PKCT Project. Off site PKCT activities relate to the delivery of coal. Trucks and trains use existing routes which are not proposed to be altered by this proposal. There are not considered to be any impacts on important or unique fauna from this proposal.

4.2 (h) Current state of the environment

Include information about the extent of erosion, whether the area is infested with weeds or feral animals and whether the area is covered by native vegetation or crops

There are not any current important or unique matters relating to the state of the environment in relation to the PKCT project. There is no erosion, weeds or feral animals on the PKCT site. There is no native vegetation on the PKCT site.

4.2 (i) Commonwealth Heritage Places and places on the Register of the National Estate

There are no heritage places or properties impacted by continued onsite or off site PKCT related operations.
You must include details of any Commonwealth Heritage Places and places on the Register of the National Estate if the proposed action is by a Commonwealth agency or may affect Commonwealth land.

4.2 (j) Known Indigenous heritage values

You must include details of Indigenous values if the proposed action is by a Commonwealth agency or may affect Commonwealth land.

PKCT on site or off site related activities have no impact on indigenous heritage values. The action is not proposed by a Commonwealth agency and will not affect Commonwealth land.

4.2 (k) Other important or unique values of the environment

None in relation to the PKCT proposal.
Describe any other key features of the environment affected by, or in proximity to the proposed action (for example, any national parks, conservation reserves, wetlands of national significance etc).

4.2 (l) Tenure of the action area (eg freehold, leasehold)

The PKCT premises are located on land owned by the Port Kembla Port Corporation. PKCT are a tenant.

4.2 (m) Existing land uses

PKCT is an intermodal receival and dispatch company. Products (of which the vast majority is coal) are delivered by road or rail to nominated areas within the PKCT leased site. The product is transported within the PKCT site primarily by conveyor belt to outdoor storage areas. When a ship is in port the product is loaded onto the ship for transportation to different locations around Australia and the southern hemisphere.

4.2 (n) Proposed land uses

This proposal does not propose to alter the existing land use. It is only proposed to increase the permitted delivery hours and annual permitted limits of coal via road transportation.

5 Nature and extent of likely impacts

5.1 Likely impacts on matters of national environmental significance (NES)

Your assessment of impacts should refer to the following resources (available from the Department's web site):

- specific values of individual World Heritage properties, National Heritage places and the ecological character of Ramsar wetlands;
- databases at the website enable identification of the potential presence of listed species. In some cases, profiles of relevant species will be available that will assist in the identification of significance;
- *Principle Significance Guidelines 1.1 – Matters of National Environmental Significance*; and
- associated sectoral and species guidelines available on the web site, as relevant.

Note that even if your action will not be taken in a World Heritage area or a Ramsar site it could still impact upon these areas (for example, through downstream impacts).

5.1 (a) Likely impact on the world heritage values of a declared World Heritage property

It is suggested that green house gas emissions could impact climate change resulting in an increase in the temperature of oceans. This temperature increase could detrimentally affect the Great Barrier Reef.

The coal industry, including mining, transportation and burning, contributes to GHG emissions. PKCT are a part of this industry and whilst their individual emissions are very low DoPs requirement to assess impacts from existing and ongoing PKCT operations is considered to warrant a referral relating to the EPBC Act.

On a comparative basis, the total GHG emissions associated with the PKCT project represent a very small proportion of annual global GHG emissions and the project is not expected to make a significant contribution to global warming/climate change.

The consideration of the referral with regard to GHG impacts should be balanced with consideration to:

- the project's contribution to global warming/climate change
- whether refusing the project application would reduce global GHG emissions
- the need for the project
- the benefits of the project, including job creation and its contribution to the NSW economy
- available GHG impact mitigation measures.

There is a definite need for the continued operation and increased throughput at PKCT. Without this facility, and the proposed increase, coal mined in the Southern NSW Coalfields would have to be transported to Kooragang Coal Terminal in Newcastle. This distance of travel would significantly increase GHG emissions related to the transportation of coal. Further it is questionable if Kooragang has the capacity for such an increased throughput which would result in NSW not being able to meet customers export demands. This would have flow on detrimental impacts on the economy and employment in NSW and particularly the Illawarra region.

The benefits of continued operation of PKCT to local business and employees, State resources and Federal tax income far out weighs the very small impact from PKCT on global GHG emissions. If the continued operation or increased throughput of PKCT is refused it is unlikely to result in any reduction in global GHG emissions, as the gap in through put would almost certainly be filled by another intermodal facility and the coal would still be used.

As part of the Part 3A application PKCT will investigate measures to ensure GHG emissions are minimised and, if possible, reduced.

5.1 (b) Likely impact on the heritage values of a listed National Heritage place

None.

5.1 (c) Likely impact on the ecological character of a declared Ramsar wetland

None.

5.1 (d) Likely impact on the members of a listed threatened species or ecological community, or their habitat

None.

5.1 (e) Likely impact on the members of a listed migratory species or their habitat

None.

5.1 (f) Likely impact on the environment in part of the Commonwealth marine area

It is possible that increased ocean or sea temperatures due to climate change may impact a Commonwealth marine area.

Referral assessment for the same reason as in 5.1(a) is considered relevant.

5.2 Likely impacts for nuclear actions, actions affecting Commonwealth land or actions taken by the Commonwealth

None.

You must describe the nature and extent of likely impacts on the whole environment if your project:
- is a nuclear action,
- will be taken by the Commonwealth or a Commonwealth agency, or
- will affect Commonwealth land.

Your assessment of impacts should refer to the *Principle Significance Guidelines 1.2 - Actions on, or impacting upon, Commonwealth land, and actions by Commonwealth agencies* and specifically address impacts on:
- ecosystems and their constituent parts, including people and communities;
- natural and physical resources;
- the qualities and characteristics of locations, places and areas;
- the heritage values of places; and
- the social, economic and cultural aspects of the above things.

Your referral must identify potential impacts on values recognised in any relevant Commonwealth Heritage Place or a place listed on the Register of the National Estate if this section is applicable. Information on the values of these places is available at the Department's web site through the Heritage Database page.

Where indigenous stakeholders are likely to be affected by your proposed action, your referral should describe any consultations undertaken with indigenous stakeholders. Identify the relevant stakeholders and the status of consultations at the time of the referral. Consultation with indigenous stakeholders should start as early as possible in the life-cycle of the project where such interests are likely to occur or will be affected.

6 Measures to avoid or reduce impacts

GHG emissions directly from PKCT operations are very small. This is because the only diesel powered machinery on site at PKCT is 5 front end loaders and 1 bobcat. All other machinery at PKCT is powered by electricity. There will be very small GHG emissions related to the spontaneous combustion of coal stored on site at PKCT.

GHG emissions associated with offsite activities related to PKCT will be:

- Diesel truck and train engines delivering product to PKCT
- Electricity generation to operate PKCT machinery
- Ship engines taking coal away from PKCT.

There are GHG emissions from the coal industry which are ‘upstream’ and ‘downstream’ of PKCT. These are related to the extraction of coal and the burning of coal.

The calculated PKCT GHG emissions are as follows:

Operations	Scope 1 Emissions (tonnes CO2-e / yr)	Scope 2 Emissions (tonnes CO2-e / yr)	Scope 3 Emissions (tonnes CO2-e / yr)
Existing Operations	41,290	18,690	105,133,697
Existing Operations + 24/7 Road Deliveries	58,158	22,428	148,039,015

The Scope 3 emissions are high because these related to the burning of the coal for energy production at locations away from PKCT and completely outside of PKCT control. It is arguable if the Scope 3 emissions have any direct relevance to the activities at, or related to, PKCT premises.

It is Scope 1 & Scope 2 emissions which are directly influenced by PKCT existing operations and the proposed 24 hours 7 days per week road delivery proposal. A comparison of the PKCT Scope 1 & Scope 2 emissions for existing operations and 24/7 road deliveries and Australian and world GHG emissions is provided below.

	World CO2 Emissions	Australian CO2 Emissions	PKCT CO2 Emissions (Scope 1 & 2)
Actual Amount (tonnes CO2-e / yr)	41,825,000,000	560,000,000	80,586
Percent of World CO2 Emissions	100%	1.34%	0.0000019%

As GHG emissions directly from PKCT are so minimal there is little PKCT can do to reduce the impacts. The diesel powered machinery is used within the Bulk Products Berth (BPB) which has significantly lower throughput than the Coal Berth. So whilst the diesel powered machinery is required it does not have a high level of use. Furthermore the low level of use of the BPB does not provide economic viability or operational requirement for the installation of conveyor belts.

PKCT has reviewed the opportunity to reduce GHG emissions associated with offsite activities related to their operations. Coal is transported to PKCT by rail where possible as this is seen to have less GHG emissions than road transport. The only collieries which deliver to PKCT by road do not, and for a variety of reasons can not, have access to rail infrastructure. The option of powering coal trucks by other sources to diesel or petrol has been reviewed. The only possible alternative was biofuels. Such fuels are not supported by the truck manufacturer and as such will not be implemented by the haulage companies.

PKCT has no influence over GHG emissions from power stations, the mining companies or the burning of coal.

The Minister for the Environment, Heritage and the Arts may decide that a proposed action is not a controlled action if the action will be undertaken in a specified manner that will ensure that any potential significant impacts are avoided or reduced by mitigation measures to the extent that they will not be significant (Subsection 77A(1) of the EPBC Act).

To be considered, any such measures must:
- clearly form part of the referral (eg be identified in the referral form and fall within the responsibility of the person proposing to take the action),
- be concrete and prescriptive, and
- be clearly effective in avoiding or mitigating significant impacts.

Examples of relevant measures to avoid or reduce impacts may include the timing of works to avoid critical periods for listed species, avoidance of habitat important for listed species from direct and indirect impacts, application of specific design measures to avoid or reduce impacts, or adoption of specific work practices to reduce or avoid impacts.

More general commitments (eg preparation of management plans or monitoring) and measures aimed at providing environmental offsets, compensation or off-site benefits CANNOT be taken into account in making a decision on significance (but are relevant at the assessment and approval stages if your project proceeds to these stages).

Refer to the Guideline on Application of 'Particular Manner' in Decision-making under the EPBC Act available at the Department's web site.
For any measures intended to avoid or mitigate significant impacts matters protected under the EPBC Act, specify:
- what the measure is
- how the measure is expected to be effective
- the timeframe or workplan for the measure.

7 Conclusion on the likelihood of significant impacts

NOTE: Under the EPBC Act, you must identify in the referral whether or not you believe significant impacts on the matters protected under the Act are likely. If you identify that significant impacts are likely, you must identify the relevant protected matters in section 7.2.

Do you THINK your proposed action is likely to have significant impacts?

X	No, complete section 7.1
	Yes, complete Section 7.2

7.1 Proposed action is NOT LIKELY to have significant impacts

Specify the key reasons why you think the proposed action is NOT LIKELY to have significant impacts.

Key reasons

The contribution of Port Kembla Coal Terminal to GHG emissions associated with the coal industry is very minor as PKCT is only involved by linking land based transport modes to ship transportation. Furthermore PKCT operations directly emit very small amounts of GHG due the vast majority of the machinery being powered by electricity rather than diesel.

Impacts on World Heritage or Commonwealth marine areas directly from PKCT will be so small as to be impossible to calculate. There is also nothing PKCT can directly do to reduce GHG emissions from the entirety of the coal industry.

7.2 Proposed action is LIKELY to have significant impacts

Type 'x' in the box for the matter(s) of the EPBC Act that are impacted

	Matters likely to be impacted
	sections 12 and 15A (World Heritage)
	sections 15B and 15C (National Heritage places)
	sections 16 and 17B (Wetlands of international importance)
	sections 18 and 18A (Listed threatened species and communities)
	sections 20 and 20A (Listed migratory species)
	sections 21 and 22A (Protection of the environment from nuclear actions)
	sections 23 and 24A (Marine environment)
	sections 26 and 27A (Protection of the environment from actions involving Commonwealth land)
	section 28 (Protection of the environment from Commonwealth actions)

Specify the key reasons why you think the proposed action is LIKELY to have significant impacts.

Key reasons

8 Assessment approach under the EPBC Act

NOTE: If a decision is made that a proposal needs approval under the Act, the Minister will also decide the assessment approach needed to satisfy the objectives of the Act. While the information you have provided in this referral will be taken into account in making this decision, the final decision rests with the Minister.

Type 'x' in the box for the level of assessment you think is appropriate

	Level of assessment
X	Bilateral Agreement applies
	Accredited assessment
	Assessment on referral information
	Preliminary information
	Public Environment Report
	Environmental Impact Statement
	Commission of Inquiry
	No comment/Not sure

Specify any reasons or views that you have that may be relevant to the decision about the appropriate level of assessment.

Key reasons

The PKCT proposal is being assessed under Part 3A of the NSW EP&A Act 1979. A bilateral agreement exists to allow The Department of the Environment, Water, Heritage and the Arts to assess the proposal under the EPBC Act based on the Part 3A application. The Part 3A application has not yet been formally advertised by DoP. If EPBC assessment is required the proposal can be advertised as progressing under the Bilateral Agreement.

9 Environmental history of the responsible party

NOTE: The EPBC Act Regulations provide for the environmental history of the party proposing to take the action to be taken into account when deciding the assessment approach for actions that need approval under the Act.

		Yes	No
9.1	Does the party taking the action have a satisfactory record of responsible environmental management. • If Yes, provide details Please refer to the enclosed previous three years of annual reports in relation to compliance with the PKCT Environmental Protection Licence. This shows PKCT are responsible environmental managers as environmental impacts are identified, reported and resolved.	**X**	
9.2	Is the party taking the action subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources? • If Yes, provide details		**X**
9.3	For an action for which a person has applied for a permit under the EPBC Act, is the person making the application subject to any proceedings under a Commonwealth, State or Territory law for the protection of the environment or the conservation and sustainable use of natural resources? • If Yes, provide details		**X**
9.4	If the party taking the action is a corporation, will the action be taken in accordance with the corporation's environmental policy and planning framework? • If Yes, provide details of environmental policy and planning framework PKCT may be a corporation. Their environmental policy is attached.	**X**	

10 Information sources and attachments

10.1 References

- List the references used in preparing the referral.
- Highlight documents that are available to the public, including web references if relevant.

10.2 Reliability of information

For information in sections 4 and 5 specify:

- source of the information
- how recent the information is
- how the reliability of the information was tested and
- any uncertainties in the information.

The information provide has been prepared by Cardno Forbes Rigby (CFR) who are the PKCT lead consultant and Project Manager in relation to the Part 3A application regarding proposed increased road deliveries and approval for ongoing operations. This referral has become relevant due to work relating to this Part 3A application and is based on information obtained as part of this project.

CFR work very closely with PKCT and BHP Billiton Illawarra Coal to ensure information is up to date and correct. Information provided in this referral application is therefore very reliable.

10.3 Attachments

Type 'x' in the box for the documents you have attached.

You must attach	figures, maps or aerial photographs showing the project locality (section 2)	**X**
	figures, maps or aerial photographs showing the location of the project in respect to any matters of national environmental significance or important features of the environments (section 4)	**X**
If relevant, attach	copies of any state or local government approvals and consent conditions (section 3.4)	**X**
	copies of any completed assessments to meet state or local government approvals and outcomes of public consultations, if available (section 3.5)	**N/A**
	copies of any flora and fauna investigations and surveys (section 4)	**N/A**
	technical reports relevant to the assessment of impacts on protected matters and that support the arguments and conclusions in the referral (section 4 and 5)	**N/A**
	report(s) on any public consultations undertaken, including with Indigenous Stakeholders (section 4)	**N/A**

11 Signatures and declarations

NOTE: Providing false or misleading information is an offence punishable on conviction by imprisonment and fine (Section 489, EPBC Act).

	Project title	The continued use of existing and approved infrastructure at the Port Kembla Coal Terminal, allowing products to be received by road 24 hours a day, 7 days a week.
11.1	**Party who prepared the referral**	I declare that the information contained in this form is, to my knowledge, true and not misleading. I request that the person named in 11.3 below (if any) be designated as the proponent for the action.
	Signature	
	Date	24th April 2008
	Full name	Philip Paton
11.2	**Party who is responsible for action**	I declare that the information contained in this form is, to my knowledge, true and not misleading.
	Signature	
	Date	24 April 2008.
	Full name	Peter Green
11.3	**Proponent (complete only if different from 11.2)**	I, being the person nominated in Section 1.3 of this referral form as the nominated proponent (or agent acting on behalf of), agree to be designated as the proponent for the action described above if it is decided that the action requires approval under Part 9 of the EPBC Act.
	Signature	
	Date	
	Full Name	

If the referring party is a small business (fewer than 20 employees), estimate the time, in hours and minutes, to complete this form (include your time reading the instructions, working on the questions and obtaining the information and time spent by all employees in collecting and providing this information).

Hours	Minutes

Australian Government

Department of the Environment, Water, Heritage and the Arts

Mr Peter Green
General Manager
Port Kembla Coal Terminal
PO Box 823
WOLLONGONG NSW 2500

Date
2 June 2008

EPBC Ref
2008/4206

EPBC project officer
Rochelle Basham
02 6274 1874
rochelle.basham@environment.gov.au

Dear Mr Green

Request for additional information
Port Kembla Coal Terminal increase in public road use

Thank you for submitting a referral under the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act) concerning the above proposed action.

In light of the recent observation of the Green and Golden Bell Frog onsite (as notified by Mr James Anderson on 2 June 2008), we require further information from you to allow us to consider all the relevant issues. Accordingly, we are requesting the provision of the information specified below, pursuant to s.76 of the EPBC Act. Our main concern is the potential impact of the project on the Green and Golden Bell Frog, which is listed as vulnerable under the EPBC Act.

In order for us to consider all relevant issues, we ask that you please provide further information as follows:

- Details of the Green and Golden Bell Frog population onsite, including the location of the sightings, estimated population size, and potential habitat within the site;
- Potential impacts to the species as a result of the proposed action; and
- Any mitigation measures you are proposing to reduce the potential impacts on the species.

In any correspondence with the Department please quote the title of the action and EPBC reference, as shown on the beginning of this letter. You can send information to us:

by letter SE QLD/NSW Assessment Section
Environment Assessment Branch
Department of the Environment, Water, Heritage and the Arts
GPO Box 787
CANBERRA ACT 2601

by email rochelle.basham@environment.gov.au

by fax 02 6274 1789

We would appreciate your response as soon as possible. Please note that the timing for us to make a decision on your referral stops on the date of this letter, and restarts once we have received satisfactory information.

We will let you know whether or not approval is needed under the EPBC Act as soon as a decision is taken.

If you have any questions about the process please contact the EPBC project officer and quote the EPBC reference number shown at the beginning of this letter.

Yours sincerely

Cathy Skippington
Assistant Secretary
Environment Assessment Branch

CC:
Mr Philip Paton
Mr James Anderson

ABN 72 003 942 774
Port Kembla Road, Inner Harbour, Wollongong NSW
PO Box 823, WOLLONGONG NSW 2520 Australia
Tel +61 2 4228 0288   Fax +61 2 4228 7605

17 June 2008

SE QLD/ NSW Assessment Section
Environmental Assessment Branch
Department of the Environment, Water Heritage and the Arts
GPO Box 787
CANBERRA ACT 2601

Attn: Rochelle Basham

Dear Ms Basham

RE: Request for additional information
Port Kembla Coal Terminal increase in Public Road Use
EPBC Reference: 2008/ 4206

In response to your request for further information regarding the Green and Golden Bell Frogs discovered at Port Kembla Coal Terminal, the following information is provided for your reference. Since the initial sighting of the Frogs, Biosphere Environmental Consultants have been engaged to provide expert advice on study and management of the frogs.

An Interim Plan of Management has been prepared for the frogs during the winter period, where the species are generally inactive and difficult to comprehensively study. This plan of management is enclosed for your review and covers the information requested in your letter dated 2nd June 2008. Several interim controls with regards to management of the frogs have been recommended by Biosphere Environmental Consultants and endorsed by PKCT.

Biosphere Environs have concluded that the proposed actions associated with the EPBC referral will not adversely impact Green and Golden Bell Frogs at north Port Kembla, subject to mitigation measures being implemented. The implementation of these mitigation measures has commenced and is expected to be completed in the coming weeks.

Should you have any queries please do not hesitate to contact Debra Murphy on 02 4221 1826.

Yours sincerely

Peter Green
General Manager

Australian Government

Department of the Environment, Water, Heritage and the Arts

Notification of
REFERRAL DECISION – not controlled action

Port Kembla Coal Terminal increase in public road use, Wollongong NSW
(EPBC Reference 2008/4206)

This decision is made under Section 75 of the *Environment Protection and Biodiversity Conservation Act 1999* (EPBC Act).

Proposed action

person named in the referral	Port Kembla Coal Terminal
proposed action	To increase the transport of product to the Port Kembla Coal Terminal using existing public road infrastructure, as described in the referral documentation submitted under the EPBC Act on 9 May 2008 and in additional information received on 18 June and 2 July 2008.

Referral decision: Not a controlled action

status of proposed action	The proposed action is not a controlled action.

Person authorised to make decision

Name and position	Cathy Skippington Assistant Secretary Environment Assessment Branch
signature	C Skippington
date of decision	7-7-08

Biosphere Environmental Consultants Pty Ltd
Dr. Arthur White - ph & fax: (02) 9599 1161

Mail Address: 69 Bestic St. Rockdale NSW 2216 A.C.N. 065 241 732
e-mail :awh41103@bigpond.net.au A.B.N. 32 065 241 732

INTERIM

PLAN of MANAGEMENT

GREEN and GOLDEN BELL FROGS

PORT KEMBLA COAL TERMINAL

JUNE 2008

Introduction

Green and Golden Bell Frogs *Litoria aurea* was once abundant along the eastern coast of New South Wales but has undergone a significant decline here and elsewhere over the past forty years (White and Pyke 1996). It is now considered 'endangered' in New South Wales and is specifically protected under the NSW *Threatened Species Conservation Ac*t 1995 and the Commonwealths *Environmental Protection and Biodiversity Conservation Act* 1999. Several population of Green and Golden Bell frog remain in the Illawarra area and some of these are centred around Port Kembla. Many of the areas of habitation at Port Kembla are used or disused industrial sites.

On the 21st of May 2008, workers at the Port Kembla Coal Terminal uncovered fifteen Green and Golden Bell frogs while moving discarded equipment in an outdoor storage area (referred to as the “Spares Area”). Management of the terminal were informed of this discovery and Mr

Chris Wade, local frog authority, was asked to confirm the identity of the frogs. He quickly confirmed that the frogs were Green and Golden Bell frogs and informed the terminal staff of the protected status of these frogs. Port Kembla Coal Terminal quickly notified the Department of Environment and Climate Change (DECC) and the Port Kembla Port Authority of the discovery.

In early June, Port Kembla Coal Terminal engaged Biosphere Environmental Consultants Pty Ltd to assess the finding of the frogs and to advise of the short-term and long-term actions for the company. The current report has been developed to cover the immediate conservation needs of the frogs on site and to establish the protocols for the long-term assessment and management of these frogs.

Biology of the Green and Golden Bell Frog

The Green and Golden Bell Frog is an aquatic breeding species that generally requires a water body that is shallow (i.e. <1m deep), still or moving slowly (e.g. ponds), unshaded and free of fish, has an area of open water (ie., free of floating and/or emergent vegetation), and contains water that has low salinity (i.e. <8 ppt) and is warm (i.e. >20^0 C) during the spring/summer breeding season. In addition, this species breeds opportunistically and responds to certain types of habitat disturbance that trigger movement and breeding. This disturbance, which may include changes in water depth, salinity or amounts of aquatic vegetation, can be naturally or artificially induced. The Green and Golden Bell Frog forages mostly on the ground or on low vegetation, utilising areas with either little vegetation or sparse tree cover (Pyke and White 2001).

During the day they may shelter from predators or inclement conditions, under water, in or under thick low vegetation, and under rocks fallen timber, or various kinds of human-created debris. During prolonged dry or cold periods, they seek more permanent shelter habitat, such as large rocks or rock piles, timber stacks or other large ground cover items.

The Bell Frogs found at the Coal Terminal were apparently seeking over-winter shelter sites when they were found. Their presence in the Coal terminal area during the colder months of the year does not necessarily mean that these frogs also feed and breed on the site; they may have dispersed onto the site from surrounding properties.

In order to protect and enhance populations of the Green and Golden Bell Frog in the short and long-terms, it is necessary to manage breeding, foraging, and shelter habitats. Considering the nature of the discovery of these frogs, it is likely that adjoining landholders will also be involved in the development and enaction of the long-term management of these frogs.

Frogs Found on the Coal Terminal Site

The immediate problem for staff working on the Coal terminal Site is the presence of an endangered species on a site where there is constant movement of heavy machinery and trucks. There is a real risk that Bell Frogs could be inadvertently injured or killed during the operation of the site. To minimize these risks, the following steps are recommended:

1. A periodic survey of the Spares Area be undertaken by a qualified herpetologist and that any sheltering Bell Frogs found be captured and held in a DECC approved area.

2. The collection of frogs from the Spares Area could be facilitated by placing “shelter boards” around the site. Shelter boards are light pieces of timber (approximately 60 cm x 60 cm) that are laid on the ground; on end is slightly raised (by placing a small rock or item under the lip of the board). Bell fFogs seeking shelter may use these boards and hence will be easily captured during subsequent surveys.

3. Warning signs need to erected at the entrance and exit of the Spares Area alerting staff that an endangered species has been found in this area and to exercise caution. In addition, the notice should also indicate who to contact should Bell Frogs be found there or elsewhere on site.

4. The collected Bell Frogs will need to housed over-winter in portable containers and looked after by a qualified person.

5. The captured Bell Frogs will need to be examined for evidence of disease or injury and treated accordingly.

6. The Bell Frogs will needs to measured, sexed and implanted with a microchip before eventual release.

Road and Rail Receival Loop

Port Kembla Coal terminal currently has application before the Dept. of Planning for the upgrading of a road and rail loop. These structures are in place and have been under use. The new proposal is to allow for continuous (24 hour) traffic use of these movement lanes. With the discovery of Green and Golden Bell Frogs nearby, the application must now also demonstrate that it will not constitute a hazard to the frogs, and if so, develop measures to mitigate any potential threat to the frogs.

Two potential threats may arise from the increased use of the road and rail loop:

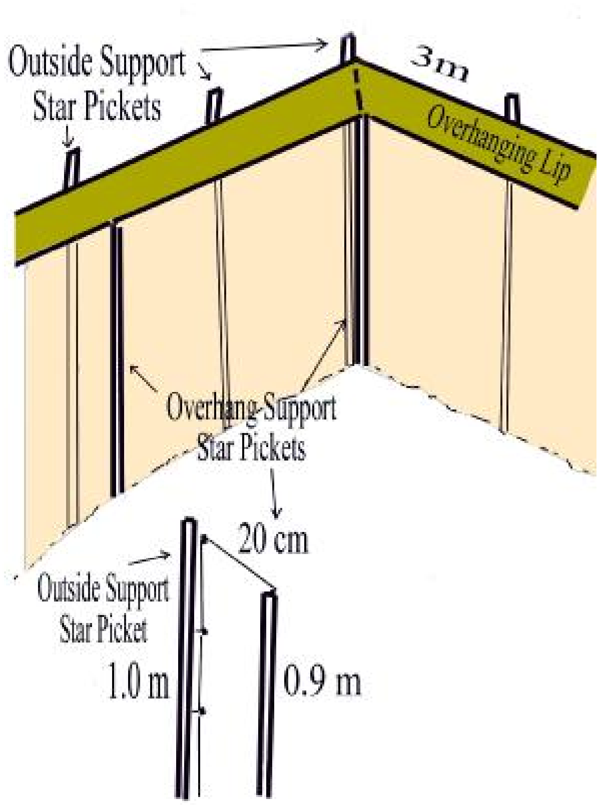
1. increased traffic may result in an increased chance of road killed frogs; and

2. increased traffic may result in increased pollution discharge from the road surfaces into surrounding stormwater drains and detention basin that may be used by Bell frogs during the warmer times of the year.

To offset these risks, it is recommended that a frog-exclusion fence be erected around the outside of the loop to prevent Bell Frogs from gaining access to the road or rail areas. The barrier material may consist of a high-grade synthetic mesh (such as weather-durable shade cloth) or other non-decomposable material. The fence can be attached to the existing chain-mesh barrier fence where possible and the base of the frog-fence will need to buried at least 20 cm into the soil. The fence will need to be about 1 metre high and have an outward facing overhang of about 20 cms width (see Figure 1). After the fence is installed, the interior area of the loop will need to be surveyed by a qualified herpetologist to ensure that no Bell Frogs have been trapped inside the loop. If Bell Frogs are found inside the exclusion fence, they are to be captured, processed as above and later released in an approved site. Once the site has been cleared of Bell Frogs, the herpetologist will provide the Coal Terminal with a letter stating that it has been cleared.

Figure 1

Self-supported Frog-exclusion Fence



The road and rail run-off from the loop area is diverted into the sites internal drainage system. Some of these drains are open and could be used by Bell Frogs as movement thoroughfares. Where possible, the surface run-off from the loop area should be directed into enclosed drains where Bell frogs are less likely to be affected.

Once these two mitigation steps have been fulfilled, the chances of an adverse impact on the Bell Frogs is very slight. To assess the potential impact, a Seven Part Test of significance has been completed and is attached as Appendix 1.

Information Needed Before Long-term POM can be Prepared

At this point in time, the only definite fact that is available is that Bell Frogs have entered the Coal Terminal site in search of over-winter habitat. It is not known if Bell Frogs also utilize other parts of the sites for other purposes, nor is known if Bell Frogs move between the Coal terminal and other areas throughout the year.

During my brief inspection of the site and nearby lands on the 4th of June 2008, it appears that the Coal Terminal offers little in the way of breeding or foraging habitat for the frogs. The terminal site does offer shelter habitat and is criss-crossed by a series or open and closed drains that could readily accessed by dispersing Bell Frogs.

In order to successfully manage the Bell frogs in and around the Coal Terminal, more basic information is required about the movements and habitat usage by Bell Frogs in this area. It is recommended that frog surveys be conducted, commencing in early spring and extending to early summer, to try to:

1. determine if habitats, other than over-winter sites, occur inside the Coal Terminal area;

2. determine if Bell Frogs move between the Coal Terminal and nearby properties;

3. determine movement corridors within the Terminal and leading off the Terminal to adjoining lands;

4. determine where the nearest breeding and foraging habitat areas are; and

5. assess the threats to the survival of Green and Golden Bell Frogs in the north Port Kembla area.

Surveys will need to be conducted at night (searches for moving frogs) and by day (tadpole surveys of wetlands). The search should include the adjoining land owned by the Port Authority and which is currently unleased, the Sewage Treatment Plant site and the Wollongong Golf Course (Figure 2). Land-owners of these sites should be informed well ahead on the impending surveys so that they are aware that they may have an endangered species on their land and that the surveys may result in some long-term commitments by them to protect the frogs.

When the surveys have been completed, the habitat data will be used to prepare the Long-term Plan of Management. This is likely to recommend the creation of a dedicated conservation area for the frogs where they can be managed and allowed to persist indefinitely. The location of this site will depend on the survey outcome and could be on Coal Terminal land or on land belonging to any of the other land-owners. It is recommended that the various land-owners get together before the completion of the surveys so that they can be better informed on the reasons and possible outcomes of the surveys. Some land-owners may be anxious about having an endangered species on their land and may refuse permission for the surveys on their land. To obviate this problem, the DECC will need to contact land-owners and inform them (in a non-threatening way) that they will be part of the development of the long-term POM and that the ultimate outcome will take into account existing land uses and other concerns. The whole process should not be seen as heavy-handed despite the legal obligation of the land-owners.

The location of the site for the Frog Conservation Area will ultimately be a compromise of various land use issues, however, the site will be located in a position that is strategically important for Bell Frogs at north Port Kembla. This site should allow Bell frogs to disperse freely to the Conservation Area as well as away from it.

The Continued Presence of Bell Frogs on the Coal Terminal Site

The Coal Terminal, while providing at least some habitat elements for Bell Frogs, remains as a potentially dangerous site for frogs. Detention basins around the site collect run-off that is high in coal fines. These basins need to be regularly excavated and the sediment disposed of; they cannot become habitat for Bell Frogs. For the effective management of the Coal Terminal, it is in the terminal's interest to facilitate the development of a Bell Frog Conservation Area nearby. Once that area is established and has been shown to be effective, the terminal should set about to prevent frog access to work areas inside the Terminal complex. This may entail the exclusion fencing or barricading drain accesses leading onto the site.

As the Terminal occupies a long, narrow peninsula, all frog entry to the site must be from the north. The most likely location for a Frog Conservation area will be either on the northern boundary of the Terminal land, or on land close y. The intention of the long-term POM would be to exclude Bell frogs from dangerous parts of the Terminal and to develop the Frog Conservation Area and frog movement corridors to nearby habitat areas so that the frogs are able to survive without disrupting works at the terminal or on nearby lands.

Dr. Arthur White

6 June 2008

SECTION 5A ASSESSMENTS
(Seven Part Tests)

As Green and Golden Bell frogs are an endangered species (listed under Schedule 1 of Part 1 of the Threatened Species Conservation Act 1995), any actions that may impact upon this species or their habitat must be assessed. The Seven Part Test is a rapid assessment tool to determine if the actions may have a detrimental impact on the species.

This Seven Part has been applied on the understanding that the recommended mitigation measures including the erection of frog-exclusion fences and the modification of road run-off will take place. The assessment is therefore based on the likely outcomes when these measures are in effect.

1. *In the case of a threatened species, whether the action proposed is likely to have an adverse effect on the life cycle of the species such that a viable local population of the species is likely to be placed at risk of extinction;*

The road and rail loop area is not associated with any breeding habitat and so increased traffic in this area will not adversely affect the life cycle of Bell frogs. Run-off from the road and rail loop does not affect any known breeding sites for the Green and Golden Bell Frog.

2. In the case of an endangered population, whether the action proposed is likely to have an adverse effect on the life cycle of the species that constitutes the endangered population such that a viable local population of the species is likely to be placed at risk of extinction;

The north Port Kembla Bell frogs are not listed as an endangered population.

3. In the case of an endangered ecological community or critically endangered ecological community, whether the action proposed:

a) is likely to have an adverse effect on the extent of the ecological community such that its local occurrence is likely to be placed at risk of extinction ,or

The north Port Kembla Bell Frogs are not listed as an endangered ecological community.

b) is likely to substantially and adversely modify the composition of the ecological community such that its local occurrence is likely to be placed at risk of extinction ,or

Not applicable.

4. In relation to the habitat of a threatened species, population or ecological community:

a) the extent to which habitat is likely to be removed or modified as a result of the action proposed, and

Habitat for Green and Golden Bell Frogs is not present in the road and rail loop area. However, these frogs are active dispersers and can move over long distances during the warmer months of the year (Pyke and White 2001). To ensure that dispersing frogs cannot get into the road and rail loop area, frog-exclusion fences will be erected to keep the frogs outside of this hazardous area.

b) whether an area of habitat is likely to become fragmented or isolated from other areas of habitat as a result of the proposed action, and

The erection of the frog-exclusion fences will stop frogs from entering the road and rail loop area but will not occlude potential frog corridors along the eastern side of the site (which appears to be the most likely used dispersal route onto and from the site. The proposed works will not fragment habitat or isolate habitat areas.

c) the importance of the habitat to be removed, modified, fragmented or isolated to the long-term survival of the species, population or ecological community in the locality;

No habitat is to be modified or lost under the proposed works.

5. Whether the action proposed is likely to have an adverse effect on critical habitat (either directly or indirectly);

No critical habitat has been listed at north Port Kembla.

6. Whether the action proposed is consistent with the objectives or actions of a recovery plan or threat abatement plan, and:

The Recovery Plan states that, where possible, threats to populations or habitats should be removed. The protection of Green and Golden Bell Frog from injury or death by the erection of frog-exclusion fences and controlling road run-off is consistent with the Recovery Plan. The Plan recognises the Port Kembla population as one of regional significance, although the Plan was prepared at a time when Bell Frogs were only known from south of the Port Kembla harbour.

7. Whether the action proposed constitutes or is part of a key threatening process or is likely to result in the operation of, or increase the impact of, a key threatening process.

The proposed works are not listed as a Key Threatening process and will not exacerbate any listed Key Threatening process.

Conclusion:

The proposed actions (increased traffic on rail/road loop and the establishment of the listed mitigation measures) will not adversely impact Green and Golden Bell Frogs at north Port Kembla.

References Cited

Pyke, G.H. and A.W. White (2001). A Review of the Biology of the Green and Golden Bell Frog *Litoria aurea*. *Aust. Zool.* **31**(4): 563-598.

White, A.W., and G.H. Pyke (1996). Distribution and conservation status of the Green and Golden Bell Frog *Litoria aurea* in New South Wales. *Aust. Zool.* **30**: 177- 189.

Insight for
Business & Government

Port Kembla Coal Terminal Community Survey

Measuring perceptions of PKCT and its planned changes to coal truck delivery hours

Management Report

Prepared for

Prepared by
IRIS Research Ltd

April 2008

IRIS Research ABN 16 002 278 793
Porter Street Annex, The University of Wollongong, 22 Porter Street, Nth Wollongong
Postal address: Northfields Ave, Wollongong. NSW 2522 Telephone: (02) 4229 4777 Fax: (02)4227 2987
Net: http://www.iris.org.au Email: research@iris.org.au

Table of Contents

1 Executive Summary

During April 2008, IRIS Research undertook a community survey on behalf of Port Kembla Coal Terminal (PKCT) using IRIS's CATI (Computer Aided Telephone Interviewing) facility. A random sampling technique was used to survey 330 permanent households in the survey area between the 8th to 11th April, 2008. Respondents for the sample were drawn from the population of households that are found along the road transportation corridor. The overall goal of the survey was to assess community support for planned changes to coal truck delivery hours and ascertain any community concerns.

The key findings from the survey are summarised below under the main headings used in this report:

Support for Extending Delivery Hours

When presented with the description of the proposed 24/7 operating times for coal truck movements;

- 59% of respondents indicated a medium to high level of support for the change, 38% indicated no to low support and 3% could not provide an opinion.
- The reason why residents were in favour of the proposal was overwhelmingly because of the reduction in congestion during peak times (25%).

  A further 6% of residents supported the proposal because it can generate further employment in the region.

Environmental and Transport Issues

Residents potentially affected by the planned changes were prompted with a range of eight environmental and transport issues and were asked to rate their level of concern for each of these.

Table E1 below is a summary of the pertinent attitudes specifically relating to the overall goal of the research. The top two issues of concern are general road safety (51% high concern) and vehicle pollution or exhaust fumes (43% high concern)

Table E1 Level of Concern with Environmental and Transport Issues (n=330)

	% Non Response	% Low Concern (1-2)	% Medium Concern (3)	% High Concern (4-5)	Mean (Out of 5)
Road safety.	0.0	31.3	17.6	51.1	3.3
Vehicle pollution or exhaust fumes.	0.0	35.2	21.7	43.1	3.1
Congestion on the roads.	0.0	38.3	22.4	39.3	3.0
Air pollution from big industry.	0.2	43.8	18.1	37.6	2.9
Noise pollution from heavy vehicles.	0.0	50.0	17.1	32.9	2.8
Dust pollution.	0.0	54.1	15.5	30.4	2.6

Noise Pollution from Heavy Vehicles

Residents were asked to rate their level of concern with a range of environmental and transport issues in their neighbourhood;

- 33% had a high level of concern with noise pollution from heavy vehicles.

  General engine noise and air brake noise were the highest rating issues to do with noise pollution, accounting for 13% and 12% of residents respectively. Further, general night time noise (9%) and truck noise too early in the morning/affecting sleep (2%) were also mentioned in regards to noise pollution.

Changes in Truck movements

Residents were asked directly whether they could recall seeing coal trucks at night or on Sunday during the last few weeks. The 24/7 trial was conducted during that same period.

- The vast majority, 92.9% of residents, had not noticed any change in truck movements in recent weeks. This means that the change in truck transportation did not significantly affect most residents.

Congestion on the Roads

Congestion on the roads was mentioned by 39% of residents as being a high level of concern. The biggest concern relating to traffic congestion is that there are too many cars on the road, this was mentioned by 31% of residents.

General Road Safety

Community perceptions on the general issue of road safety were rated as a high concern by 51% of residents. Poor/unsafe driver behaviour was mentioned by 35% of residents.

- Those issues of relevance for the Coal Terminal were less frequently mentioned. Speeding trucks (5.5%), lack of separation from trucks and cars (1.3%), bunching of trucks (1.1%) and trucks losing control (0.8%) were problems identified by some residents.

Coal Truck Movements through Neighbourhoods

Residents were asked to think specifically about where they live, and rate their level of concern with coal truck movements in their neighbourhood.

- More than half of all residents (53.2%) have a low level of concern regarding the trucks that pass near their neighbourhoods. However, 27.4% are highly concerned with such truck movements.
- The mean level of concern is 2.6 out of 5, showing that the average respondent was moderately concerned with trucks in their neighbourhood.

2 Introduction

IRIS Research was commissioned by Port Kembla Coal Terminal (PKCT) in early 2008 to undertake a community survey. The overall goal of the survey was to assess community support for planned changes to coal truck delivery hours. The results of the survey will support management planning and decision making in the key areas of public relations strategy and corporate citizenship.

The questionnaire was developed in close consultation with the PKCT management team and administered on the IRIS computer-aided telephone interviewing (CATI) system during the period from the 8th of April to the 11th of April 2008.

3 Research Objectives

The main goal of the research was to assess community knowledge and attitudes regarding the Port Kembla Coal Terminal. In particular, the objectives of the survey were:

1. To assess the level of concern the community has with various environmental and transport issues that are related to the operations of the Coal Terminal. The survey also sought to understands the reasons behind the community's level of concern about certain issues.
2. To measure residents concern with coal truck movements through their neighbourhood, and along their common travel routes.
3. To objectively assess whether the six week trial of the proposed new delivery hours had a noticeable impact upon residents.
4. To quantify the community support for the Coal Terminal's proposal to spread delivery hours to 24 hours, 7 days per week.
5. To explore the reasons why residents either support, oppose or are unsure about the extended hours delivery plan.

This report provides a succinct overview of the key results from the survey.

4 Methodology

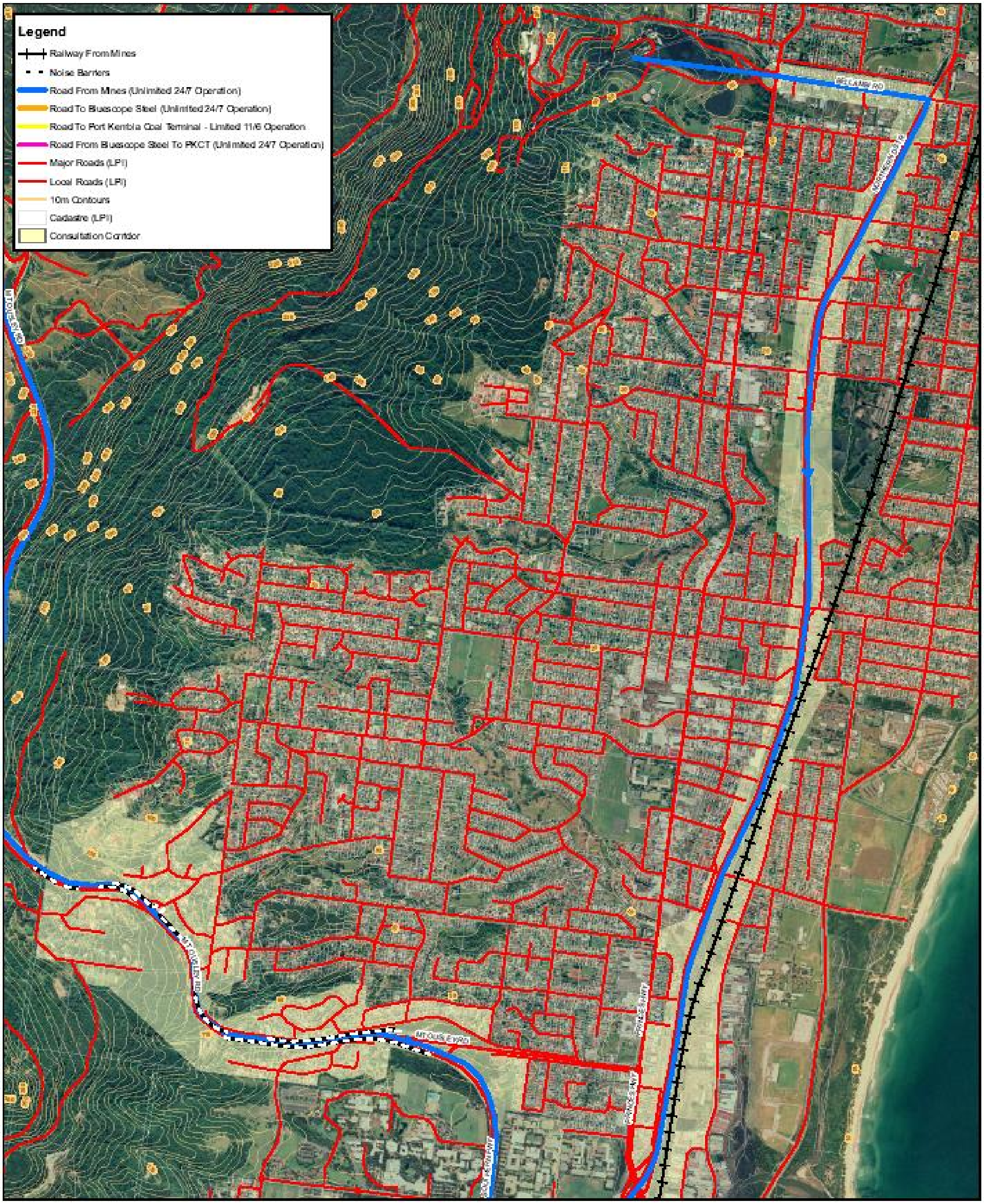
4.1 Sample Design

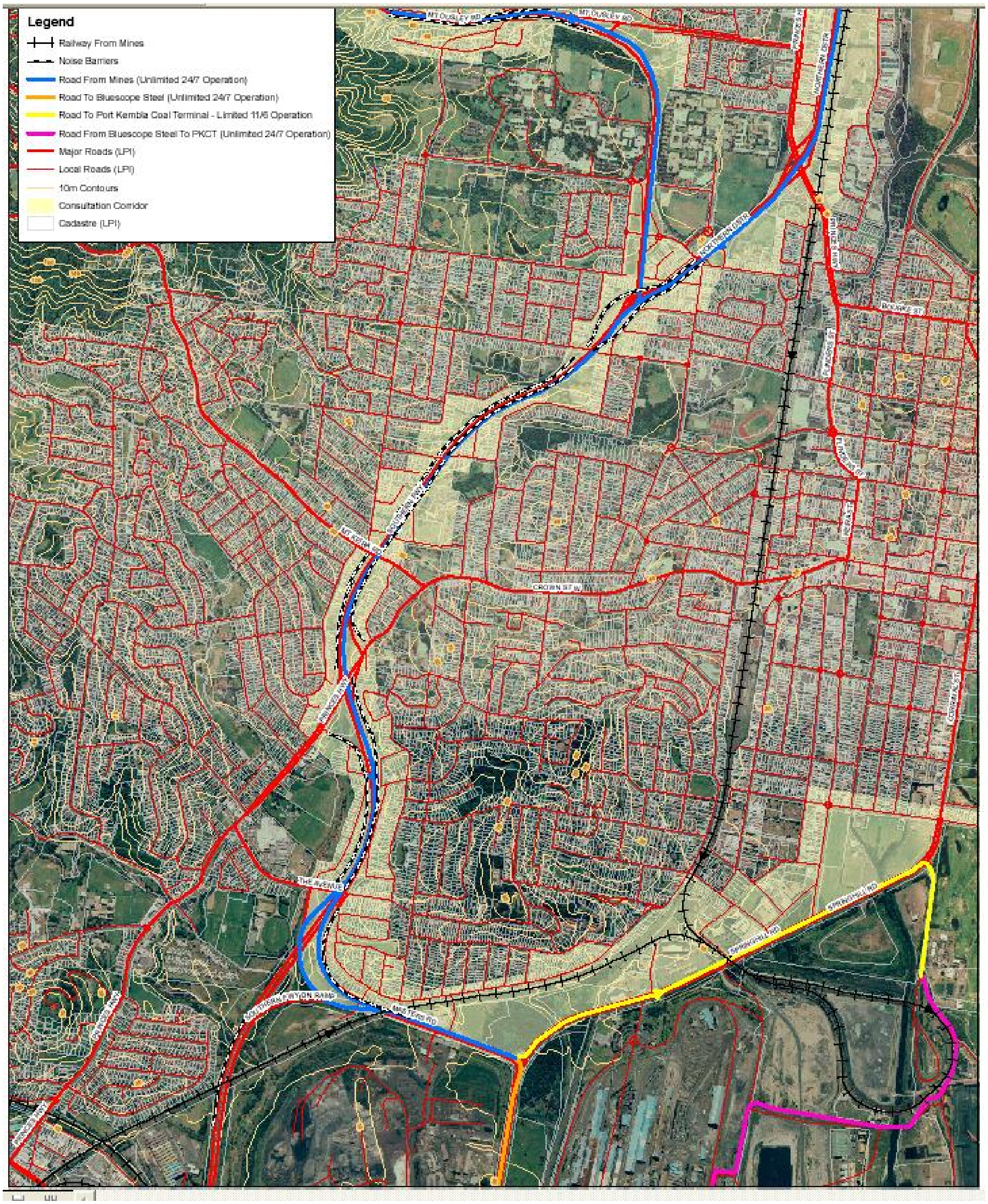
A telephone-based survey was used. The survey unit are permanent households of the areas defined in maps A1 and A2 below. A geographically stratified sample was developed in consultation with management from PKCT. The lightly shaded areas of the maps follow the route used by coal trucks as they travel along the Northern distributor and Bellambi road in the northern suburbs and the Southern Freeway, Masters road and Springhill road in the south. This forms the corridor of residential areas that may be affected by noise from additional coal trucks and defines the population of interest for this study. A target response of 300 completed interviews was set.

The sample frame for the survey was the electronic White Pages telephone directories. All telephone numbers that were from streets identified as being potentially noise affected were drawn to form the sample frame. The sample frame was then examined to identify those streets where the majority of the street was outside of the corridor. Once the potential universe of numbers had been generated, a computer programme was used to randomise the database.

This process gave a very even distribution of potential numbers across the whole survey area. Upon contacting each selected household, the interviewer asked to speak to a permanent resident aged 18 or older. If an appropriate person was not available, callbacks were scheduled for a later time or day. Unanswered numbers were retried six times throughout the period of the survey.

These procedures ensured a good sampling process was used, so that statistical inferences could be made about the entire resident population.


Legend
Railway From Mines
Noise Barriers
Road From Mines (Unlimited 24/7 Operation)
Road To Bluescope Steel (Unlimited 24/7 Operation)
Road To Port Kembla Coal Terminal - Limited 11/6 Operation
Road From Bluescope Steel To PKCT (Unlimited 24/7 Operation)
Major Roads (LPI)
Local Roads (LPI)
10m Contours
Cadastre (LPI)
Consultation Corridor


Legend
Railway From Mines
Noise Barriers
Road From Mines (Unlimited 24/7 Operation)
Road To Bluescope Steel (Unlimited 24/7 Operation)
Road To Port Kembla Coal Terminal - Limited 11/6 Operation
Road From Bluescope Steel To PKCT (Unlimited 24/7 Operation)
Major Roads (LPI)
Local Roads (LPI)
10m Contours
Consultation Corridor
Cadastre (LPI)
CROWN ST W
THE AVENUE
SPRINGHILL RD

4.2 Data Collection

Interviews were conducted from 8th to 11th of April between 4.30 p.m. and 8.30 p.m. Toward the end of the fieldwork period a geographic quota sampling procedure was employed to ensure that an adequate distribution households from all streets in the targeted geography were selected for interview.

A final phase of the sample refinement, post data collection, included identifying those remaining streets, such as Kembla and Corrimal, where a significant proportion may not be within the corridor containing the population of interest. Data collected from those streets was analysed separately and compared to the remainder of the sample to determine any statistical differences in response patterns. Results showed that no significant differences were present and hence this data remained as part of the overall sample.

Business numbers and faxes reached during the selection process were excluded from the sample. The survey was implemented under IQCA quality guidelines. Continuous interviewer monitoring was used and post interview validations were conducted within five days of the close of the survey.

4.3 Response performance

At the end of the survey period, 330 completed interviews had been collected. Table 1 below shows the compliance rate achieved for the entire sample. The compliance rate is the number of interviews as a proportion of completed surveys plus refusals. A compliance rate of 33% is considered acceptable for a survey of this type.

Table 1 Survey compliance rate

Response sequence	Outcome
Interviews	330
Refusals	685
Valid contacts (Excludes disqualified – businesses, out of area, under 18yrs etc)	1015
Compliance rate	33%

4.4 Survey Accuracy

The results of the survey are based on a sample of residents. As with all sample surveys, the results will be subject to some amount of sampling variability. When analysing results for the entire sample, the maximum error rate will be about ±5.3% at the 95% confidence level (assuming a proportional response of 50%). That is, we can be confident that if the survey were to be repeated, there are approximately 19 chances in 20 that the new result would lie within at least ±5.3% of the result achieved in this survey.

5 Findings

One of the objectives of the survey was to understand the relative importance of PKCT related environmental and transport issues (such as coal dust) amongst the broader environmental and transport concerns of Wollongong residents.

In all, there were 8 environmental and transport issues that were measured:

1. Road Safety
2. Vehicle pollution or exhaust fumes
3. Congestion on the roads
4. Air pollution from big industry
5. Noise pollution from heavy vehicles
6. Dust pollution
7. Bad smells/odours from pollutants
8. Smoke in your local area

Residents were asked to rate their level of concern with the environmental and transport issues listed above on a 5 point scale, where 1 was not concerned and a 5 was very concerned, and the results are presented below in section 5.1.

Sections 5.1.1 to 5.1.4 explore in more detail those environmental and transport issues which relate specifically to the operations of the Port Kembla Coal Terminal. Residents who gave a 4 or 5 rating for their level of concern with noise pollution from heavy vehicles, dust pollution, congestion on the roads and road safety were asked to list specifically those issues which explained their high level of concern. Tables 3, 4, 5 and 6 report the percentage of the total sample who mentioned each of these issues.

5.1 *Environmental and Transport Issues*

Residents were asked to rate their level of concern with a range of environmental and transport issues on a 1 to 5 scale, where a 1 was not concerned and a 5 was very concerned. Table 2 below reports the mean levels of concern and the distribution of responses for each issue.

Table 2 Level of Concern with Environmental and Transport Issues (n=330)

	% Non Response	% Low Concern (1-2)	% Medium Concern (3)	% High Concern (4-5)	Mean (Out of 5)
Road safety.	0.0	31.3	17.6	51.1	3.3
Vehicle pollution or exhaust fumes.	0.0	35.2	21.7	43.1	3.1
Congestion on the roads.	0.0	38.3	22.4	39.3	3.0
Air pollution from big industry.	0.2	43.8	18.1	37.6	2.9
Noise pollution from heavy vehicles.	0.0	50.0	17.1	32.9	2.8
Dust pollution.	0.0	54.1	15.5	30.4	2.6
Bad smells/odours from pollutants.	0.2	64.2	11.8	23.8	2.3
Smoke in your local area. eg. fireplaces	0.2	81.1	7.9	10.9	1.7

Key Findings:

- The top three issues identified by residents were 'road safety', 'vehicle pollution or exhaust fumes' and 'congestion on the roads'.
- 'More than half of the residents were highly concerned about 'road safety', and this resulted in the highest mean rating of 3.3.
- 'Vehicle pollution' and 'Congestion on the roads' also received high mean levels of concern with mean ratings of 3.1 and 3.0 respectively.
- For those issues which specifically relate to the operations of the Port Kembla Coal Terminal there was a mixed level of concern. As already mentioned, 'road safety' and 'congestion on the roads' were relatively more concerning to residents than most issues. However, 'dust pollution' and 'noise pollution from heavy vehicles' were relatively less important. 'Dust pollution' had a mean score of 2.6 and 'noise pollution from heavy vehicles' had a mean score of 2.8.
- For almost all of the transport and environmental issues listed above, the youngest (aged 18-29) and the oldest age groups (aged 65+) had a lower mean level of concern than the middle two age groups (aged 30-49 and 50-64).
- Females were more concerned than males about 'dust pollution', 'congestion on the roads', 'road safety' and 'vehicle pollution or exhaust fumes'.

5.1.1 Noise Pollution from Heavy Vehicles

One issue of particular relevance to the Port Kembla Coal Terminal is the noise created by trucking movements, especially given the plan to extend delivery hours to include night time and Sundays. Residents that indicated they were highly concerned with noise pollution from heavy traffic were asked to explain the reasons behind their concern. More than one issue could be mentioned by each individual. Table 3 below indicates the percentage which mentioned each issue out of the total number surveyed.

Table 3 Main Issues with Noise Pollution from Heavy Vehicles (n=330)

	(%) of Total Population
General engine noise	12.8
Air braking noise	12.0
General night time noise	9.3
General daytime noise	7.5
General traffic and road noise	4.0
Truck noise too early in the morning/affecting sleep	2.3
Coal Train Noise	2.1
General truck noise/other truck noise	2.1
Banging tail gates	0.5
Other	1.7

Key Findings:

- General engine noise and air brake noise were the most mentioned issues for residents who were worried about noise pollution from heavy vehicles. General engine noise was an issue that was indicated by 12.8% of residents, while air braking noise was mentioned by 12.0%.
- General night time noise and general daytime noise were also important issues for a substantial proportion of residents, mentioned by 9.3% and 7.5% of the population, respectively.
- One issue that may impact upon the Port Kembla Coal Terminal's plan to spread coal truck delivery hours is that 2.3% of the population were concerned that early morning truck noise was affecting their sleep.
- Interestingly, banging tail gates was hardly an issue at all, as it was mentioned by only 0.5% of the population.

5.1.2 Dust Pollution in Your Neighbourhood

Dust pollution is an important environmental issue to be considered by the PKTC, as coal trucks are a source of the dust pollution in the region. The 100 residents who rated dust pollution as highly concerning were asked to indicate the source of their concern. Each individual could mention more than one issue of concern regarding dust pollution. Their responses are contained in table 4 below.

Table 4 Issues mentioned with dust pollution (n=330)

Issue	(%) of Total Population
Dust or fallout from Bluescope Steel	9.7
Coal dust from trucks	9.3
Dust or fallout from heavy industry in general	5.5
Dust or fallout from the Coal Terminal	3.8
Dust from construction	3.5
Dust from the road or road works	2.7
Health concerns from dust	1.9
General dust or dust source unknown	1.5
Dust from coal trains	1.3
Dust or fallout from Port Kembla Port Corporation	0.4
Other	0.2

Key Findings:

- The dust generated by Bluescope Steel was identified as the most concerning aspect of dust pollution by 9.7% of residents. Dust from coal trucks was the second most mentioned issue relating to dust pollution, identified by 9.3% of the population.
- Other frequently mentioned issues were dust from heavy industry in general (5.5%), dust from construction (3.5%) and dust from the road or road works (2.7%).
- The issues which specifically related to the Port Kembla Coal Terminal were dust or fallout from the Coal Terminal itself (3.8%), dust from coal trains (1.3%) and coal dust from trucks (9.3%).

5.1.3 Congestion on the Roads

The major benefit for the Coal Terminal's plans to extend coal truck delivery hours is that it will reduce congestion on the roads. Residents who had a high level of concern for congestion on the roads were asked to provide unprompted answers on why they felt congestion on the roads was a worry. The issues that were raised are illustrated in Table 5, which reports the percentage that mentioned a particular issue out of the total population.

Table 5 Issues mentioned about congestion on the roads (n=330)

Issue	(%) of Total Population
Too many cars	30.9
Poor driver behaviour	8.9
Lack of parking/university parking	3.8
Bunching of trucks	2.8
Poor traffic lights/roundabouts etc	1.5
Speeding trucks	1.3
Safety and pedestrian safety	1.3
Size of trucks	0.6
Trucks losing control	0.3
Can't say	0.6
Other	0.6

Key Findings:

- The results show resoundingly that the biggest concern relating to traffic congestion is that there are too many cars on the road. This was mentioned by 30.9% of the population.
- Poor driver behaviour was the second most mentioned issue with 8.9% of residents identifying this as a problem.
- The lack of parking, and university parking in particular, ranked more highly than did issues specifically relating to coal trucks.
- Many of the issues which related specifically to the Port Kembla Coal Terminal rated quite lowly. The bunching of trucks (2.8%), speeding trucks (1.3%), the size of trucks (0.6%) and trucks losing control (0.3%) were mentioned by a relatively small number of residents.

5.1.4 Road Safety

Sometimes residents associate large coal trucks with a lack of road safety, so it is important for the Port Kembla Coal Terminal to monitor community perceptions on this issue. The table below reveals the areas of concern on the issue of road safety for those that rated road safety as a major worry.

Table 6 Issues mentioned about road safety (n=330)

Issue	(%) of Total Population
Poor driver behaviour	20.0
Unsafe Driving behaviour	14.7
Traffic infrastructure. eg lights, roundabouts, roads	10.2
Speeding trucks	5.5
Too much traffic	5.2
Child safety	2.0
Poor visibility	1.8
Size of trucks	1.7
Lack of separation of trucks from cars	1.3
Bunching of trucks	1.1
Trucks Losing Control	0.8
Can't Say	0.8
Other	2.4

Key Findings:

- On the issue of road safety, the standout concerns were poor driver behaviour, which received comment from 20.0% of residents, and unsafe driving behaviour, which received comment from 14.7%.
- Complaints about the traffic infrastructure, such as traffic lights and roundabouts, also rated quite highly with 10.2% of the population making comments about such issues.
- Those issues of relevance for the Coal Terminal were less frequently mentioned. Speeding trucks (5.5%), lack of separation from trucks and cars (1.3%), bunching of trucks (1.1%) and trucks losing control (0.8%) were problems identified by some residents.

5.2 Coal Transportation Issues

One of the objectives of this survey was to assess the community's concerns with coal truck movements through the region. To address this objective section 5.2.1 reports the community's level of concern with truck movements through their neighbourhoods and section 5.2.2 details the community's concerns with coal truck movements on their usual travel routes. Both of these sections follow the same structure. Residents were asked to rate their level of concern on a 5 point scale, and the mean scores and distributions are recorded in Table 7 and Table 9. Those residents who gave a high concern rating of 4 or 5 were asked to indicate why they gave this response, and these results are given in Table 8 and Table 10.

Section 5.2.3 measures resident's awareness of the six week trial of the proposed new delivery hours, conducted by Port Kembla Coal Terminal. The results in Table 11 show how many residents noticed a change in movements and what changes they noticed.

5.2.1 Coal Truck Movements through Neighbourhoods

On the way to Port Kembla Coal Terminal, coal trucks must travel along Mt Ousley Road, Springhill Road, Bellambi Lane and the Northern Distributor. These major roads pass through some of the residential suburbs of Wollongong. Residents were asked to think specifically about where they live, and rate their level of concern with coal truck movements in their neighbourhood. The results presented in the following table attempt to measure the level of concern held by residents in these neighbourhoods.

Table 7 Residents level of concern about coal truck movements in their neighbourhood (n=330)

	% Non Response	% Low Concern (1-2)	% Medium Concern (3)	% High Concern (4-5)	Mean (Out of 5)
Coal Truck Movements in Neighbourhood	0.7	53.2	18.5	27.4	2.6

Key Findings:

- More than half of all residents (53.2%) have a low level of concern regarding the trucks that pass near their neighbourhoods. However, 27.4% are highly concerned with such truck movements. It is more than likely that those that are most concerned are those closest to these main roads.
- The mean level of concern is 2.6 out of 5, showing that the average respondent was moderately concerned with trucks in their neighbourhood.

- Residents aged 18-29 were much less concerned with coal trucks passing through their neighbourhood than all of the older age groups.

Those residents who were highly concerned with coal truck movements through their neighbourhood were asked to indicate specifically the reasons why they were concerned. Each individual could provide more than one response and the answers were not prompted. Table 8 below illustrates the main issues raised by residents who were highly concerned about coal truck movements through their neighbourhood.

Table 8 Issues of Concern with Coal Truck Movements through Neighbourhoods (n=330)

Issue	(%) of Total Population
Truck Noise	7.9
Traffic congestion/too many trucks	6.6
Safety concerns/dangerous driving	5.4
Coal dust/pollution	2.4
Prefer rail transport	1.4
They use the same roads	1.3
Truck hours	1.1
Other	1.0

Key Findings:

- Truck noise was the stand out issue for those residents who were highly concerned with trucks passing by their neighbourhood. This issue was mentioned by 7.9% of the population.
- 'Traffic congestion' and 'safety concerns' were also very important issues, mentioned by 6.6% and 5.4% of residents, respectively.
- All of the other issues that residents had with trucks passing near their neighbourhoods were less of a concern, mentioned by less than 3.0% of the population.

5.2.2 Coal Movements through Resident Travel Routes

Residents can also be affected by coal trucks passing through their usual travel routes, and they may experience difficulties with trucks on their way to work, shops or school. As such, residents were asked to indicate their level of concern with coal truck movements on their everyday travel routes, and the results are presented in table 9 below.

Table 9 Residents level of concern about coal truck movements on their travel routes (n=330)

	% Non Response	% Low Concern (1-2)	% Medium Concern (3)	% High Concern (4-5)	Mean (Out of 5)
Coal truck movements on travel routes	1.1	60.7	16.3	21.6	2.4

Key Findings:

- For 60.7% of residents, coal truck movements on their usual travel routes were a low level concern. Coal truck movements on travel routes were a major concern for 21.6% of the population however.
- The average score was 2.4 out of 5, showing that the average person is moderately concerned with coal truck movements on their travel routes.

The 71 people who gave a rating of 4 or 5 were asked to give specific reasons why they were highly concerned with coal truck movements through their everyday travel routes. These issues are listed below in Table 10.

Table 10 Issues of Concern with Coal Truck Movements through Travel Routes (n=330)

Issue	(%) of Total Population
Safety/Dangerous driving	8.4
Congestion/too many trucks	7.5
Travel on those routes regularly	1.6
Dust/pollution/health	1.3
Coal by train/other methods	0.9
Other	1.6

Key Findings:

- Safety is the biggest worry for residents who expressed a high level of concern about coal truck movements in their neighbourhood. Their safety concerns were often due to a perception that truck drivers often drive dangerously, sometimes speeding, tailgating and generally driving selfishly. Out of the total population, 8.4% mentioned safety as an issue.
- The other standout issue for residents was congestion on the roads, with 7.5% of the total population reporting this as a major issue with trucks using their travel routes.

5.2.3 Changes in Truck Movements

The Port Kembla Coal Terminal ran a six week trial of the new coal transportation scheme, immediately prior to this survey being conducted. The purpose of this trial was to get an unbiased viewpoint on the effects of extending truck delivery hours. The trial was intended to show whether residents notice the extension in hours to include nights and Sundays, and whether they would notice the reduced frequency of trucks throughout the day.

The table below indicates the percentage of the total sample who noticed a change in coal truck movements, and the specific changes that they could recall seeing. Following this, residents were asked directly whether they could recall seeing coal trucks at night, and whether they could recall seeing coal trucks on a Sunday. These results are also reported in table 11.

Table 11 Residents Perceptions of Changes in Coal Truck Movements (n=330)

	% of Total Residents		
	Unsure	No	Yes
Notice a change in coal truck movements	0.3	92.9	6.8
What changes:			
More trucks on the road			5.2
More truck movements at night			1.3
More noise from trucks			0.7
Less trucks on the road			0.3
More truck movements on the weekend			0.3
Other			0.8
Recall seeing coal trucks at night		74.7	10.9
Recall seeing coal trucks on Sunday		76.3	6.3

Key Findings:

- The vast majority, 92.9% of residents, had not noticed any change in truck movements in recent weeks. This means that the change in truck transportation did not significantly affect most residents.
- Only 6.8% of residents did actually notice a change in truck movements. This included 5.2% of residents noticing that there had been more trucks on the road, 1.3% of residents noticing that there had been more truck movements at night and 0.7% felt that there had been more noise from trucks. Males were more likely to have noticed a change in coal truck movements than females.

- When asked specifically whether they could recall seeing coal trucks at night, 74.7% of residents responded no, 10.9% responded yes and the remainder were not sure.
- Similarly, 76.3% of residents could not recall seeing coal trucks on a Sunday, only 6.3% could recall seeing coal trucks on a Sunday, while the remainder of the population were unsure. Those aged 50 and over were more likely to recall seeing a truck on Sunday, while the younger residents (18-50) were more likely to indicate they were unsure.
- These results overwhelmingly show that the majority of residents did not notice the change in coal truck delivery hours that occurred during the six week trial.

5.3 Options for Road Coal Transportation

A key objective of this survey was to test the community's support for the Port Kembla Coal Terminal's plan to extend delivery hours to a 24 hour, 7 day a week period.

Section 5.3.1 measures the community's support for extending delivery hours in general. Table 12 shows the proportions of the population that either support the proposal, are against the proposal or are unsure. Those residents who did not support the proposal were asked to give reasons why they held this viewpoint, and these reasons are also given in table 12.

Section 5.3.2 measures the support for the 24/7 delivery hours proposal. Residents were asked to rate their level of support for such a proposal on a five point scale, and table 13 shows the residents mean ratings and distributions. Table 14, 15 and 16 are used to explore the specific reasons why people have a low, medium or high level of support for the plan.

5.3.1 Support for Extending Delivery Hours

Currently road deliveries to the Port Kembla Coal Terminal are restricted to the hours of 7am to 6pm on Monday to Saturday. The Coal Terminal is considering extending these hours to spread deliveries over a longer period. The below results gauge the level of support for such a proposal, and also the reasons why people are opposed to the idea, or are unsure.

Table 12 Support for extending delivery hours (n=330)

	Yes (%)	No (%)	Unsure (%)
Support deliveries over a longer period	49.5	36.7	13.6
Why not support:			
Truck Noise		10.7	
Prefer rail or other transport options		5.5	
Congestion/too many trucks		3.6	
Residents on truck routes badly affected		3.0	
Dangerous/safety concerns/bad driving		2.9	
Don't want to extend/want a downtime period		2.6	
Don't want trucks travelling on Sundays		2.4	
Dust/pollution/affect on health		2.2	
Other		2.3	
Would like limit on truck hours			3.7
Doesn't affect me			3.4
Not enough knowledge/need more information			1.9
Prefer rail or other transportation option			1.6
Other			0.6

Key Findings:

- Residents were split on their support for spreading out coal truck deliveries, with 49.5% in favour, 36.7% in opposition and 13.6% unsure.
- The main reason why residents were against the proposal was because of truck noise and its effect on people sleeping (10.7%). The next most common reason given was that residents would prefer that rail or other transportation options be utilised (5.5%).
- Residents who were unsure said that they would like a limit on truck hours (3.7%) or that they were unsure because it did not affect them very much (3.4%).

5.3.2 Support for Extending Delivery Hours to 24/7

Port Kembla Coal Terminal is proposing to spread coal truck delivery hours over a 24 hour, seven day a week, period. This would result in fewer trucks on the road during busy times of the day but this may cause concern for some residents. Before going ahead with this proposal, the Coal Terminal wanted to gauge the level of support for the plan in the community, and this is displayed in Table 13 below.

Table 13 Level of support for proposal to have coal truck deliveries 24/7 (n=330)

	% Non Response	% No to Low Support (1-2)	% Medium Support (3)	% High Support (4-5)	Mean (Out of 5)
Support for having truck deliveries 24/7	3.2	38.0	22.8	36.0	3.0

Key Findings:

- The majority of respondents (59%) indicated a medium to high level of support for a 24/7 delivery period.
- Overall, the mean level of support was 3.0, showing that the average person supports the proposal.
- 18-29 year old residents were more likely to be in favour of the proposal than the older age groups.
- The reasons behind residents' choices are presented below.

The following tables (14-16) provide a summary of the reasons given by residents for their level of support for the proposal to extend truck delivery hours to 24 hours, 7 days a week. For example, Table 14 reveals the reasons given by residents for their low level of support for the proposal.

Table 14 Residents Reasons for Low Level of Support (n=330)

Issue	% of Residents with Low Level of Support
Truck Noise	15.8
Don't want more trucks on road/enough already	6.7
Bad for people living on routes	3.7
Don't increase hours/new hours too long	2.9
Prefer rail/other option	2.4
Safety concerns	2.2
Enough time already	1.2
Other	2.5

Key Findings:

- The results reveal that the main reason why some residents do not support the proposal is because of truck noise and its affect on people sleeping at night. This reason was given by 16%.
- Many residents were also concerned that there were already too many trucks on the road, and they did not want anymore (7%).
- Other issues raised were that it would be bad for people who live along the truck routes (4%), people did not want an increase in truck hours (3%), they would prefer another transportation option (2%), they had safety concerns (2%) or they believed that coal trucks had enough time for deliveries already (1%).

Table 15 Resident Reasons for Moderate Level of Support (n=330)

Issue	% of Residents with Moderate Level of Support
Doesn't affect me as a driver/doesn't affect me as resident	6.5
Truck Noise	2.8
Will reduce road congestion	2.5
Employment/Good for community/its needed	1.9
Don't want more trucks on road/enough already	1.9
Unsure/more info needed/can see both sides	1.7
Don't increase hours/new hours too long	1.6
Safety concerns	0.5
Other	1.9

Key Findings:

- Those residents who gave a medium level of support for the proposal gave a mix of positive, negative and indifferent responses to explain their level of support. The negative responses can be interpreted as reasons why they did not give the proposal greater support, while the positive responses can be interpreted as the reason why they supported the proposal to some extent.
- The main reason why residents gave a moderate level of support for the proposal was because they were indifferent, stating that it did not affect them as a driver or as a resident. This was the reason stated by 6.5%. A further 1.7% expressed that they were unsure, and that they needed more information or could see both sides.
- Negative responses included that the truck noises would disturb people including people's sleep (2.8%), that they do not want more trucks on the road (1.9%) and that they don not want to see an extension of truck hours (1.6%).
- Positive response included that the proposal would reduce road congestion (2.5%) and that the proposal is good for the community in the form of increased employment (1.9%).

Table 16 Resident Reasons for High Level of Support (n=330)

Issue	% of Residents with High Level of Support
Will reduce congestion/peak hour/more spread out	25.0
Employment/Good for community/its needed	5.5
In coal or related industry	1.3
Safety concerns	1.2
Don't want more trucks on road/enough already	1.0
Other	0.8

Key Findings:

- The reason why residents were in favour of the proposal was overwhelmingly because of the reduction in congestion during peak times (25%).
- A further 6.0% were in favour because they viewed the proposal as something that could generate further employment in the region.
- Curiously, 1.2% cited safety concerns and 1.0% gave the reason that they did not want more trucks on the road.

6 Appendix

PORT KEMBLA COAL TERMINAL
Transportation Survey

DRAFT QUESTIONNAIRE – Version 2

18th March 2008

INTRODUCTION

Hello, my name is ...... from Illawarra Regional Information Service. We are conducting a survey about the local environment in your neighbourhood. We would really appreciate the input of a person from your household - is now a convenient time for you? [IF NOT, ASK WHEN WOULD BE A MORE CONVENIENT TIME TO CALL BACK]

SCREEN_1
First of all, we only want to interview permanent residents of this area. Do you live in this dwelling for the majority of the year? (IF NO, SELECT 'N/A')

SCREEN_2
Are you aged 18 years or older? (IF NO, SELECT 'N/A')

SCREEN_3 ['STRT']
And I just need to check your dwelling is located in the survey area. What is the name of the street you live in?

Interviewer checks street against look up directory and codes address.

Ok, before we begin the survey proper, I have to inform you that our conversation may be monitored by our supervisor for quality purposes.

SECTION 1: ISSUES & PERCEPTIONS

Q1
I'm going to read out a number of environmental and transport issues. Now thinking about where you currently live (that is your neighborhood), please rate how concerned you are with each issue. I would like you to use a scale of 1 to 5, where 1 means not concerned at all and 5 means very concerned.

[THE FOLLOWING ITEMS ARE RANDOMLY PRESENTED BY THE COMPUTER]

Q103a01	"Noise pollution from heavy vehicles."
Q103a02	"Bad smells/odours from pollutants."
Q103a03	"Smoke in your local area. eg. fireplaces, wood burning."
Q103a04	"Dust pollution."
Q103a04	"Congestion on the roads"
Q103a04	"Road safety"
Q103a05	"Vehicle pollution or exhaust fumes."
Q103a06	"Air pollution from big industry."

IF RATED 4 or 5
Q2
You indicated that you were concerned with noise pollution from heavy vehicles in your neighbourhood. What are your main concerns with the noise pollution?

[DO NOT READ OUT LIST - MULTIPLE RESPONSE POSSIBLE]

PROBE: Anything else?

1. Air braking noise
2. General Engine noise
3. Banging tail gates
4. General night time noise
5. General daytime noise
6. Other (please specify)
7. DONT KNOW / CANT SAY

IF RATED 4 or 5
Q3
You indicated you were concerned with dust pollution in your neighbourhood. What are your main concerns with dust pollution?

[DO NOT READ OUT LIST - MULTIPLE RESPONSE POSSIBLE –

PROBE: Anything else?

1. Coal dust from trucks
2. Dust or fallout from Bluescope / Steelworks / BHP Steel
3. Dust or fall out from Port Kembla Port Corporation in general
4. Dust or fall out from Heavy industry in general
5. Other (please specify)
6. DONT KNOW / CANT SAY

IF RATED 4 or 5
Q4
You indicated you were concerned with congestion on the roads near where you live. What are your main concerns with road congestion?

[DO NOT READ OUT LIST - MULTIPLE RESPONSE POSSIBLE}

PROBE: Anything else?

1. Size of trucks
2. bunching of trucks
3. Speeding trucks
4. Poor driver behaviour
5. trucks losing control
6. Too many cars
7. Other (please specify)
8. DONT KNOW / CANT SAY

IF RATED 4 or 5
Q5
You indicated you were concerned with road safety where you live. What are your main concerns with road safety?

[DO NOT READ OUT LIST - MULTIPLE RESPONSE POSSIBLE]

PROBE: Anything Else?

1. Lack of separation of trucks from cars
2. Size of trucks
3. Bunching of trucks
4. Speeding trucks
5. Poor driver behaviour
6. Trucks losing control
7. Other (please specify)
8. DONT KNOW / CANT SAY

SECTION 2: COAL TRANSPORTATION ISSUES

In this section I'd like to ask your opinion about the delivery of coal to the Port Kembla Coal Terminal. Coal is transported to Port Kembla via road and rail. Coal trucks travel down Mt Ousley Rd and on to Springhill Rd at Port Kembla. Also trucks travel Bellambi Lane and the Northern Distributer and exiting at Springhill Road. Trains also deliver coal from the north along the Illawarra Line until Coniston and then veer off to Port Kembla, and from the south down the Moss Vale line and onto Port Kembla.

Q6
Thinking specifically about where you live.
How concerned are you with coal trucks movements near your neighbourhood?

Use a scale of 1 to 5, where 1 means "Not concerned at all" and 5 means "very concerned"?

1	Not concerned
2	
3	
4	
5	Very concerned
6	Can't say

IF 4 or 5: Ask: Why are you concerned?

Q7
Thinking specifically about the normal routes you travel on? That is routes you use to get to work, the shops or school.

How concerned are you with coal trucks movements on these routes?

Use a scale of 1 to 5, where 1 means “Not concerned at all” and 5 means “very concerned”?

1 Not concerned
2
3
4
5 Very concerned
6 Can’t say

IF 4 or 5: Ask: Why are you concerned?

Q7A
Thinking about the last few weeks have you noticed any changes in COAL truck movements on Mt Ousley or Springhill Roads.

1. Yes
2. No

IF YES: What changes have you noticed (NO PROMPTING)

1. Less trucks on the road
2. More trucks on the road
3. More truck movements at night
4. More truck movements on the weekend
5. Less noise from trucks
6. More noise from trucks
7. Other (please specify)

Q8
In the past few weeks can you recall seeing COAL trucks on Mt Ousley Rd or Springhill Rd at night?

1. Yes
2. No
3. NOT SURE

Q9
In the past few weeks can you recall seeing COAL trucks on Mt Ousley Rd or Springhill Rd at Sunday?

1. Yes
2. No
3. NOT SURE

SECTION 3: OPTIONS FOR ROAD COAL TRANSPORTATION

The Port Kembla Coal Terminal is looking at options for increasing the amount of coal exported out of Port Kembla. This will have significant economic benefits for the region, but will require an increase in the volume of traffic delivering coal to Port Kembla.

Q10
Currently road deliveries to the coal terminal are restricted to the hours of 7am to 6pm Monday to Saturday, resulting in a bunching of truck deliveries during the peak commuter periods. Would you support options which spread deliveries over a longer period?

1. Yes
2. No
3. NOT SURE

IF 1: Ask:
Why wouldn't you support these options?

[80 CHAR TEXT BOX]

Q11
I would now like you to rate your level of support for the following proposal.

For road deliveries to the Coal Terminal, the proposal is to extend the hours of operation beyond the current 7am to 6pm Monday to Saturday window, this would spread coal truck movements out over a 24 hour seven day a week period which could result in fewer coal trucks on the roads during busy commuting times of the day.

How strongly do you support this proposal on a scale of 1 to 5, where 1 means not at all and 5 means strongly support.

1. Not at all
2.
3
4.
5. Strongly support
6. Can't say

Why do you provide that rating?

[120 CHARACTER TEXT BOX]

SECTION 5: RESPONDENT CHARACTERISTICS

Finally, I'd just like to ask you a few questions to help qualify your responses.

SEX

Hearing your voice I presume you are a ...

1 Male
2 Female

AGE

Which of the following age brackets do you fall into ?

1. 18 to 29
2. 30 to 49
3. 50 to 64
4. 65+
9. Refused to say

SUB

and what suburb do you live in?

____

NAME

Finally, could you tell me your first name as my supervisor audits 1 in 10 of my calls?

CONCLUSION

That completes our interview. This survey was conducted on behalf of the Port Kembla Coal Terminal, who are very grateful for your time.

Would you like further information or answers to any queries you have concerning the issues addressed by this survey. IF YES: (PROVIDE CONTACT DETAILS OF PKCT)

As this is social research, you can be assured that it is carried out in full compliance with the Privacy Act and the information you provided is only used for research purposes.

Again, my name is ….and my supervisors name is …. If you have any questions about this survey, or would like further information about IRIS Research, you can call our office between 9am and 5pm weekdays on 4229-4777. Thank you for your time.

END.

Support For Clean Up Australia Day

The Coal Terminal is pleased to be a part of this worthwhile clean up activity, with employees volunteering to support by picking up rubbish

The Port Kembla Coal Terminal supported the Friends of the Tom Thumb Lagoon and Conservation Volunteers Australia by both sponsoring and practically participating in the Business Clean-up Australia Day in February 2008 at the Tom Thumb Lagoon Wetland.

Rubbish was collected, with six out of the ten most common types of rubbish found being recyclable items, including drink cans and bottles. The rubbish enters the Tom Thumb Lagoon Wetland from stormwater drains and waterways within the catchment and if not removed it could pollute Port Kembla Harbour and could cause harm to native water birds, fish, frogs and crustaceans.

Designed by iQmultimedia

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PORT KEMBLA COAL TERMINAL

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Coal Terminal Seeks Efficency Improvements

The Port Kembla Coal Terminal operates two loading berths at Port Kembla Harbour, the coal berth, which last financial year loaded 11.7 million tonnes of coal and the bulk products berth, which loaded 540,000 tonnes of bulk products. The Coal Terminal receives coal from twelve mines in the Illawarra and Lithgow regions via both road and rail, which is stockpiled and then loaded onto ships, with over 90% destined for export markets.

The Coal Terminal operates 24 hours per day, 7 days per week (24/7) to meet shipping requirements. However, a restriction on road transported coal under a State Government planning policy developed in 1982 limits the Coal Terminal to receiving coal via public road to 11 hours per day, 6 days per week, ie during the hours of 7.00am to 6.00pm Monday to Saturday. The current restriction was developed over 25 years ago, and much has changed since then. Trucks now use different routes, roads have been significantly improved with noise attenuation and jersey barriers, and truck fleets have been made quieter, cleaner and safer. The Coal Terminal considers that it is time for a review of this old regulation in the context of today's operating environment.

> ***"The Coal Terminal considers that it is time for a review of this old regulation in the context of today's operating environment"***

Approval is being sought from the Minister for Planning to permit the Coal Terminal to receive coal deliveries via public roads 24/7 which will enable efficient operations

Story continued on page 2

Coal Terminal Seeks Efficency Improvements

Continued from page 1

and result in a more constant spread of coal trucks on the roads over a 24 hour period. No other changes will be made to the existing Coal Terminal operations as a result of this 24/7 approval request.

Over 50% of coal is currently received at the Coal Terminal by rail. The mines that deliver coal by road have either no or limited access to rail lines and are limited to road transportation by a combination of terrain, land constraints and economic viability. On average, there are 420 coal truck movements to the Coal Terminal 6 days per week. It is noted that coal trucks represent a small percentage of total traffic on Mount Ousley and Springhill Roads, at 1-2%. Moreover, coal trucks represent between 8-16% of total heavy vehicles on Mount Ousley and Springhill Roads.

Volumes of coal (tonnes) and numbers of trucks are not currently restricted, however, the proposed change will result in a 10 million tonne per annum cap on the volume of road transported coal. It is envisaged that trucks will be spread more constantly over each 24 hour period, and the result should be fewer trucks per hour during peak

THEN

NOW

"Coal trucks represent a small percentage of total traffic on Mount Ousley and Springhill Roads, at 1-2%"

commuter times at current volumes.

Restrictions do not apply to the times trucks can operate at any other industry or port operators in Port Kembla, only the Coal Terminal, which is clearly not equitable.

An Environmental Assessment of the change to 24 hour, 7 day deliveries is currently being developed to support the application to the Department of Planning. The preparation of the Environmental Assessment has involved multiple specialist environmental studies to assess likely impacts of the proposal. The Environmental Assessment is likely to be on public exhibition during June/July 2008. In the interim, if you would like further information on the Coal Terminal's current operations or proposed changes, please contact the Community Hotline on 1800 111 448 or email: communitylinks@pkct.com.au.

If you wish to be kept informed of the Coal Terminal's Environmental Assessment progress, please subscribe by sending an email to: transport@pkct.com.au.

Keep Informed:

For further information on the Coal Terminal's current operations or proposed changes:

- **Email: communitylinks@pkct.com.au**
- **Ph: 1800 111 448**

Subscribe to the Coal Terminal's Environmental Assessment progress:

- **Email: transport@pkct.com.au**

Environmental Assessment

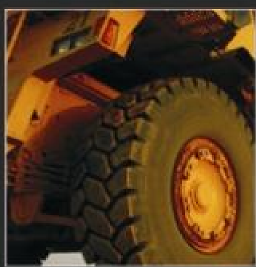
Existing Operations &
Increased Road Receival Hours
for Port Kembla Coal Terminal

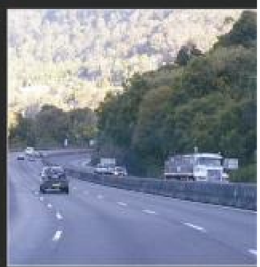
Traffic Study

Volume i
Main Report

Prepared for:
Port Kembla Coal Terminal

September 2008





PKCT
PORT KEMBLA COAL TERMINAL

Cardno
Eppell Olsen
Shaping the Future

DOCUMENT CONTROL

Document Control Environmental Assessment - TRAFFIC STUDY Existing Operations & Increased Road Receival Hours for Port Kembla Coal Terminal Volume 1 of 2 – Main Report					
Version	Date	Author		Reviewer	
		Name	Initials	Name	Initials
1.0	12 May 2008	Wilkie Ngan	WN	Anissa Levy	AL
2.0	2 June 2008	Wilkie Ngan	WN	Anissa Levy	AL
3.0	3 June 2008	Wilkie Ngan	WN	Anissa Levy	AL
4.0*	13 June 2008	Anissa Levy	AL	John Olsen	JO
5.0	3 July 2008	Anissa Levy	AL	Ken Hind	JO
6.0	26 August 2008	Wilkie Ngan	WN	Anissa Levy	AL

* Interbal review version only, not distributed externally

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Appendices (contained in Volume ii)

1 INTRODUCTION

Port Kembla Coal Terminal (PKCT), is a major intermodal coal facility in southern New South Wales (NSW), located in the Inner Harbour of Port Kembla, near Wollongong. The terminal operates 24 hours a day, 365 days per year, exporting approximately 10.8 million tonnes of coal per annum and playing a vital role in NSW's coal export industry. PKCT is the major coal intermodal facility in southern NSW for the transfer of coal from rail and road to ship.

The terminal is responsible for receiving, assembling and loading coal from the Southern and Western New South Wales coal fields, which is to be transported by ship to international and domestic markets. PKCT has two bulk handling facilities; a high capacity Coal Berth that handles the loading of coal, and a Bulk Products Berth that loads and unloads a range of bulk products.

PKCT currently operates under consent conditions attached to its 1979 Development Approval. State Environmental Planning Policy (SEPP) (Infrastructure) 2007, has superseded three of these conditions in relation to road haulage and limits the hours in which PKCT is permitted to receive coal deliveries on a specific section of public road to between 7am and 6pm on Monday to Saturday (11/6).

Based on studies of maximum throughput, this time restriction constrains PKCT's maximum capacity to receive coal by public road to 5.2 million tonnes per year. PKCT is seeking approval to increase road receivals to 24 hours per day 7 days per week (24/7) for a maximum of 10 million tonnes per year of coal received by public road.

This study forms part of an Environmental Assessment (EA) to assess proposed changes to existing operations to a proposed 24 hour 7 day per week delivery of coal via public road and increased delivery of coal to a maximum of 10mtpa over a ten year period.

The purpose of this study is to inform the EA of the impacts the proposed operating conditions would have on road traffic.

1.1 BACKGROUND

PKCT is serviced by extensive road and rail infrastructure. There are currently ten collieries supplying coal to the terminal. Approximately 38% of coal is being delivered by road and the remaining being delivered by rail. 90% of the coal received at the terminal is exported with the remaining 10% destined for the domestic market.

Road receivals at PKCT are currently only permitted to use the section of Springhill Road, north of Masters Road between 7:00am and 6:00pm Monday to Saturday. PKCT receives coal by road from three collieries, Appin Colliery (AC), West Cliff Colliery (WC), and Gujarat Natural Resources Environment (GNRE) No.1 Mine. Coal from West Cliff and Appin collieries is delivered to PKCT via Appin Road, Mount Ousley Road, Southern Freeway, Masters Road, and Springhill Road. Coal from GNRE Mine is delivered to PKCT via Bellambi Lane, Northern Distributor, Southern Freeway, Masters Road, and Springhill Road.

Outside the permitted hours, the coal from Appin Colliery and West Cliff Colliery is delivered to PKCT via Springhill Road, south of Masters Road and enters BlueScope Steel Limited's (BSL) Port Kembla Steelworks at Entry Road. The coal is delivered using the private roads situated inside the BSL Steelworks.

1.2 STUDY AREA

The PKCT is located in the Inner Harbour of Port Kembla, near Wollongong as shown on Figure 1.1. The study area includes:

- Three primary mine sites:
  - Appin Colliery;
  - West Cliff Colliery; and
  - GNRE No. 1 Mine.
- Two secondary coal coke works:
  - Coalcliff Coke Works; and
  - Corrimal Coke Works.

The above site locations are noted on Figure 1.1.

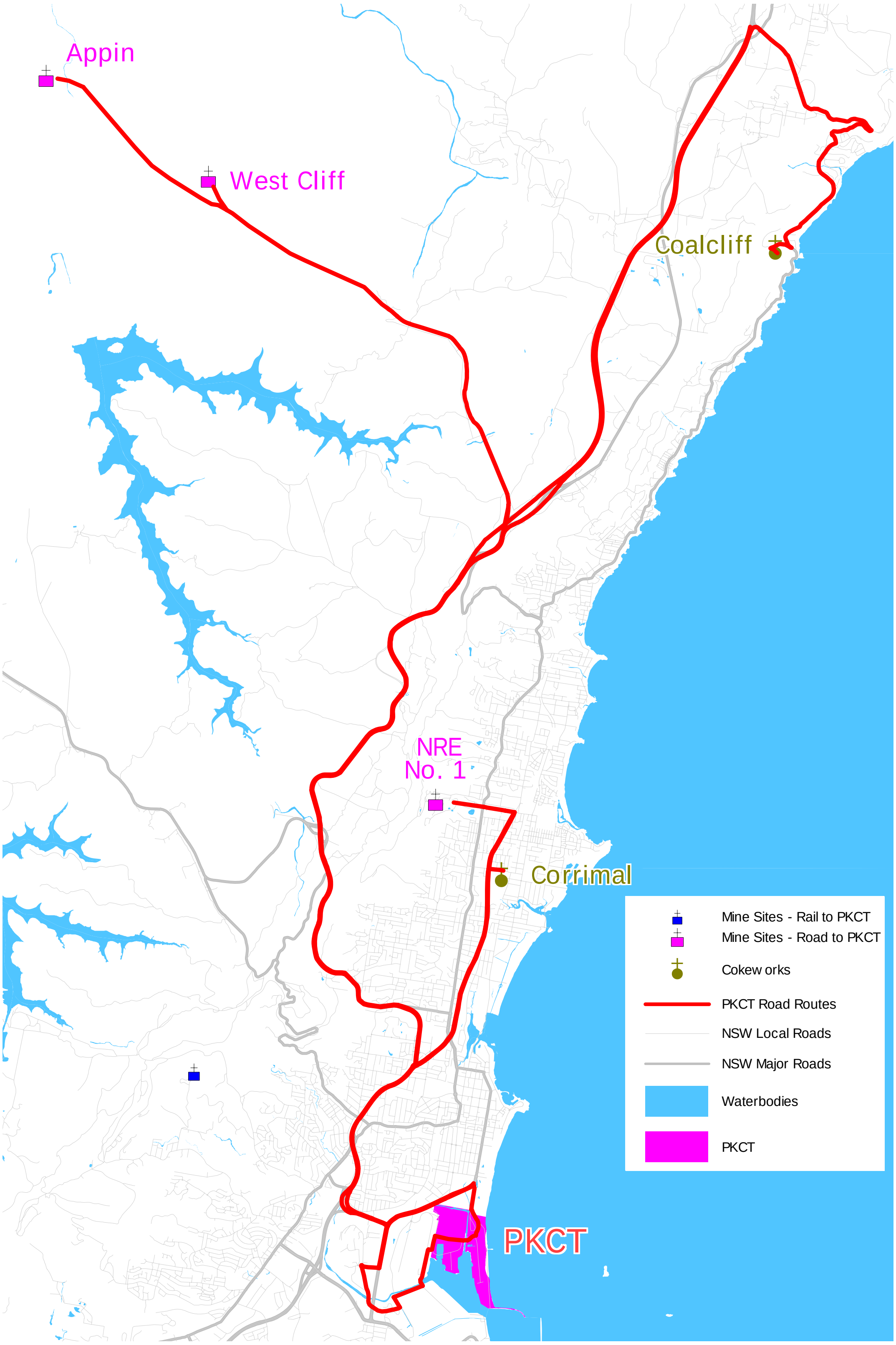
The key public road routes within the study area are:

- Appin Road from West Cliff to Mount Ousley Road;
- Mount Ousley Road from Appin Road to the Southern Freeway;
- Southern Freeway from Mount Ousley Road to Masters Road;
- Masters Road from Southern Freeway to Springhill Road;
- Springhill Road from Masters Road to Port Kembla Road;
- Bellambi Lane from Princes Highway to Northern Distributor;
- Northern Distributor from Bellambi Lane to the Southern Freeway;
- Southern Freeway from Appin Road to Lawrence Hargrave Drive; and
- Lawrence Hargrave Drive from Southern Freeway to Coalcliff.

Other materials transported to PKCT from BlueScope Steel Limited (BSL) and Australian Steel Mill Services (ASMS) operations in Port Kembla do not travel on the public road network and travel only on the internal Port Kembla private roads.

The route overview is also shown on Figure 1.1.

Figure 1.1 Site Location and Route Overview



1.3 SCOPE OF STUDY

There are three stages to this study:

- Overview of Existing Situation;
- Review of Trial 24/7 Operations; and
- Assessment of Increased Road Receivals and change of operating hours.

The overview of the existing situation considers:

- Existing PKCT road receivals;
- Existing road network environment:
  - Inventory of road haulage routes;
  - Description of land uses along the routes; and
  - Overview of issues on routes.
- Existing road safety issues along road haulage routes:
  - Road Safety audits of road haulage routes (day and night); and
  - Review of crash statistics; and
- Existing traffic volumes and capacity constraints.

The review of trial operations considers the changes in the road traffic environment as a result of the trial operations.

The assessment of increased road receivals and change of operating hours considers various scenarios to highlight the road traffic impacts on the public road network under each scenario. The increased outputs from the Westcliff CPP and the GNRE No.1 Mine will result in increased coal truck movements on the public road system. Other products transported to PKCT either do not travel on the public road network or are not expected to change over the coming years, this includes materials transported to/from:

- Illawarra Coke Company (ICC);
- BlueScope Steel Limited (BSL);
- Australian Steel Mill Services (ASMS); and
- Dendrobium Coal Preparation Plant.

As such the future truck movements to/from the above locations are not considered to change the volumes on the public road system. The existing truck movements to/from ICC are considered as background traffic (which remains unchanged) in the future assessment.

This study is primarily a review of road traffic. Much of the data reviewed and the analysis undertaken was provided to the Noise Consultants for review and assessment of Noise Impacts. This study does not consider noise.

1.4 REFERENCES

The following documents have been referenced as part of this study:

- RTA's Guide to Traffic Generating Developments (2002);
- Austroads Guide to Traffic Engineering Practice (AGTEP) Part 2;
- Sinclair Knight Merz (SKM) Environmental Assessment Final Report (December 2005);
- AUSLINK Sydney-Wollongong Corridor Strategy;
- Connell HATCH Coal Transport Noise Study November to December 2004;
- Connell HATCH Coal Transport Noise Study Report of SEPP 7 Extension Noise Assessment February to March 2007;
- Transport and Urban Planning Traffic and Road Safety Assessment of Coal Haulage between Appin and West Cliff Collieries and Port Kembla Coal Terminal (June 2003);
- Illawarra & South Coast NSW Freight Study, Department of Planning (Strategic Design and Design, December 2005); and
- Northern Distributor Extension Noise Mitigation Design (Wilkinson Murray Pty. Limited, May 2006).

1.5 REPORT FRAME WORK

This report is divided into 8 sections:

- SECTION 1 provides an introduction and background to the study;
- SECTION 2 provides an overview of the existing operations and road receivals. This section also details the existing coal truck movements;
- SECTION 3 documents the existing road haulage routes in terms of physical description of the routes, capacity and road safety issues related to the routes;
- SECTION 4 provides an overview of the 24/7 trial period, documenting the coal truck movements during this period;
- SECTION 5 outlines the estimated future background traffic volume scenarios;
- SECTION 6 documents the projected future road receival scenarios in terms of coal truck movements along the routes under different operational scenarios;
- SECTION 7 identifies the traffic impacts of the proposal; and
- SECTION 8 summarises the key issues and recommendations of the report.

2 EXISTING OPERATIONS & ROAD RECEIVALS

This chapter provides an overview of the current Port Kembla Coal Terminal Operations as they relate to road receivals on public roads. This assessment considers only the coal and coke transported by trucks on public roads and does not consider coal and coke transported by rail or on private roads. For the purposes of this study public roads are defined to be publicly owned roads and not privately owned roads that may be currently available for public use. Road receivals are defined to be any coal and coke transported to the final PKCT destination by road.

2.1 OVERVIEW

Port Kembla Coal Terminal (PKCT), located at Port Kembla near Wollongong, is the major coal terminal facility in southern New South Wales (NSW) and is connected with road and rail infrastructure. The terminal currently receives approximately 38% of coal by road and 62% by rail. All of the coal received at the terminal is transferred onto ships for export and domestic markets.

2.2 EXISTING OPERATIONS

The Port Kembla Coal Terminal (PKCT) serves the Southern, South-western and Western coal fields. The coal mines supplying coal to the Terminal are located in three regions the Southern Coalfields, Burragorang Valley District and the Western Coalfields.

The coal terminal is located at the southern end of a small peninsula on the northern side of the port on land separating the ocean and the inner harbour. The subject land is vested with the Port Kembla Port Corporation and is leased to the PKCT.

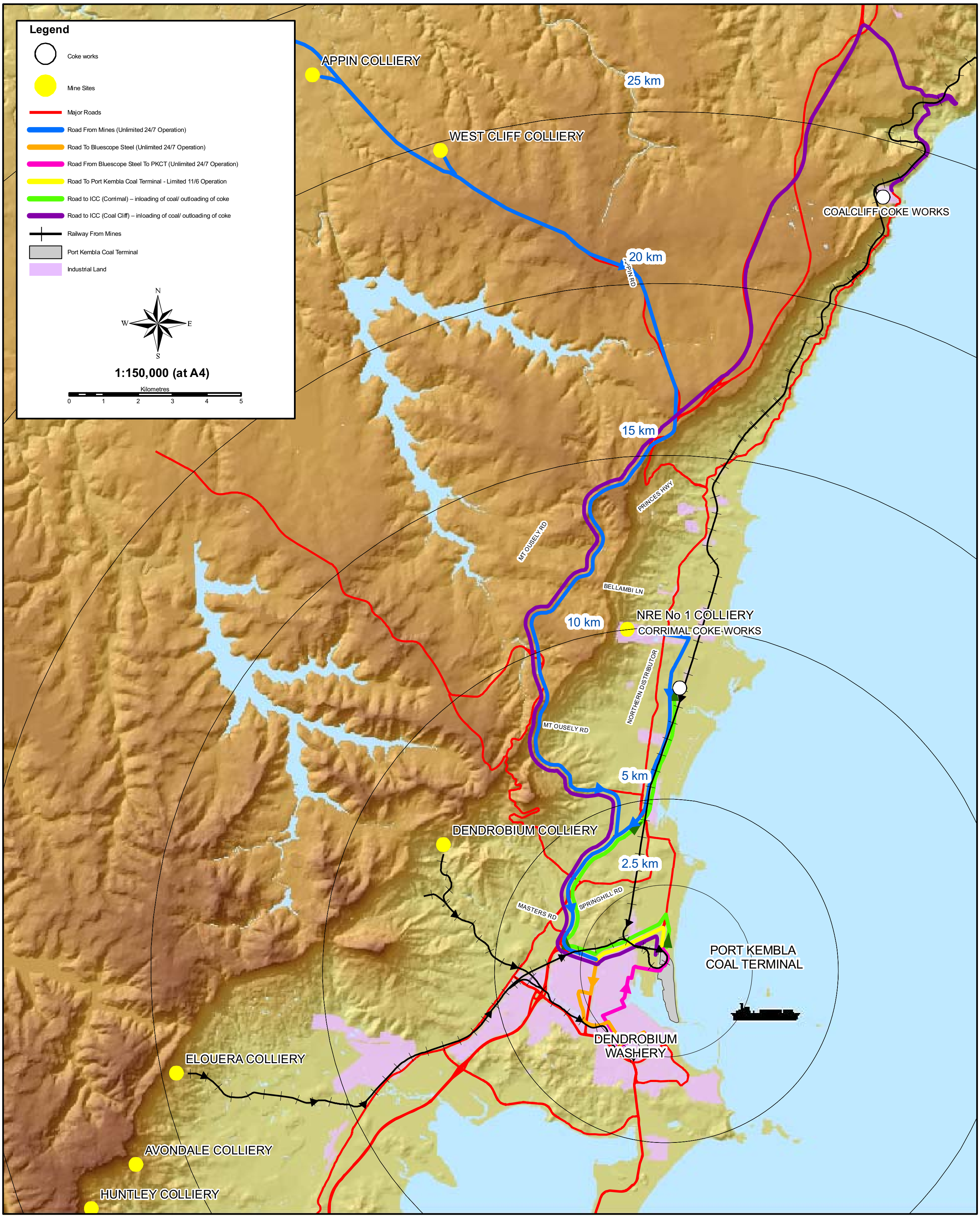
The existing infrastructure at PKCT is adequate to meet current operations and the proposed increased operations which are anticipated in this Environmental Assessment. The total throughput for PKCT for the financial year 2006/2007 was 12.2 mt (11.7 mt coal, 0.5 mt coke/slag). The throughput for the financial year 2007/2008 total is estimated at 13mt.

The terminal receives approximately 4.7mtpa of coal at the road receivals area from the following locations:

- BHP Billiton Illawarra Coal (BHPBIC) via:
  - West Cliff Colliery via West Cliff Coal Preparation Plant (WCCPP) - coal is received via public roads;
  - Appin Colliery via West Cliff CPP - coal is received via public roads;
  - Dendrobium Coal Preparation Plant (DCPP) - coal is received into BSL site via rail and then transported via internal private roads only to the PKCT; and
- Gujarat NRE No. 1 Mine - coal is received via public roads.

The terminal also receives coke from the Illawarra Coke Company's operations at:

- Corrimal Coke Works; and
- Coalcliff Coke Works.



PKCT
PORT KEMBLA COAL TERMINAL

Overview of Existing Operations

PORT KEMBLA COAL TERMINAL

Figure 2.1

Cardno Forbes Rigby
Shaping the Future

Map Produced by Cardno Forbes Rigby
Date: 29 October 2007
Coordinate System: Zone 56 MGA/GDA 94
GIS MAP REF:
108004_01_1801_Existing_Operations_A4.mxd

The coal is delivered to the PKCT road receival loop which is located off Port Kembla Road and within the rail receival loop. The coke is delivered to the Bulk Products Stockyards.

Figure 2.2 represents the coal transport process to and from PKCT.

2.2.1 BHP Billiton Illawarra Coal (BHPBIC) Collieries

BHP Billiton Illawarra Coal (BHPBIC) operate the following collieries

- Appin Colliery;
- West Cliff Colliery; and
- Dendrobium Colliery.

The West Cliff and Appin collieries operate and deliver coal by road 24 hours a day, 7 days a week. Coal from both collieries is washed at West Cliff CPP. Coal is delivered from the West Cliff CPP by public road to PKCT or BlueScope Steel Limited (BSL).

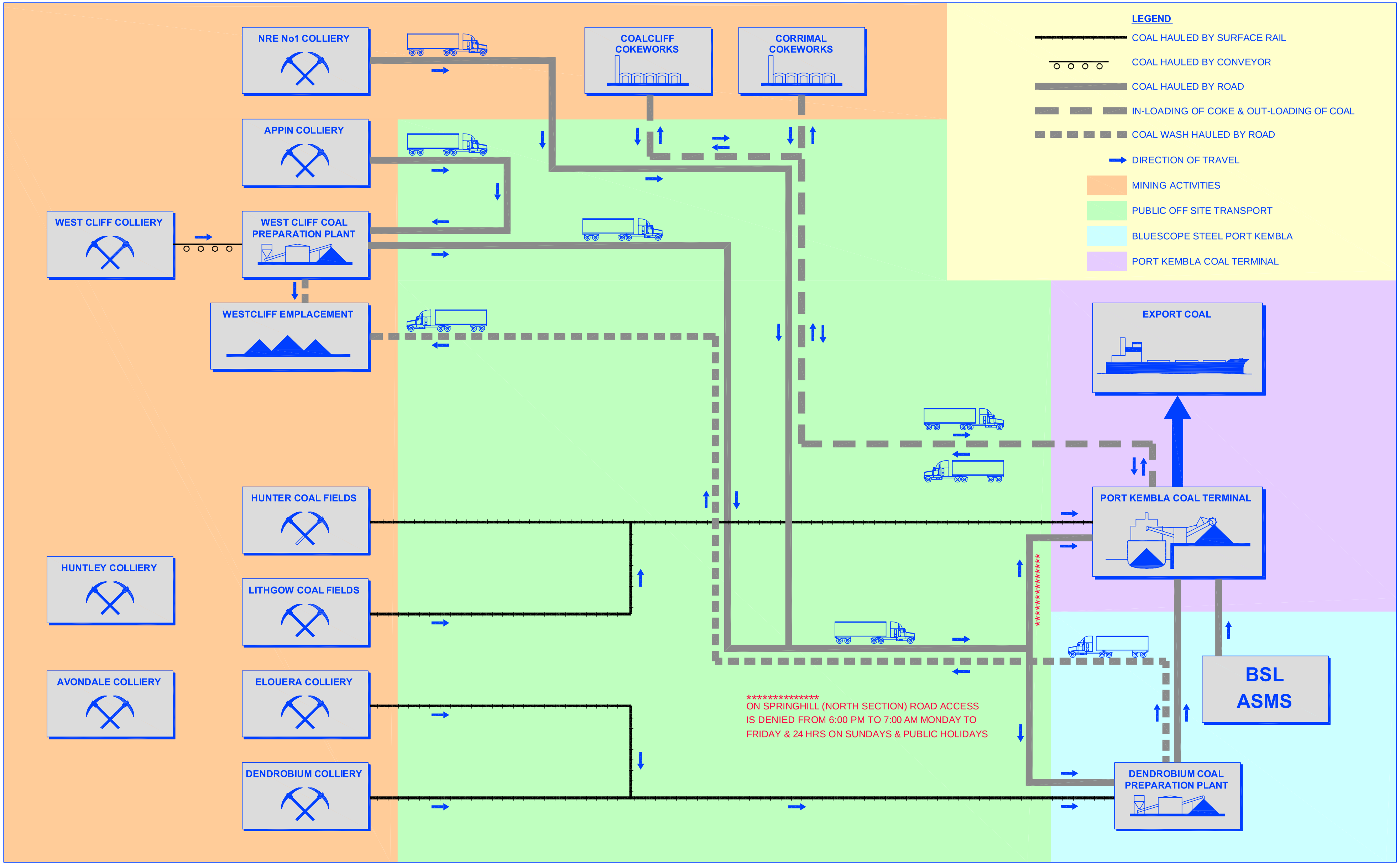
The BHPBIC Dendrobium Colliery rails coal from the colliery to Dendrobium CPP, within BSL. Product from Dendrobium CPP is delivered to PKCT by truck. This route is via internal private road.

2.2.2 West Cliff Coal Preparation Plant (WCPP)

West Cliff Coal Preparation Plant operates and delivers coal 24 hours a day, 7 days a week. The coal is delivered to PKCT by public road via Port Kembla Road between 7:00am to 6:00pm. During other times, when coal delivery trucks are denied access to Springhill Road north of Masters Road, the coal is delivered to PKCT via Dendrobium CPP located within BSL.

Approximately 2.8mtpa of coal is transported by public road from Westcliff CPP (combined output from Appin and Westcliff Collieries) to PKCT. Coal is transported from the West Cliff CPP to PKCT by a range of coal trucks. BHP Billiton has a contract with Bulktrans which supply a number of trucks for the delivery of coal. These trucks are also supplemented with sub-contracted trucks. The number of trucks working on the route from West Cliff to PKCT is highly variable due to the number of sub contracted trucks required to efficiently deliver coal, which is dependant on variable customer demand.

The typical trucks used consist of a combination of truck and dog trailers, articulated vehicles and B-Doubles. These trucks can be classified as shown in Table 2.1. For the purposes of this study all vehicles are considered to be articulated vehicles.



SCHEMATIC PROCESS DIAGRAM

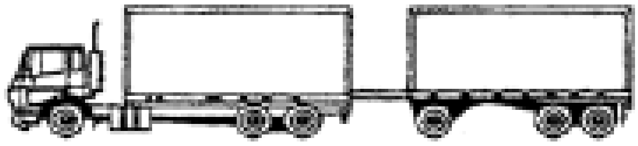
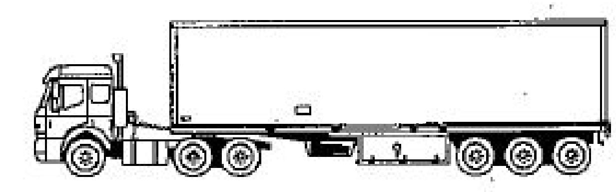
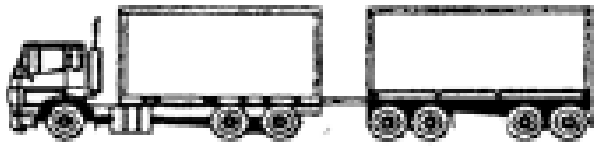
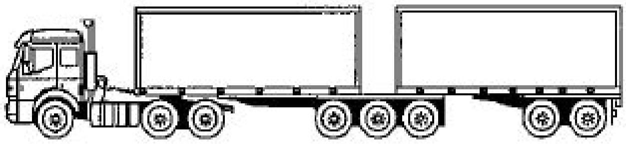
PORT KEMBLA COAL TERMINAL OPERATIONS

FIGURE - 04

CFR REF 108004 - 01

Figure 2.2

Table 2.1 Truck Types Used by BHPBIC from West Cliff CPP to PKCT

Class	Type	Number of Axle Pairs	Typical Axle Configuration*
9	Truck and Dog Trailers	6 axles	
9	Articulated Vehicle	6 axles	
10	Truck and Dog Trailers	7 axles	
10	B-Double	8 or 9 axles	

* AUSTROADS Vehicle Classification System (not to scale)

There is no typical trip duration for the delivery of coal between West Cliff CPP and PKCT. Observations of a single truck for the duration of the driver shift found West Cliff – PKCT – West Cliff journey times to be between 83 minutes and over 2 hours. Many variables come into play such as meal breaks, coal wash backloading, queuing etc.

2.2.3 Gujarat NRE (GNRE) No. 1 Mine

The Gujarat NRE (GNRE) No. 1 Mine is permitted to carry out mining activities 24 hours a day, 7 days a week (24/7). GNRE currently do not operate on Sundays. Coal is delivered to PKCT during the day time, typically departing the mine between 6:00am and 5:00pm. All deliveries are currently made via Port Kembla Road to the road receival.

GNRE deliver coal by public road from GNRE No. 1 Mine to PKCT. The characteristics of the current coal delivery patterns have been advised by GNRE to be as follows:

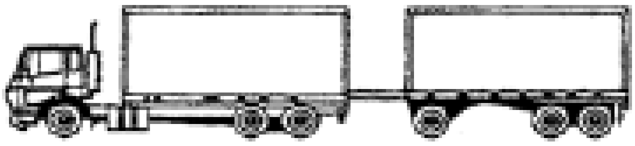
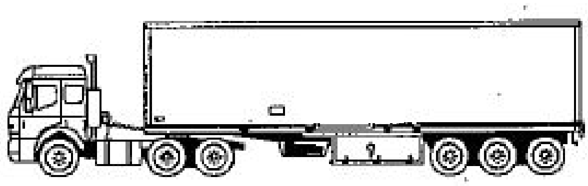
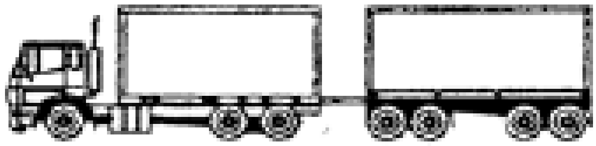
- Deliveries are generally made only on Tuesdays, Thursdays, Fridays and Saturdays between 6:00am and 5:00pm (as the current 11/6 restrictions prevent them from accessing the site prior to 7:00am, hence the first truck departs No. 1 Mine at between 6:30 and 6:45am):
  - deliveries are not normally made on Mondays as GNRE fill the truck loading bins on this day rather than making staff do this on the Saturday and work late;
  - deliveries are not normally made on Wednesdays - GNRE consider there are high truck movements on this day along Bellambi Lane and so restrict their own haulage to reduce impact on the local community;
- Number of trucks in fleet is 8 to 10;
- GNRE do the majority of their truck movements in the morning as drivers have been working since midnight – 1am elsewhere and are only permitted to work 12 hours at a time. On a day to day basis the number of trucks hauling coal for GNRE:
  - is less in the mornings;
  - reaches max of 14 towards midday;
  - drops back down to as low as only 4 trucks through the afternoon as many drivers have finished their 12 hour shift.
- GNRE ships hold around 75,000tonnes of coal and visit PKCT approximately every 5 weeks;
- Deliveries occur all year around but daily volumes are generally higher just before a ship arrives;
- It takes a max of 4 minutes to fill a truck and trailer at the No. 1 mine. The fastest loading is a semi taking 2 minutes;
- Undertake approximately 110 – 120 truck movements per delivery day to transport the desired amount of coal.

GNRE advised that the average round trip between GNRE No. 1 Mine and PKCT is typically:

- 45 minutes in early mornings;
- 55 – 60 minutes in the morning to 9:30am;
- 45 minutes late morning to early afternoon;
- 55 – 60 mins between 3:00pm – 5:00pm.

Typically coal is transported from the GNRE No. 1 Mine to PKCT by either articulated vehicles or truck and trailer combinations as shown in Table 2.2. For the purposes of this study all vehicles are considered to be articulated vehicles.

Table 2.2 Truck Types Used by GNRE from No. 1 Mine to PKCT

Class	Type	Number of Axle Pairs	Typical Axle Configuration*
9	Truck and Dog Trailers	6 axles	
9	Articulated Vehicle	6 axles	
10	Truck and Dog Trailers	7 axles	

* AUSTROADS Vehicle Classification System (not to scale)

2.2.4 Illawarra Coke Company (ICC)

The Illawarra Coke Company (ICC) operates the Coalcliff Coke Works & the Corrimal Coke Works. Illawarra Coke Company does not operate 24/7, the 'coal to coke' operations usually occur between 6:00am to 2:00pm, with final trucks leaving the site between 4:00pm and 5:00pm. ICC converts coal into coke and receives coal directly from mines in the Illawarra by road delivery. ICC also receives coal from PKCT by road delivery. ICC sends coke from both Corrimal and Coalcliff Coke Works to PKCT by road.

2.2.5 Dendrobium Coal Preparation Plant (DCPP)

BHP Billiton Illawarra Coal (BHPBIC) operates the Dendrobium Coal Preparation Plant. Dendrobium Colliery rails coal from the Dendrobium Colliery to Dendrobium CPP, within BSL. Product from Dendrobium CPP is delivered to PKCT by truck via the BSL product Berths gate along Product Berth Road (internal private road).

Approximately 1-1.75mtpa of coal is transported from Dendrobium CPP to PKCT. The typical trucks used are B-Doubles and semi-trailers.

2.2.6 BlueScope Steel Limited (BSL)

BlueScope Steel Limited (BSL) operates 24/7 and delivers approximately 260,000 tonnes per annum of coke to PKCT via Tom Thumb Road (internally within the Port).

2.2.7 Australian Steel Mill Services (ASMS)

Australian Steel Mill Services (ASMS) is a joint venture between the Cement Australia Group and the Edward C Levy Co (USA) formed in 1989 to service the slag-handling contract at BlueScope Steel Port Kembla. ASMS is contracted to collect and treat molten slag from blast furnaces and the steel making processes. ASMS generally operate 7:30 am to 3:30 pm within the Port Kembla precinct and deliver processed slag to PKCT. At times, there may be deliveries direct to ships 24/7.

ASMS have advised the following:

- the current throughput is variable but last financial year was approximately 150,000 tonnes per annum;
- There is a possible growth of 300,000 tonnes per annum predicted; and
- Shipment sizes are 28,000 tonnes with approximately 10 ships.

2.2.8 Port Kembla Coal Terminal (PKCT)

PKCT operate 24 hours a day, seven days a week (24/7), with the exception of road receivals via public road, which are limited to 7am to 6pm Monday to Saturday excluding Public Holidays. PKCT is staffed 24 hours a day, seven days per week. Staff rosters are organised to ensure 24/7 operation of the Terminal to meet customer requirements. As PKCT does not have any on site operational time restrictions work may be carried out at any time during a 24 hour period.

Coal is delivered to PKCT by road from West Cliff and Appin Collieries via West Cliff CPP and GNRE No. 1 Mine.

Coke is delivered by road from Coalcliff Coke Works and Corrimal Coke Works.

The coal is delivered to the PKCT road receival loop which is located off Port Kembla Road and within the rail receival loop. The coke is delivered to the Bulk Products Stockyards. Coal is delivered to PKCT by rail from other collieries in the Illawarra and Western coalfields.

2.2.9 Summary

A summary of the existing key operating features are provided in Table 2.3.

Table 2.3 Operations Summary Table

Description	Facility Operational Hours	Delivery Hours
West Cliff Colliery (WCC)	24 Hours a day 7 Days a week (24/7)	Delivery to WCCPP by conveyor 24/7
Appin Colliery (AC)	24 Hours a day 7 Days a week (24/7)	24/7 to WCCPP
West Cliff CPP (WCCPP)	24 Hours a day 7 Days a week (24/7)	7.00am - 6.00pm / Monday to Saturday To PKCT (via Port Kembla Road) 6.00pm - 7.00am / Monday to Saturday & Sunday (all day) To PKCT (via BSL)
Gujarat NRE No. 1 Mine (GNRE)	6.00am - 6.00pm / Monday to Saturday	6.00am - 5.00pm / Monday to Saturday (generally not Monday & Wednesday) to PKCT (via Port Kembla Road)
Dendrobium CPP (DCPP)	24 Hours a day 7 Days a week (24/7)	24/7 to PKCT (via internal private roads)
Illawarra Coke Company (ICC)	6.00am - 5.00pm / Monday to Friday (for deliveries)	6:00am to 2:00pm arriving at the site 6:00am to 5:00pm departing the site
BlueScope Steel Limited (BSL)	24 Hours a day 7 Days a week (24/7)	24/7 to PKCT (via internal private roads)
Australian Steel Mill Services (ASMS)	Generally: 7.30am to 3.30pm At peak times: 24 Hours a day 7 Days a week (24/7)	Generally: 7.30am to 3.30pm to PKCT (via internal private roads) At peak times: 24/7 to PKCT (via internal private roads)
Port Kembla Coal Terminal (PKCT)	24 Hours a day 7 Days a week (24/7)	24/7 to Domestic and Export Markets (by ships)

2.3 COAL TRUCK MOVEMENTS

BHPBIC and GNRE have provided detailed coal truck movement data to coincide with each traffic counting period. For the purposes of assessing coal truck movements to PKCT coal delivery times are classified as day or night to coincide with the PKCT restrictions, where:

- Day is considered to be 7:00am to 6:00pm; and
- Night is considered to be 6:00pm to 7:00am.

2.3.1 West Cliff Coal Preparation Plant

Truck movement data from West Cliff CPP to PKCT was provided by BHPBIC for four periods:

- 2006 DATA (AUGUST):
  - Dates: 14-20 August 2006;
  - Deliveries occurred: 7 days out of 7 days recorded.
- 2007 SEPP 7 RELAXATION PERIOD DATA (FEBRUARY – MARCH):
  - Dates: 23 Feb – 21 March 2007;
  - Deliveries occurred: 27 days out of 27 days recorded.
- 2007 HIGH OUTPUT PERIOD DATA (NOVEMBER):
  - Dates: 1 November – 14 November 2007;
  - Deliveries occurred: 14 days out of 14 days recorded.
- 2008 TRIAL 24/7 DATA:
  - Dates: 3 March – 13 April 2008 (24/7 trial period);
  - Deliveries occurred: 30 days out of 42 days recorded.
- 2008 POST TRIAL 11/6 DATA (MAY):
  - Dates: 2 – 20 May 2008;
  - Deliveries occurred: 14 days out of 19 days recorded.

The data supplied for 2006, 2007 and 2008 post trial provided detailed information for each truck departing the West Cliff CPP (as recorded at the Weighbridge) including:

- Departure Time;
- Gross, Net & Tare weight; and
- Destination.

The data supplied for 2008 trial period provided the following information for trucks departing the West Cliff CPP (as recorded at the Weighbridge):

- Number of trucks per hour; and
- Total tonnes of coal per hour.

Detailed data is provided in Appendix A and a summary of the coal truck movement data recorded departing West Cliff CPP for PKCT is presented in a series of figures and tables following:

- Figure 2.3 – Total daily truck movement by day;
- Figure 2.4 - Number of trucks per hour;
- Table 2.4 – average weekday and weekend delivery summaries; and
- Figure 2.5 to Figure 2.10 - average weekday and weekend delivery summaries.

Figure 2.3 Average Daily Coal Truck Movements West Cliff CPP to PKCT

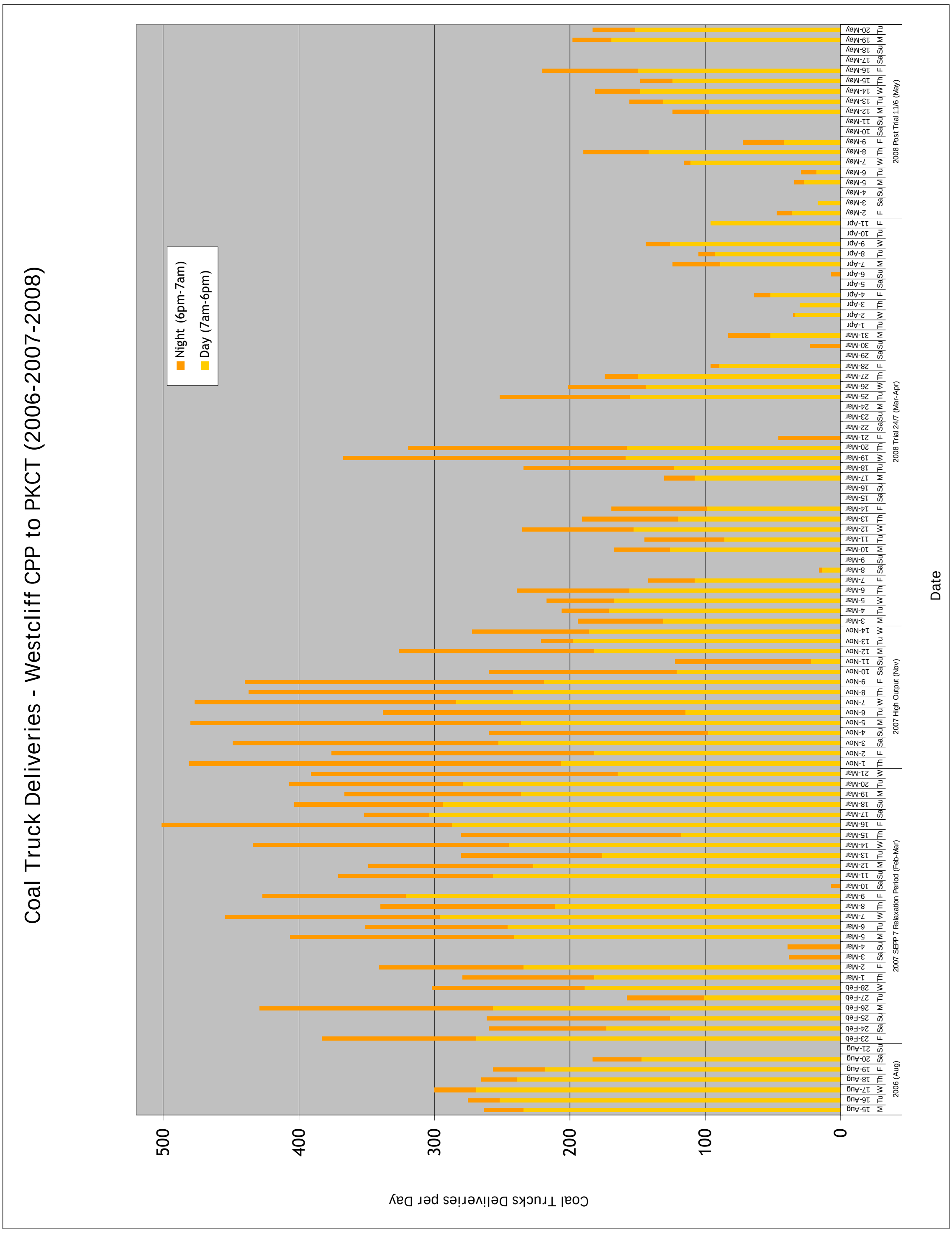


Figure 2.4 Average Coal Truck Movements by Time of Day
West Cliff CPP to PKCT

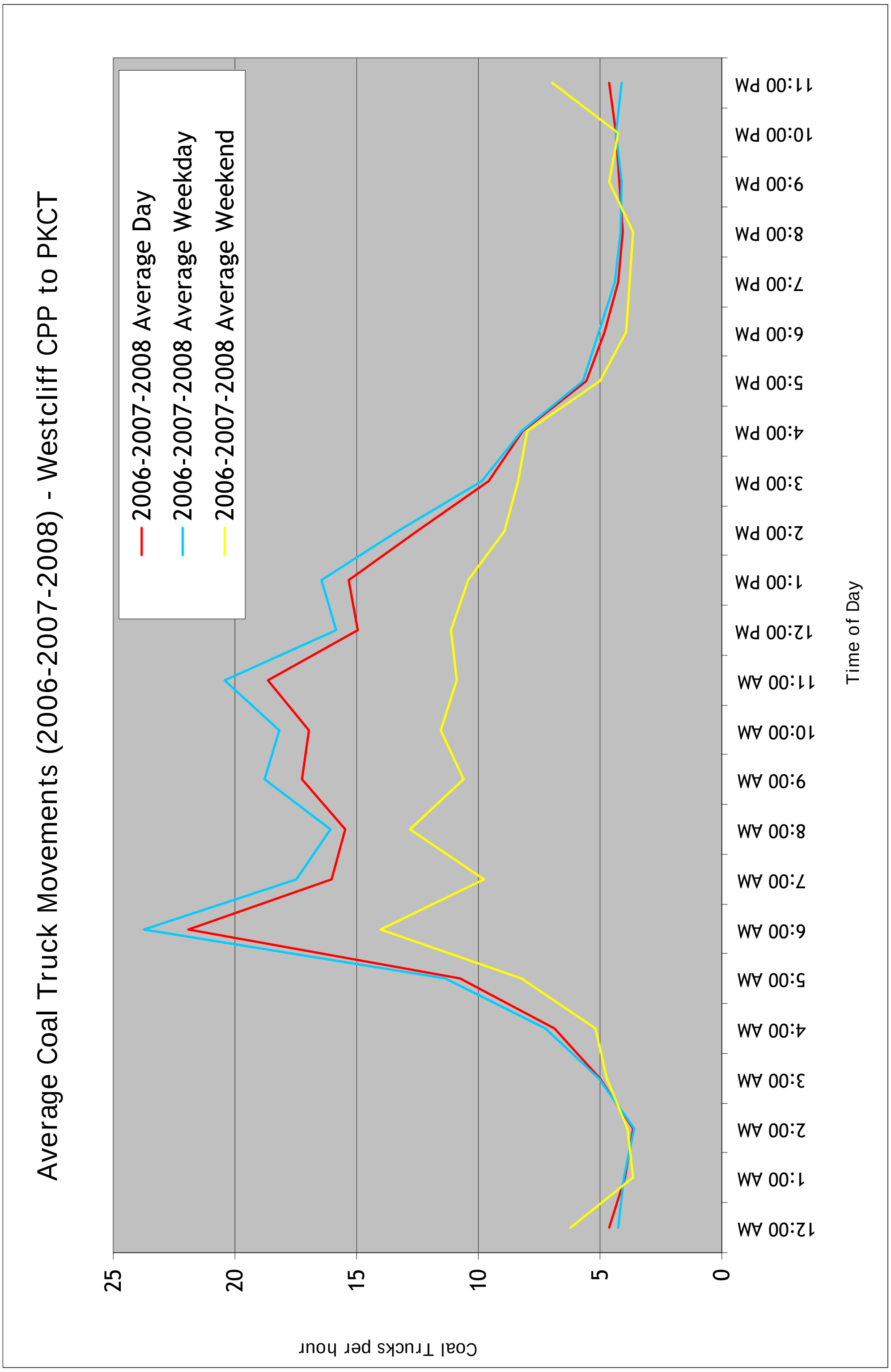


Table 2.4 Summary Coal Truck Movements - West Cliff CPP to PKCT

Period		Loads			Tonnes			% Loads at Night	Average Tonnes per load
		Total	Day	Night	Total	Day	Night		
ALL DATA (71 Delivery Days)									
All Days	TOTAL	21,257	13,693	7,564	764,325	472,143	292,183	35.6%	36.0
	AVERAGE	231	149	82	8,308	5,132	3,176	35.6%	36.0
Weekdays	TOTAL	18,189	11,867	6,322	651,859	408,554	243,304	34.8%	35.8
	AVERAGE	246	160	85	8,809	5,521	3,288	34.8%	35.8
Weekends	TOTAL	3,068	1,826	1,242	112,467	63,589	48,878	40.5%	36.7
	AVERAGE	170	101	69	6,248	3,533	2,715	40.5%	36.7
2008 Post Trial (6 Delivery Days)									
All Days	TOTAL	689	554	135	23,553	18,554	4,998	19.6%	34.2
	AVERAGE	115	92	23	3,925	3,092	833	19.6%	34.2
Weekdays	TOTAL	672	537	135	23,064	18,065	4,998	20.1%	34.3
	AVERAGE	134	107	27	4,613	3,613	1,000	20.1%	34.3
Weekends	TOTAL	17	17	-	489	489	-	0.0%	28.8
	AVERAGE	17	17	-	489	489	-	0.0%	28.8
2008 Trial (30 delivery Days)									
All Days	TOTAL	4,451	2,991	1,460	159,866	104,639	55,227	32.8%	35.9
	AVERAGE	148	100	49	5,329	3,488	1,841	32.8%	35.9
Weekdays	TOTAL	4,405	2,977	1,428	158,200	104,230	53,969	32.4%	35.9
	AVERAGE	163	110	53	5,859	3,860	1,999	32.4%	35.9
Weekends	TOTAL	46	14	32	1,666	408	1,258	69.6%	36.2
	AVERAGE	15	5	11	555	136	419	69.6%	36.2
2007 Records (27 delivery Days)									
All Days	TOTAL	8,609	5,434	3,175	313,226	186,795	126,432	36.9%	36.4
	AVERAGE	319	201	118	11,601	6,918	4,683	36.9%	36.4
Weekdays	TOTAL	6,878	4,280	2,598	249,907	146,736	103,172	37.8%	36.3
	AVERAGE	362	225	137	13,153	7,723	5,430	37.8%	36.3
Weekends	TOTAL	1,731	1,154	577	63,319	40,059	23,260	33.3%	36.6
	AVERAGE	216	144	72	7,915	5,007	2,908	33.3%	36.6
2006 Records (7 delivery Days)									
All Days	TOTAL	1,543	1,359	184	50,260	44,316	5,944	11.9%	32.6
	AVERAGE	257	227	31	8,377	7,386	991	11.9%	32.6
Weekdays	TOTAL	1,360	1,212	148	44,212	39,474	4,738	10.9%	32.5
	AVERAGE	272	242	30	8,842	7,895	948	10.9%	32.5
Weekends	TOTAL	183	147	36	6,048	4,841	1,207	19.7%	33.0
	AVERAGE	183	147	36	6,048	4,841	1,207	19.7%	33.0

Figure 2.5 2006 (Aug) - Daily Coal Truck Movements
West Cliff CPP to PKCT

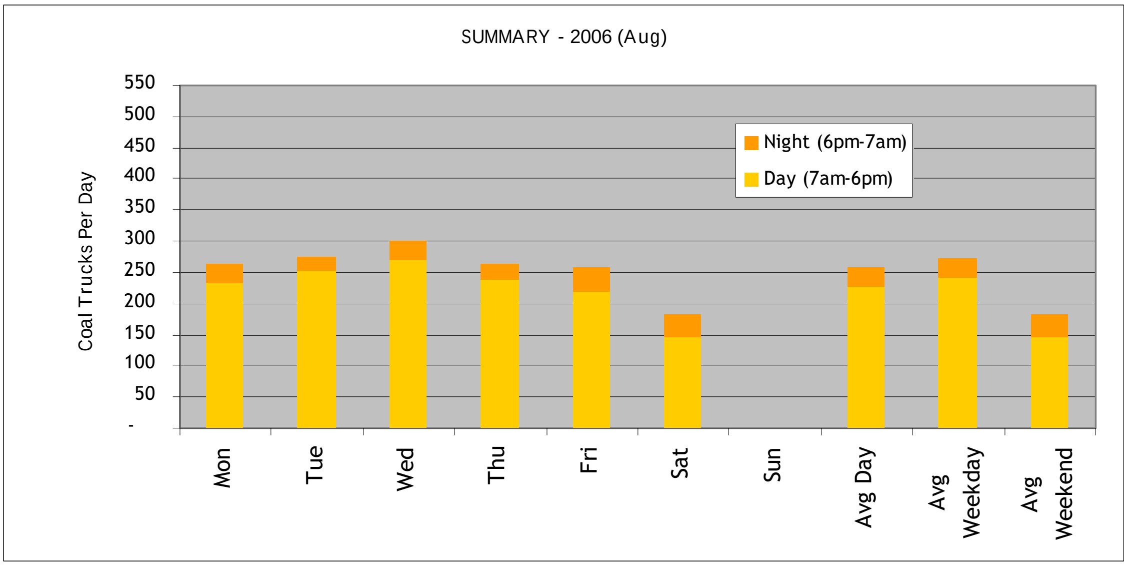


Figure 2.6 2007 SEPP 7 Relaxation - Daily Coal Truck Movements
West Cliff CPP to PKCT

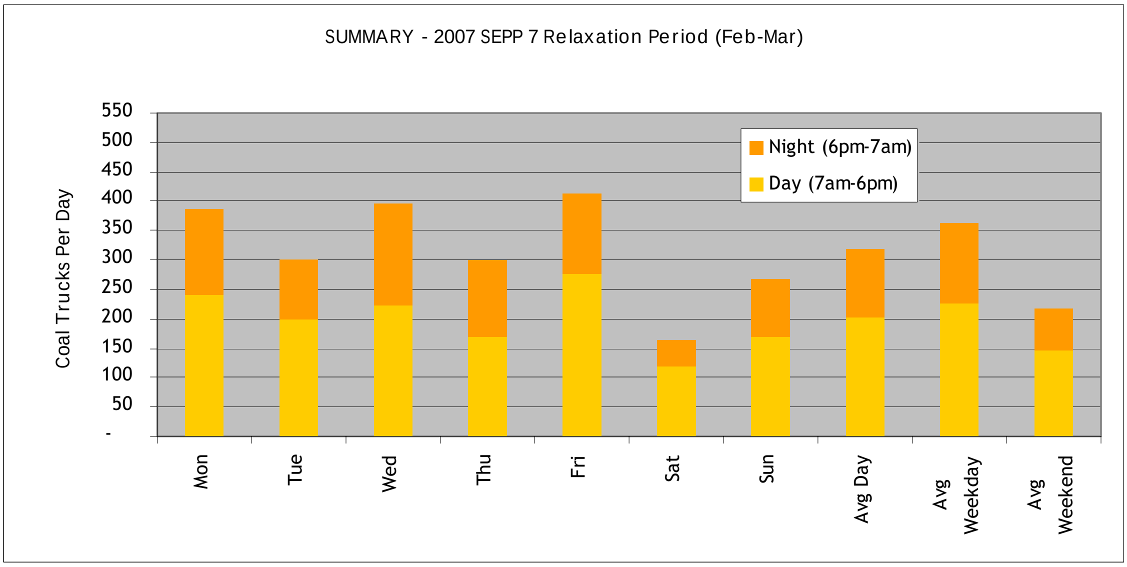


Figure 2.7 2007 (Nov) High Output - Daily Coal Truck Movements West Cliff CPP to PKCT

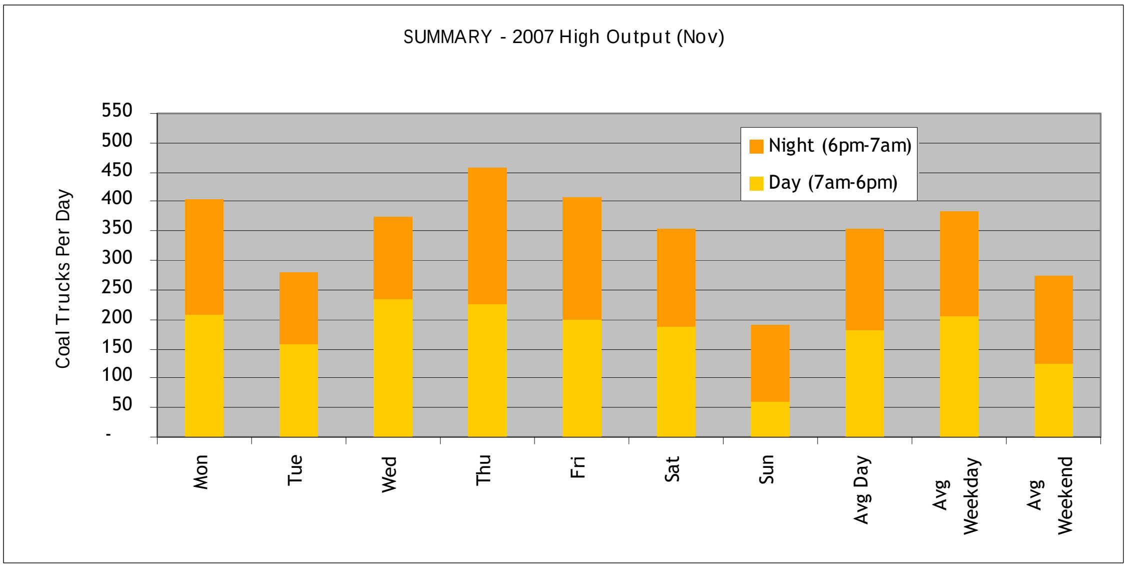


Figure 2.8 2008 Trial - Daily Coal Truck Movements West Cliff CPP to PKCT

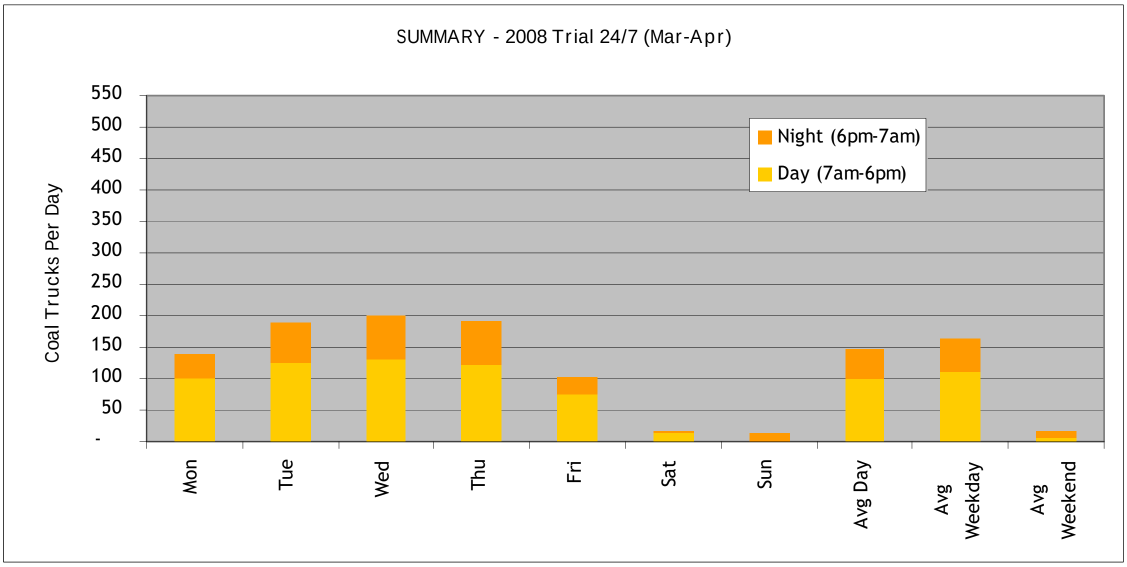


Figure 2.9 2008 Post-Trial - Daily Coal Truck Movements
West Cliff CPP to PKCT

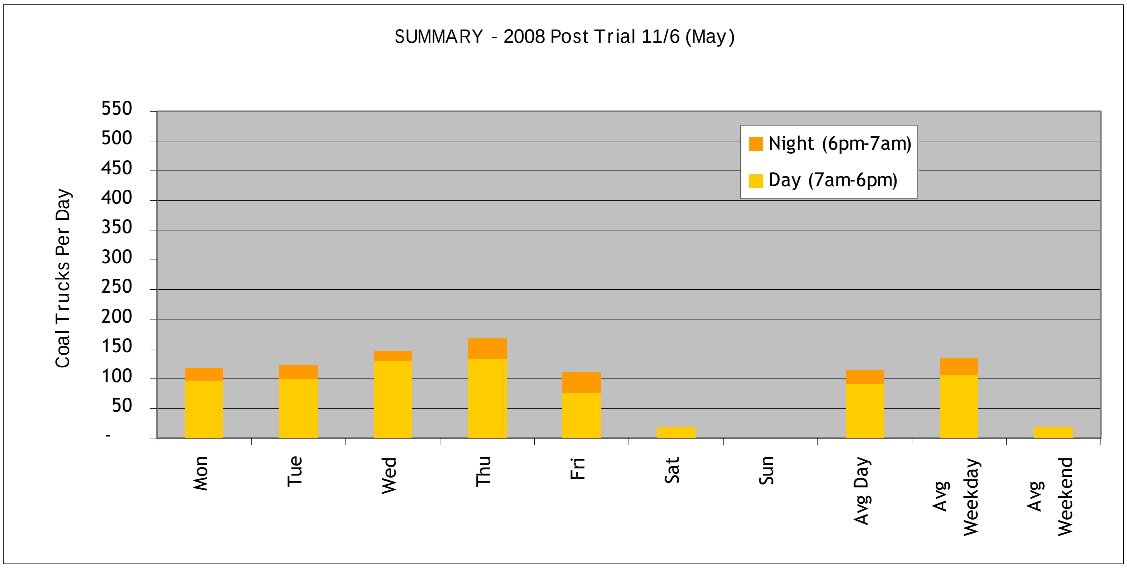
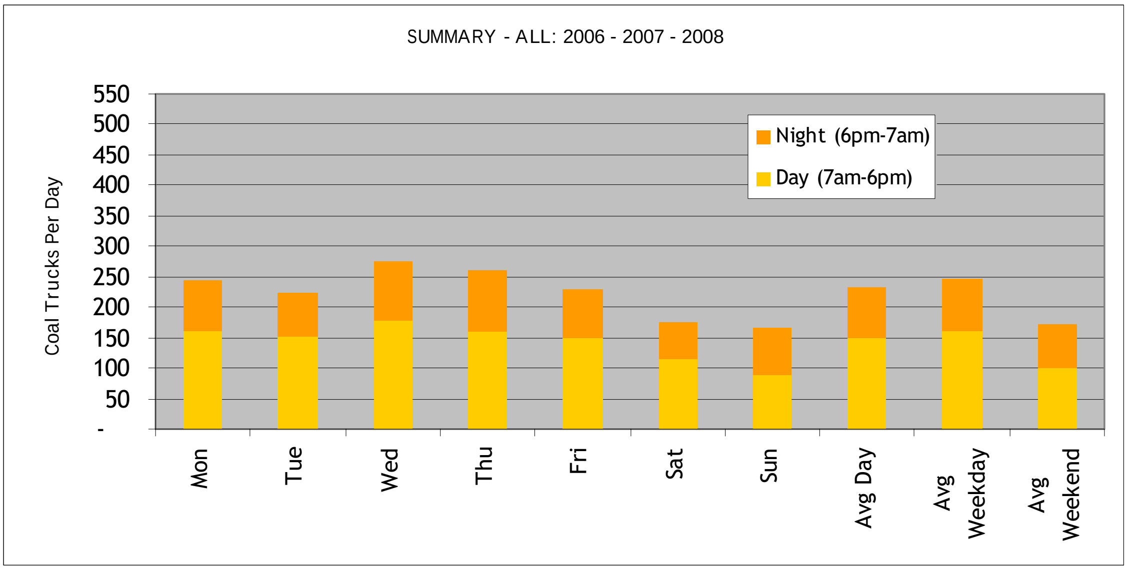


Figure 2.10 Daily Coal Truck Movements
West Cliff CPP to PKCT



2.3.2 Gujarat NRE No. 1 Mine

Truck movement data between GNRE No. 1 Mine and PKCT was provided by GNRE for the following periods:

- 2007 SEPP 7 RELAXATION PERIOD DATA (FEBRUARY – MARCH):
  - Dates: 23 Feb – 16 March 2007;
  - Deliveries occurred: 9 days out of 22 days recorded.
- 2008 TRIAL 24/7 DATA:
  - Dates: 3 March – 13 April 2008 (24/7 trial period);
  - Deliveries occurred: 15 days out of 42 days recorded.
- 2008 POST TRIAL 11/6 DATA (MAY):
  - Dates: 3 – 10 May 2008;
  - Deliveries occurred: 4 days out of 7 days recorded.

The data supplied for the 2008 trial period provided the following information for trucks departing GNRE No. 1 Mine:

- Number of trucks per hour; and
- Total tonnes of coal per hour.

The data supplied for the 2008 post trial period provided the following information for trucks departing GNRE No. 1 Mine:

- Total tonnes of coal per hour; and
- Coal trucks were assumed to carry similar average loads as during other recorded periods.

The data supplied for 2007 provided the following information for trucks departing GNRE No. 1 Mine:

- Number of trucks per day;
- Total tonnes of coal per day; and
- Coal trucks were assumed to have a similar distribution throughout the day as during the 2008 trial period.

Detailed data is provided in Appendix B and a summary of the coal truck movement data recorded departing GNRE for PKCT is presented in a series of figures and tables following:

- Figure 2.11 – Total daily truck movement by day;
- Figure 2.12 - Number of trucks per hour;
- Table 2.5 – averages weekday and weekend delivery summaries; and
- Figure 2.13 to Figure 2.16- average weekday and weekend delivery summaries.

Whilst the GNRE only deliver coal to PKCT by road from No. 1 Mine within the PKCT restricted hours (7:00am to 6:00pm) the coal trucks load and depart the GNRE No. 1 Mine prior to 7:00am. During the 2008 data collection periods 17% of trucks were reported to depart GNRE No. 1 Mine prior to 7:00am. During the 2007 data collection periods 15% of trucks were reported to depart GNRE No. 1 Mine prior to 7:00am. These truck movements are defined as 'night time' deliveries on the following graphs and tables but are not considered to arrive at PKCT outside of the 7:00am to 6:00pm restrictions, due to the travel times between the mine and PKCT.

Figure 2.11 Average Daily Coal Truck Movements GNRE to PKCT

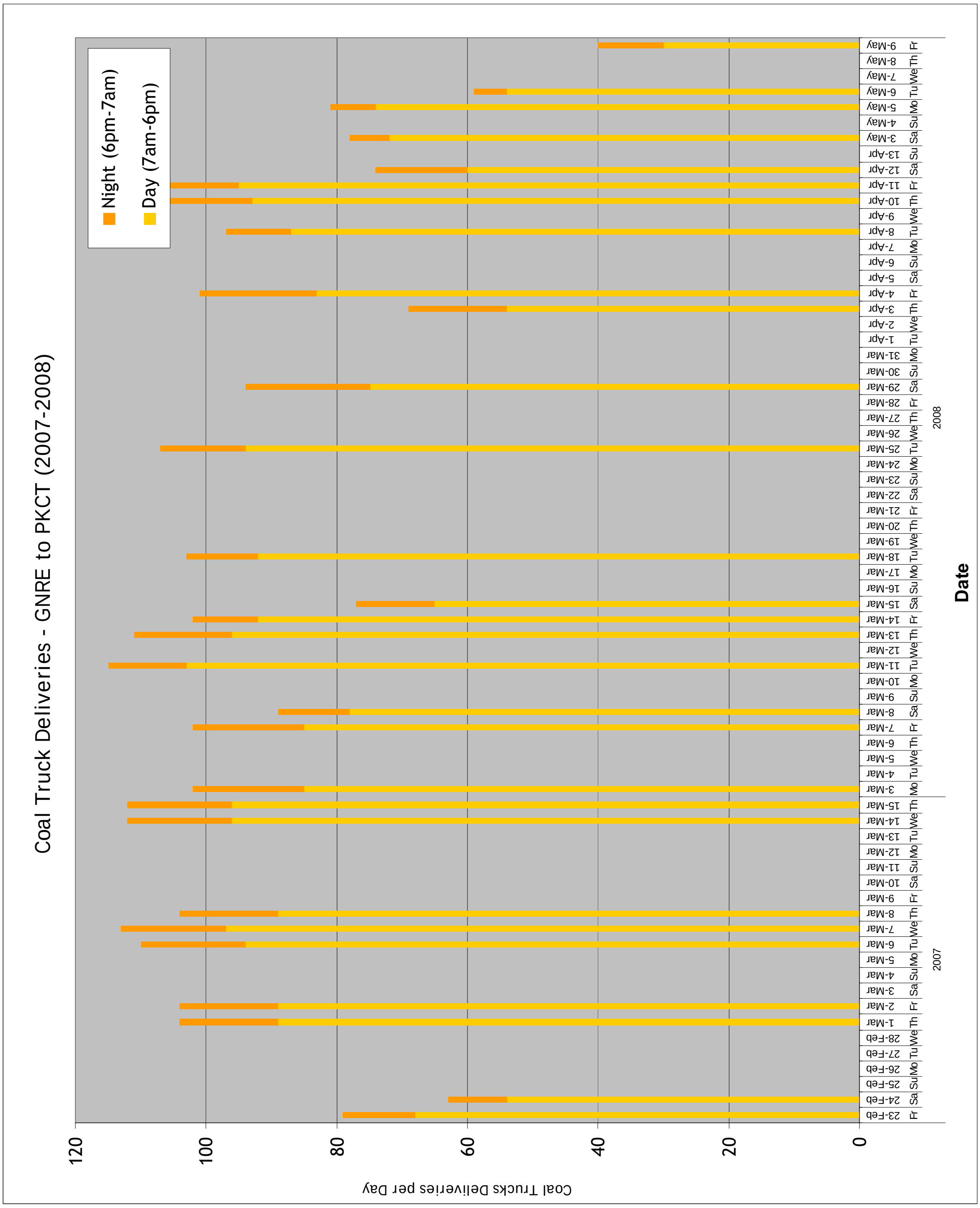


Figure 2.12 Average Coal Truck Movements by Time of Day
GNRE to PKCT

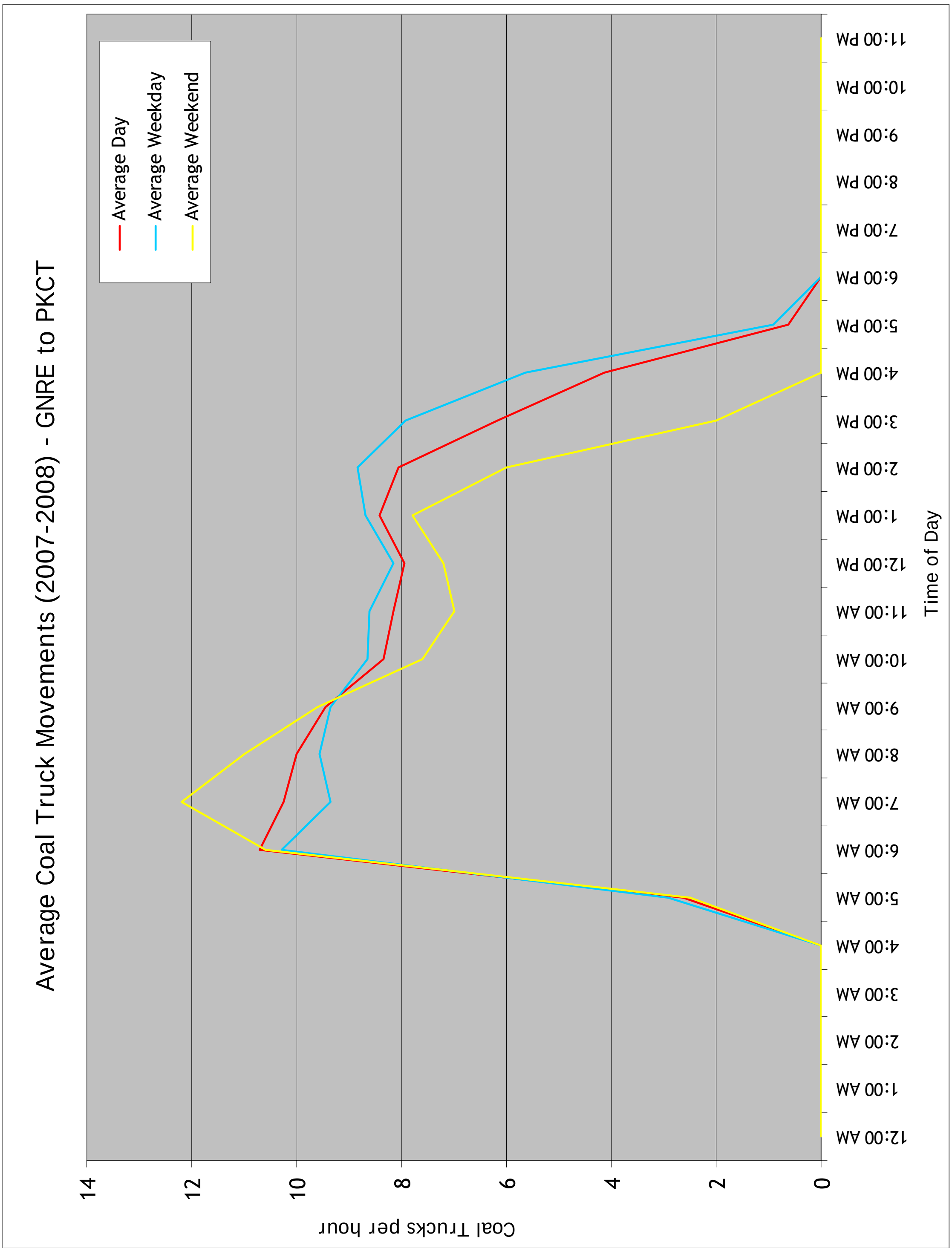


Table 2.5 Summary Coal Truck Movements - GNRE to PKCT

Period		Loads			Tonnes			% Loads at Night	Average Tonnes per load
		Total	Day	Night	Total	Day	Night		
ALL DATA (28 Delivery Days)									
All Days	TOTAL	2,622	2,254	368	86,725	74,495	12,229	14%	33.1
	AVERAGE	94	81	13	3,097	2,661	437	14%	33.1
Weekdays	TOTAL	2,147	1,850	297	70,969	61,081	9,889	14%	33.1
	AVERAGE	98	84	14	3,226	2,776	449	14%	33.1
Weekends	TOTAL	475	404	71	15,755	13,415	2,341	15%	33.2
	AVERAGE	79	67	12	2,626	2,236	390	15%	33.2
2008 Post Trial (4 Delivery Days)									
All Days	TOTAL	258	230	28	8,559	7,639	920	11%	33.2
	AVERAGE	65	58	7	2,140	1,910	230	11%	33.2
Weekdays	TOTAL	180	158	22	5,725	5,023	702	12%	31.8
	AVERAGE	60	53	7	1,908	1,674	234	12%	31.8
Weekends	TOTAL	78	72	6	2,834	2,616	218	8%	36.3
	AVERAGE	78	72	6	2,834	2,616	218	8%	36.3
2008 Trial (15 delivery Days)									
All Days	TOTAL	1,463	1,252	211	46,971	40,128	6,843	14%	32.1
	AVERAGE	98	83	14	3,131	2,675	456	14%	32.1
Weekdays	TOTAL	1,129	974	155	36,244	31,211	5,034	14%	32.1
	AVERAGE	103	89	14	3,295	2,837	458	14%	32.1
Weekends	TOTAL	334	278	56	10,727	8,917	1,809	17%	32.1
	AVERAGE	84	70	14	2,682	2,229	452	17%	32.1
2007 Records (9 delivery Days)									
All Days	TOTAL	901	772	129	31,195	26,728	4,467	14%	34.6
	AVERAGE	100	86	14	3,466	2,970	496	14%	34.6
Weekdays	TOTAL	838	718	120	29,000	24,847	4,153	14%	34.6
	AVERAGE	105	90	15	3,625	3,106	519	14%	34.6
Weekends	TOTAL	63	54	9	2,195	1,881	314	14%	34.8
	AVERAGE	63	54	9	2,195	1,881	314	14%	34.8

Figure 2.13 2007 SEPP 7 Relaxation - Daily Coal Truck Movements GNRE to PKCT

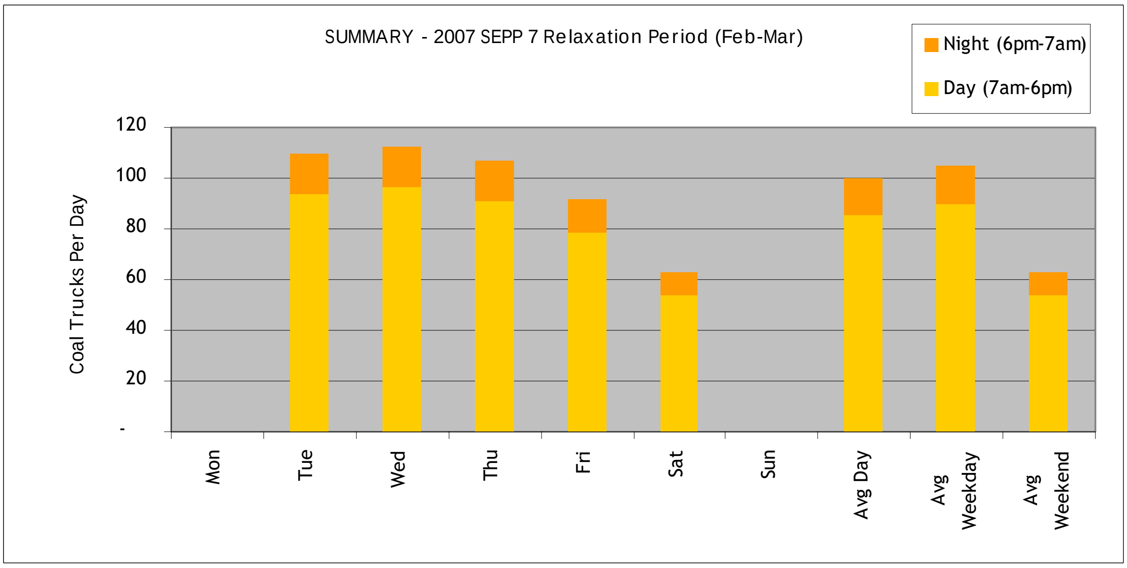


Figure 2.14 2008 Trial - Daily Coal Truck Movements GNRE to PKCT

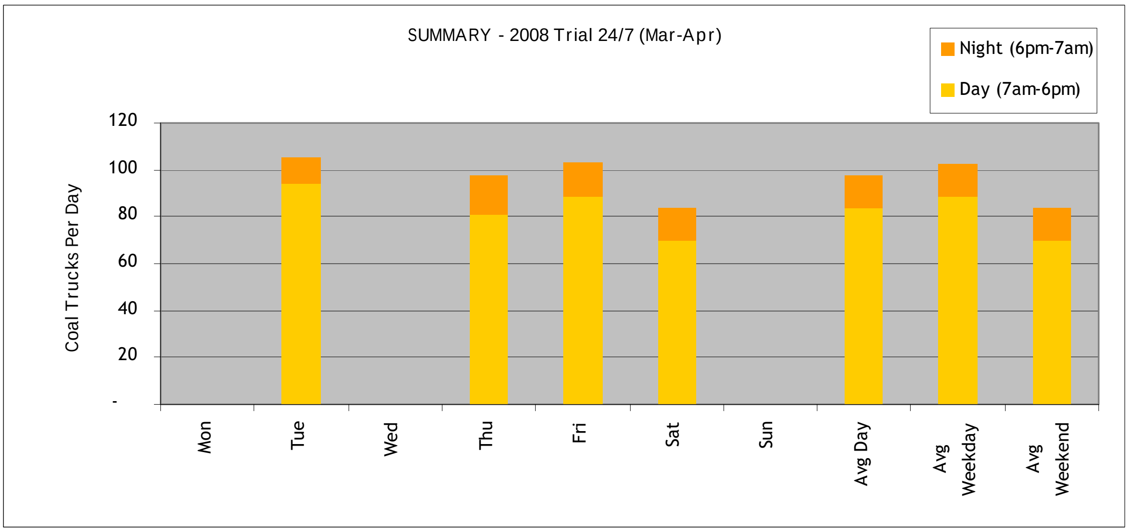


Figure 2.15 2008 Post-Trial - Daily Coal Truck Movements GNRE to PKCT

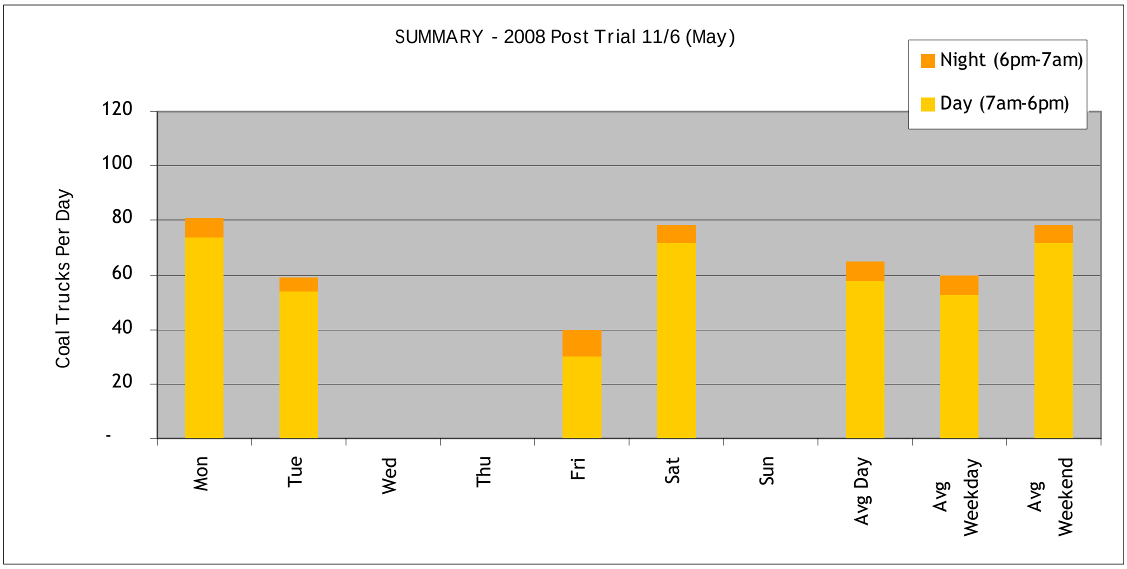
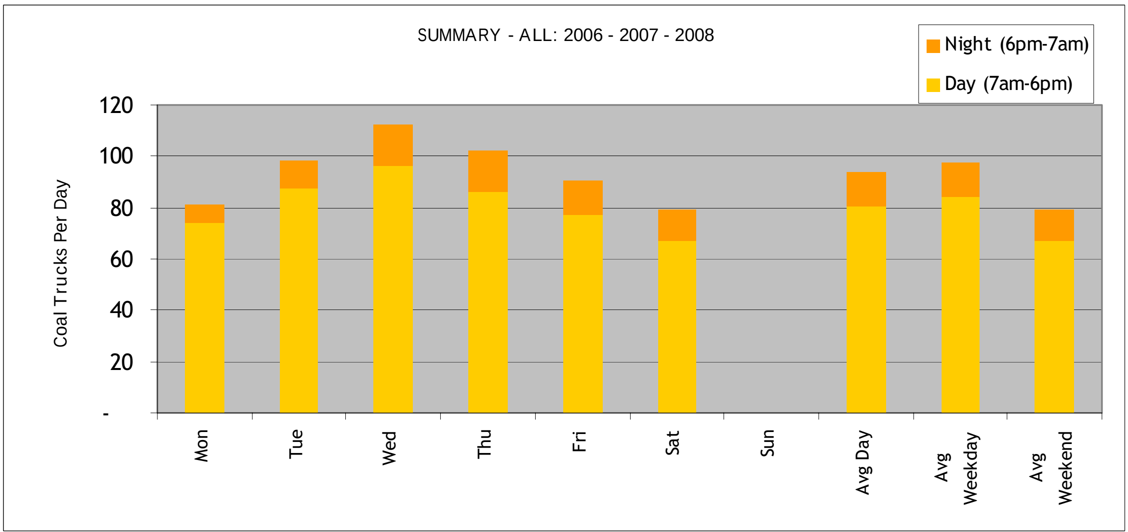


Figure 2.16 Daily Coal Truck Movements GNRE to PKCT



2.3.3 Illawarra Coke Company

ICC has advised that the expected truck movements to PKCT for the 2007-2008 financial year would be in the order of 14,200 for coke and a small number of additional movements for their coal project. The expected payload per truck is approximately 28 tonnes.

ICC has advised that there is a fair amount of certainty for their output of coke to PKCT over the next few years and expect that the current rate of export through PKCT to continue for some years to come:

"*The expected use of Semi Soft coal may recommence from 2008 but this being based on the market trend of the cost of coal. If we continue to use Semi Soft coal then we would have to carry out the project through PKCT as an ongoing exercise as we have done so far this year.*"

For 2008 – 2009 and beyond ICC expect that similar coke trucking movements will continue, however the coal may increase up to approximately 3000 movements per annum.

2.3.4 Dendrobium Coal Preparation Plant

BHPBIC have advised that the following typical coal truck movements occur between Dendrobium CPP and PKCT along the internal roads:

- Average of 195 Truck movements /day
- Maximum of 315 Truck movements / day
- Maximum of 28 Truck movements / hour

2.3.5 BlueScope Steel Limited

It is estimated that the following typical coal truck movements occur between BSL and PKCT along the internal roads:

- 9,285 trucks per annum;
- 25 trucks per day;
- 50 truck movements per day.

2.3.6 Australian Steel Mill Services

ASMS have advised that the following typical truck movements occur between ASMS and PKCT along the internal roads:

- Normal Deliveries: 20,000 tonnes over 7 day period; 12 deliveries per hour
- Peak Deliveries: 20,000 tonnes; 24 deliveries per hour

2.3.7 Observations

Road haulage of coal to the Port Kembla Coal Terminal is regulated under State Environmental Planning Policy (Infrastructure) 2007, which normally restricts the hours of transportation to between 7.00am and 6.00pm, Sundays and public holidays excepted. The NSW Government allowed an emergency relaxation of the then SEPP 7 restrictions during February and March 2007 because of export coal orders that needed to be shipped from Port Kembla Coal Terminal during this period. This relaxation allowed coal haulage to the Terminal at night.

A report was prepared to present the results of a study commissioned by BHPBIC and PKCT to identify environmental sound levels occurring during the transport of coal by truck down Mount Ousley to PKCT at night-time during the emergency relaxation period in 2007 (BHPBIC - PKCT - Coal Transport Noise Study Report of SEPP 7 Extension Noise Assessment February to March 2007, Hatch, May 2007).

It is important to note that the 2007 coal truck movement data was collected during this relaxation of SEPP 7 and as such represents increased delivery tonnages and slightly abnormal delivery patterns.

From the available data on coal truck delivery patterns detailed above several key observations were made.

West Cliff Coal Preparation Plant

In regards to the proportion of coal truck deliveries that departed the West Cliff CPP at night (6pm to 7am) the following was noted:

- On average 35.6% of all truck movements were at night;
- 34.8% of weekday truck movements were at night; and
- 40.5% of weekend truck movements were at night.

BHPBIC have advised that in general the bulk of the coal truck data available was collected during somewhat a-typical delivery periods with exception to 2008 post trial (May) data:

- The 2007 data was collected during the 2007 emergency relaxation of SEPP 7 to allow 24/7 deliveries;
- The 2008 trial period was testing 24/7 operations and particular high output days, however low coal volumes and shipping plans were noted during this time.

The proportion of coal truck deliveries that departed West Cliff CPP at night (6pm to 7am) during the 2008 post trial (May) period, the following was noted:

- On average 19.6% of all truck movements were at night;
- 20.1% of weekday truck movements were at night; and
- 0% of weekend truck movements were at night.

Whilst the general daily distribution of traffic was fairly normal in the higher output times there was a higher proportion of deliveries at night than would normally be undertaken.

For the purposes of future assessment the following has been assumed in relation to night time coal deliveries (6pm to 7am) from West Cliff CPP to PKCT:

- Under 11/6 Operations:
  - 20% of weekday truck movements at night; and
  - 15% of weekend truck movements at night.
- Under 24/7 Operations:
  - 35% of weekday truck movements at night; and
  - 30% of weekend truck movements at night.

These are considered to be conservative estimates of the night time-coal truck volumes, which may in fact be slightly lower than these assumptions. As night-time is the most sensitive period for noise assessment, it was considered reasonable to use these conservative assumptions.

Assuming that overall the distribution of truck is similar to the available data a series of assumed truck distribution patterns were developed for future assessment. These assumed average truck distribution patterns are presented in Appendix C.

GNRE No. 1 Mine

GNRE No. 1 Mine does not currently deliver coal to PKCT by road at night (6pm to 7am). The average daily distribution of coal trucks used for future assessment under current restricted operation is presented in Appendix D.

In the future when GNRE outputs increase it is anticipated that under certain scenarios coal trucks will deliver a proportion of coal at night (after 6pm). The following scenarios have been considered for GNRE future coal deliveries:

- 11/6 Operations - 7am and 6pm on Monday to Saturday;
- 15/5-10/2 operations, where deliveries occur:
  - 7am and 10pm Monday to Friday;
  - 8am to 6pm Saturday and Sunday; and
- 24/7 operations - 24 hours per day 7 days per week;

For the purposes of future assessment the following has been assumed in relation to night time coal deliveries (6pm to 7am) from GNRE to PKCT:

- Under 11/6 Operations:
  - no weekday truck movements at night; and
  - no weekend truck movements at night.
- Under 24/7 operations (hence 13 hours of night deliveries 6pm to 7am) - the same proportion of night time traffic as for BHPBIC has been assumed:
  - 35% of weekday truck movements at night; and
  - 30% of weekend truck movements at night.
- Under 15/5-10/2 operations (hence 4 hours of night deliveries 6pm to 10pm, Monday to Friday) a lower proportion of night time traffic has been assumed:
  - 15% of weekday truck movements were at night; and
  - No weekend truck movements were at night.

The future day time distribution under 24/7&15/5-10/2 or 24/7 operations is assumed to be in proportion with the current day time distribution. The night-time distribution of traffic under 24/7&15/5-10/2 or 24/7 operations is assumed to be even over the night time hours. These assumed average truck distribution patterns are presented in Appendix D.

3 EXISTING ROAD HAULAGE ROUTES

3.1 OVERVIEW

PKCT receives road hauled coal from three collieries, Appin Colliery, West Cliff Colliery, and Gujarat NRE No. 1 Mine. At present, coal deliveries to PKCT via Springhill Road and Port Kembla Road are only permitted between 7:00am and 6:00pm Monday to Saturday. Outside these permitted hours, coal is delivered to PKCT via the private roads in BSL's Port Kembla Steelwork's.

This study will consider the following routes (shown in Figure 3.1):

- Specific Routes from Gujarat NRE No.1 Mine to PKCT:
  - Bellambi Lane from Gujarat NRE No.1 to the Northern Distributor; and
  - Northern Distributor from Bellambi Lane to Southern Freeway.
- Specific Routes from West Cliff & Appin Colliery to PKCT:
  - Appin Road from West Cliff CPP to Mount Ousley Road;
  - Mount Ousley Road from Appin Road to Southern Freeway; and
  - Southern Freeway (Northern) from Mount Ousley Road to the Northern Distributor.
- Common Routes to PKCT:
  - Southern Freeway (Southern) form the Northern Distributor to Masters Road;
  - Masters Road form the Southern Freeway to Springhill Road; and
  - Springhill Road form Masters Road to Port Kembla Road.

The PKCT truck volumes along the routes to the ICC Cokeworks are not considered to change as a result of this proposal and as such a detailed review of the following routes has not been undertaken:

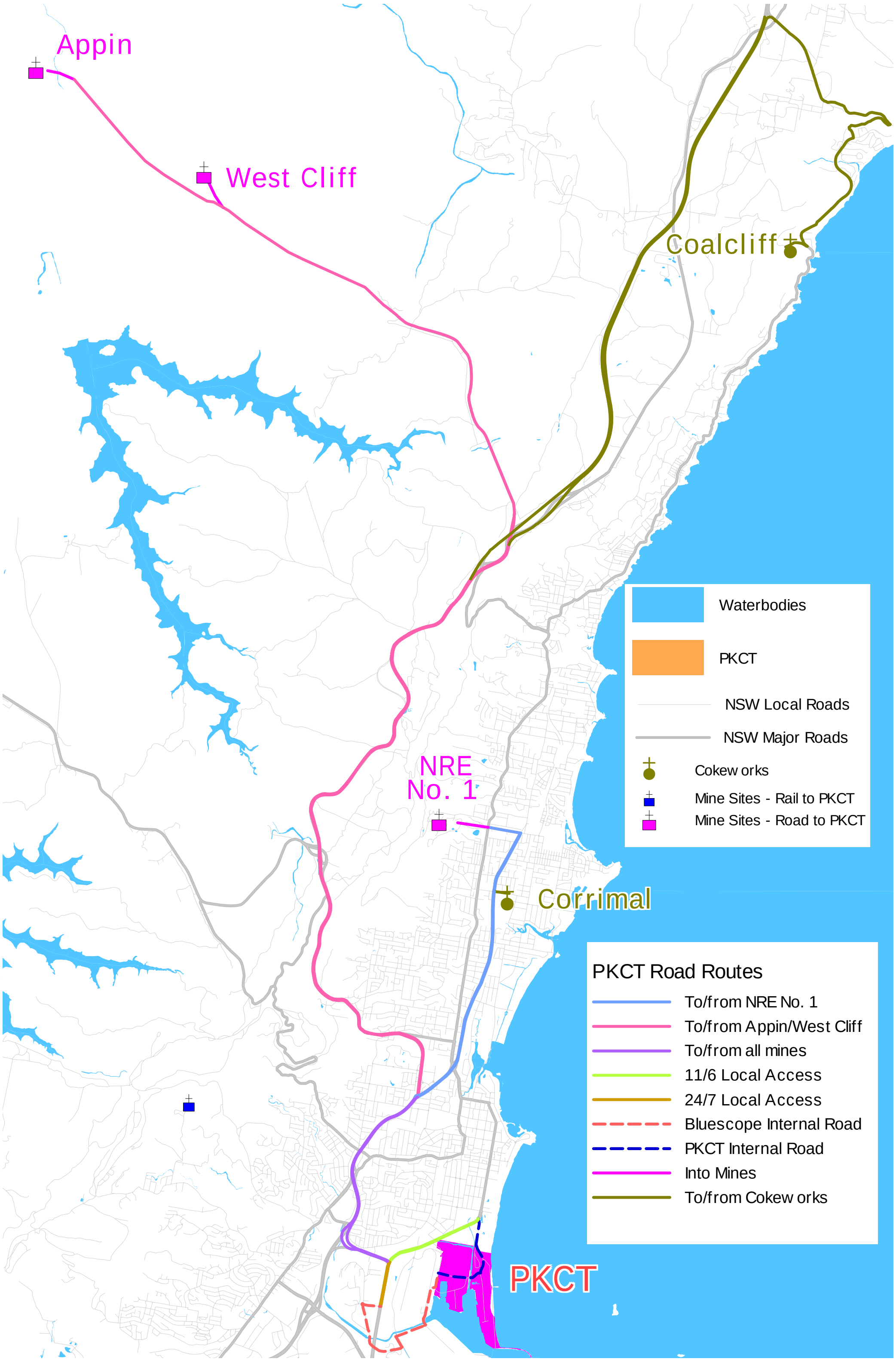
- Southern Freeway from Appin Road to Lawrence Hargrave Drive; and
- Lawrence Hargrave Drive from Southern Freeway to Coalcliff.

The truck volumes along the previously noted public road routes considered by this study include the coal/coke truck movements to and from the ICC Cokeworks as part of the background traffic volumes. All other products are transported wholly along private roads within the Port Kembla Precinct.

3.1.1 West Cliff Coal Preparation Plant

Coal from the Appin Colliery and the West Cliff Colliery are first delivered to West Cliff CPP, and then to PKCT. During the permitted hours, haulage units travel by public roads from West Cliff CPP to PKCT via Appin Road, Mount Ousley Road, Southern Freeway, Masters Road, Springhill Road and Port Kembla Road. Outside the permitted hours, the haulage units travel the same routes except the vehicles turn right at Masters Road/Springhill Road intersection and enter PKCT via the private roads in BSL's Port Kembla Steelwork's via Dendrobium CPP.

Figure 3.1 Road Haulage Routes



3.1.2 Gujarat NRE No.1 Mine

The Gujarat NRE No. 1 Mine operates from 6:00am to 6:00pm, Monday to Saturday, and delivers coal to PKCT between 7:00am to 6:00pm to coincide with the PKCT restrictions. Hence trucks generally depart from the mine site between 6:00am and 5:00pm. The delivery hours are within the permitted operating hours of Springhill Road and Port Kembla Road. The haulage units from Gujarat NRE No. 1 Mine are delivered to PKCT via Bellambi Lane, Northern Distributor, Southern Freeway, Masters Road, Springhill Road and Port Kembla Road only.

3.1.3 Illawarra Coke Company

ICC has advised that the routes used to transport coal and coke by road are as follows:

- Coalcliff Coke Works – Lawrence Hargrave Drive – F6 – Mt Ousley Road – Masters Road – Springhill Road – Port Kembla Road; and
- Corrimal Coke Works – Northern Distributor – F6 – Masters Road – Springhill Road – Port Kembla Road.

ICC has advised that coal trucks making deliveries from the Illawarra coal mines do travel along Bellambi Lane to Corrimal Coke Works, however these are not associated with PKCT activities.

3.1.4 Dendrobium Coal Preparation Plant (DCPP)

BHPBIC transport coal to PKCT from Dendrobium CPP by road within the Port Kembla precinct using the private road – Products Berth Road. Trucks do not utilise any public roads.

3.1.5 BlueScope Steel Limited

BSL transport coal/coke to PKCT by road within the Port Kembla precinct using the private road - Tom Thumb Road. Trucks do not utilise any public roads.

3.1.6 Australian Steel Mill Services

ASMS have advised that the route used to transport slag to PKCT by road do not utilise any public roads and occur only within the Port Kembla precinct from 21 Area via BlueScope Steel utilising the following private roads:

- Yampi Way;
- Tom Thumb Road; and
- Seawall Road.

3.2 EXISTING ROUTE DESCRIPTIONS

3.2.1 Appin Road

Appin Road is an arterial road linking the Southern Freeway at Bulli Tops with coal mines near Appin and south-western Sydney. It is a state road and classified as Main Road No. 177.

Appin Road is predominantly a two-lane undivided rural road, however frequent overtaking lanes are provided due to the high volume of heavy vehicles.

A posted speed limit of 100km/h applies except for the final 1km approach to the Bulli Tops interchange with the Southern Freeway, Princes Highway and Mount Ousley Road where the speed limit is 80km/h.

A good level of safety devices are provided in this section of the route, with centreline and edgeline markings, curve warnings, speed signs, sealed shoulders, guide post and reflectors.

Overtaking lanes are provided in both east bound and west bound directions between Bulli Tops and Wedderburn Road. An overtaking lane for eastbound traffic is located between Appin Colliery and Wedderburn Road.

Access is restricted along the length of the route to formalised at-grade intersections with protected deceleration lanes for turning traffic. The exception to this is some informal access tracks into the water catchment area and short lengths of bypass road alignment which are used as RTA stockpiles or Sydney Water accesses.

3.2.2 Mount Ousley Road

Mount Ousley Road is an arterial road linking the two sections of the Southern (F6) Freeway between Bulli Tops and Mount Ousley. It is a state road – classified as Main Road No. 513 north of Picton Road and Main Road No. 95 south of Picton Road – and carries a majority of the road traffic between Sydney, Wollongong and points south.

Mount Ousley Road consists of many steep descents; a posted speed limit of 40km/h applies for heavy vehicles on descent from Clive Bissell Drive to the Southern Freeway. North of Picton Road, Mount Ousley Road consists of a four-lane carriageway, divided by a jersey barrier. Steep grades characterise the road, despite extensive realignment works undertaken during the period 1970-1992. Noise barriers are also provided on Mount Ousley Road adjacent to the residential areas.

South of Picton Road, Mount Ousley Road commences a 6km descent from the escarpment to the coastal plain. An additional lane for slow vehicles is provided along the entire length of northbound traffic, and an additional southbound lane is also provided over the first 3km.

At the foot of the escarpment, the route bifurcates with most traffic heading to the right along the Southern Freeway. Mount Ousley Road continues to the left to meet the old Princes Highway at Fairy Meadow.

This section of the route is constructed to a good standard with a high level of traffic management and safety devices provided, these include:

- A jersey kerb median safety barrier;
- Lane line and edgeline markings;
- Guideposts and reflectors;
- High level of advisory and regulatory signage; and
- Emergency stopping lane and stopping bed plus a safety ramp on the Mount Ousley descent for southbound vehicles.

The main intersections are located at:

- Clive Bissell Drive;
- New Mt. Pleasant Road; and
- Mt. Ousley Road / F6 Freeway.

Interchanges are provided at:

- Picton Road;
- Princes Highway; and
- Appin Road.

3.2.3 Southern Freeway (F6)

The Southern Freeway forms part of the arterial route linking Sydney and Wollongong, and is split into two sections; Waterfall to Bulli Tops and Mount Ousley to Yallah. It is a State Road, classified as Freeway No. 6006. It carries the nickname "F6" as that was both its legal classification and route number for many years.

The focus of this study is the section of the Freeway between Mount Ousley Road and Masters Road. This section is predominantly four lanes with a jersey barrier median. Two additional lanes are provided between Northern Distributor and Princes Highway interchanges.

The speed limits are 80km/h (Mount Ousley Road to Gipps Road), 90km/h (Gipps Road to Princes Highway) and 100km/h (south of Princes Highway).

Access is restricted along the length of the route.

A central median jersey kerb is provided along the route with standard freeway treatments including lane line and edgeline markings, street lighting and pavement reflectors.

Interchanges or grade separations are provided at:

- Masters Road;
- Mount Keira Road;
- Princes Highway; and
- Northern Distributor.

Adjoining development and land uses along the route include the University of Wollongong, industrial and residential areas. Noise barriers are provided along residential and noise sensitive areas of the F6.

3.2.4 Masters Road

Masters Road is an arterial road connecting the Southern (F6) Freeway and Springhill Road. It is a state road – classified as Main Road No. 602.

It consists of dual carriageways with a total of six lanes with a posted speed limit of 80km/h. Access to Masters Road is restricted to the intersection with Drummond Street.

Masters Road was constructed in 1978 to provide a direct connection between the Southern (F6) Freeway and Springhill Road, to eliminate heavy vehicles from the Mount St Thomas residential area. The development along Masters Road is largely industrial.

At its western end, Masters Road meets the Southern (F6) Freeway and The Avenue at a grade-separated interchange. At its eastern end, Masters Road meets Springhill Road at an expansive channelised and signalised intersection.

3.2.5 Springhill Road

Springhill Road is an arterial road connecting Masters Road and Port Kembla Coal Terminal, as well as being part of the main link from Wollongong to Port Kembla, Warrawong and Shellharbour. It is a State Road – classified as Main Road No. 581. The road was purpose built as a high capacity, access restricted route as a result of port development in the period 1955-1961.
It is a single carriageway with six lanes, with a posted speed limit of 80km/h. Access to Springhill Road is restricted.

There are four signalised intersections along the route and they are:

- Springhill Road/Masters Road intersection;
- Springhill Road/Tom Thumb Road intersection;
- Springhill Road/Port Kembla Road intersection; and
- Springhill Road/Five Islands Road intersection.

3.2.6 Port Kembla Road

Port Kembla Road is a State Road – classified Main Road No. 671 – providing access from the arterial road network to Port Kembla Coal Terminal. It functions as a local road due to it only serving a heliport, sewage treatment works, golf course and the port.

Port Kembla Road is a two-lane undivided road, connecting to Springhill Road at a signalised seagull intersection.

3.2.7 Bellambi Lane

Bellambi Lane is an east-west road linking Gujarat NRE No. 1 Mine, Princes Highway, the Northern Distributor and Bellambi Railway Station. The section used for coal haulage is between Gujarat NRE No. 1 Mine and Northern Distributor.

West of Princes Highway, Bellambi Lane is a local road providing access to Gujarat NRE No. 1 Mine. It is a two-lane undivided road with a signalised intersection at Princes Highway.

Between Princes Highway and the Northern Distributor, Bellambi Lane is a four-lane undivided road with restricted access. It is part of the Princes Highway (State Highway No. 1) and a State Road. However, once the Northern Distributor extension is completed in 2009, it is proposed that the Highway No. 1 and State Road classifications will be moved onto the new road. Bellambi Lane will revert to being a collector road.

3.2.8 Northern Distributor

The Northern Distributor is an arterial road through Wollongong's northern suburbs, extending from the Southern (F6) Freeway at Gwynneville to Bellambi Lane at Bellambi. Extension of the distributor to Princes Highway at Molloy Street, Bulli, is underway and due for completion in 2009.

The section of the distributor from North Wollongong to Bellambi Lane is part of the Princes Highway, although not signed as such. Between the Southern (F6) Freeway and North Wollongong it is a State Road, classified as Main Road No. 626. North of North Wollongong, it is part of Highway No. 1 and is a State Road.

It is a dual carriageway with two lanes in each direction. Access to the Northern distributor is restricted along its length.

There are four signalised intersections and three grade-separated interchanges along the route. The intersections are at Bellambi Lane, Rothery Street, Railway Street, and Towradgi Road. The interchanges are at Princes Highway, University Avenue, and the Southern (F6) Freeway.

3.2.9 Lawrence Hargrave Drive

Lawrence Hargrave Drive is an arterial road linking the Princes Highway at Bulli with the Royal National Park and the Southern Freeway at Helensburgh. Re-opened in 2005 after a lengthy closure due to a rock slide between Coalcliff and Clifton, it is an arterial road and classified as Main Road No. 185.

Lawrence Hargrave Drive is predominantly a two-lane undivided road, with a short section at Thirroul having additional lanes, in an environment that fluctuates from urban to rural.

A posted speed limit of 60km/h applies along most of its length and access to/from the carriageway is generally unrestricted.

3.2.10 Princes Highway

The Princes Highway is an arterial route through Wollongong's northern suburbs, stretching from south of the CBD to the top of Bulli Pass. Somewhat confusingly, the Princes Highway actually follows the Northern Distributor and Bellambi Lane from North Wollongong to Bellambi, however signage does not indicate this. It is a state road and classified as State Highway No. 1. The applicable speed limit is 60km/h, with the exception of the 40km/h school zone outside Bulli Primary School.

North of Bellambi Lane the Princes Highway is a four-lane undivided road with on-street parking permitted in some locations. Peak period clearway restrictions apply to maximise available traffic capacity. The section between Bellambi Lane and Hospital Road will be bypassed by the extension of the Northern Distributor in 2009.

3.3 EXISTING ROUTE CHARACTERISTICS

3.3.1 Route Length

The road haulage routes lengths are summarised in Table 3.1.

Table 3.1 Road Haulage Route – Distance

	Distance (km)		
Route	West Cliff to PKCT	GNRE to PKCT	Any
Appin Rd	10.7		10.7
Mount Ousley Rd	14.5		14.5
Southern Fwy (north)	1.7		1.7
Southern Fwy (south)	3.4	3.4	3.4
Masters Rd	1.3	1.3	1.3
Springhill Rd	2.2	2.2	2.2
Bellambi Ln		0.7	0.7
Northern Distributor		6.5	6.5
Total	33.8	14.1	41

Just over 41 kilometres of roads are used to transport coal to PKCT from the West Cliff Colliery, and GNRE Mine No.1. The route between West Cliff and PKCT is approximately 33.8km with the route from GNRE Mine No.1 being 14.1km.

3.3.2 Physical Characteristics

The physical characteristic such as type of terrain, number of lanes, width of lanes, shoulder widths and much more all affect the overall capacity of a road. The road haulage routes physical characteristics are summarised in Table 3.2 and detailed in Appendix E.

Table 3.2 Road Haulage Route – Ownership and Type

Location			Public/ Private	Urban/ Rural	Carriageway Type	Urban Road Category
Street	between	and				
Appin Rd	Appin Mine Access	West Cliff Mine Access	Public	Rural	U2L	-
Appin Rd	West Cliff Mine Access	Dharawal Conserv. Entry	Public	Rural	U2L	-
Appin Rd	Dharawal Conserv. Entry	No. 10A Fire Road	Public	Rural	U2L	-
Appin Rd	No. 10A Fire Road	Mount Ousley Rd	Public	Rural	U2L	-
Mount Ousley Rd	Appin Rd	Picton Rd	Public	Rural	UML	-
Mount Ousley Rd	Picton Rd	Southern Fwy	Public	Rural	UML	-
Southern Fwy	Mount Ousley Rd	Northern Distributor	Public	Urban	FWY	-
Southern Fwy	Northern Distributor	Princes Hwy	Public	Urban	FWY	-
Southern Fwy	Princes Hwy	Masters Rd	Public	Urban	FWY	-
Bellambi Ln	Princes Hwy	Northern Distributor	Public	Urban	URB	4UC
Northern Distributor	Bellambi Ln	Railway St	Public	Urban	UML	-
Northern Distributor	Railway St	Southern Fwy	Public	Urban	UML	-
Masters Rd	Southern Fwy	Springhill Rd	Public	Urban	URB	6DCL
Springhill Rd	Masters Rd	Port Kembla Rd	Public	Urban	URB	6DCL
Springhill Rd	Masters Rd	Entry Road	Public	Urban	URB	6DCL

U2L = Uninterrupted Two-lane Road
UML = Uninterrupted Multi-lane Road
FWY = Freeway
URB = Urban Road

4UC = 4 lane undivided carriageway
6DCL = 4 lane divided carriageway with clearways

3.3.3 Travel Times

The travel times along the road haulage routes were estimated based on distances and average speeds at various times of the day. The estimated travel times are summarised in Table 3.3 and Table 3.4 for the route to/from West Cliff and to/from GNRE respectively.

Table 3.3 Road Haulage Travel Times (West Cliff – PKCT – West Cliff)

Road Section		Distance (km)	Speed Limit (km/h)	Average Travel Speed		Travel Times (mins)			
						Per Section		Cumulative	
Road Name	Road Type			Peak	Non-Peak	Peak	Non-Peak	Peak	Non-Peak
West Cliff Mine Access	Private	0.6	60	42	48	0.9	0.8	0.9	0.8
Appin Rd	Public	10.7	80	64	72	10.0	8.9	10.9	9.7
Mount Ousley Rd	Public	14.5	40	32	36	27.2	24.2	38.1	33.9
Southern Fwy	Public	1.7	110	99	99	1.0	1.0	39.2	34.9
Southern Fwy	Public	3.4	110	99	99	2.1	2.1	41.2	37.0
Masters Rd	Public	1.3	80	56	64	1.4	1.3	42.7	38.3
Springhill Rd	Public	2.2	80	56	64	2.4	2.1	45.1	40.3
Port Kembla Rd	Private	0.6	60	42	48	0.9	0.8	45.9	41.1
Sub-Total	Both	35.1				45.9	41.1		
at PKCT		-	-	-	-	15.0	15.0	60.9	56.1
Port Kembla Rd	Private	0.6	60	42	48	0.9	0.8	61.8	56.8
Springhill Rd	Public	2.2	80	56	64	2.4	2.1	64.2	58.9
Masters Rd	Public	1.6	80	56	64	1.7	1.5	65.9	60.5
Southern Fwy	Public	3.3	110	99	99	2.0	2.0	67.9	62.5
Southern Fwy	Public	1.8	110	99	99	1.1	1.1	69.0	63.5
Mount Ousley Rd	Public	14.4	40	32	36	27.0	24.0	96.0	87.5
Appin Rd	Public	10.9	80	64	72	10.2	9.1	106.2	96.6
West Cliff Mine Access	Private	0.6	60	42	48	0.9	0.8	107.0	97.3
Sub-Total	Both	35.4				46.1	41.3		
Total	Both	0.0				107.0	97.3		

The travel time from West Cliff to PKCT (return) is estimated to be 107 minutes in peak periods and 97 minutes in non-peak periods. This includes an allowance of 15 minutes at PKCT.

Table 3.4 Road Haulage Travel Times (GNRE – PKCT – GNRE)

Road Section		Distance (km)	Speed (km/h)	Average Travel Speed		Travel Times (mins)			
						Per Section		Cumulative	
Road Name	Road Type			Peak	Non-Peak	Peak	Non-Peak	Peak	Non-Peak
NRE Access	Private	0.7	60	42	48	1.0	0.8	1.0	0.8
Bellambi Ln	Public	0.7	60	42	51	1.0	0.8	2.0	1.7
Northern Distributor	Public	1.4	60	42	54	2.0	1.6	4.0	3.3
Northern Distributor	Public	5.0	60	42	54	7.1	5.6	11.2	8.8
Southern Fwy	Public	3.4	110	99	99	2.1	2.1	13.2	10.9
Masters Rd	Public	1.3	80	56	64	1.4	1.3	14.7	12.2
Springhill Rd	Public	2.2	80	56	64	2.4	2.1	17.0	14.2
Port Kembla Rd	Private	0.6	60	42	48	0.9	0.8	17.9	15.0
Sub-Total	Both	15.4				17.9	15.0		
at PKCT		-	-			15.0	15.0	32.9	30.0
Port Kembla Rd	Private	0.6	60	42	48	0.9	0.8	33.8	30.7
Springhill Rd	Public	2.2	80	56	64	2.4	2.1	36.2	32.8
Masters Rd	Public	1.6	80	56	64	1.7	1.5	37.9	34.4
Southern Fwy	Public	3.3	110	99	99	2.0	2.0	39.9	36.4
Northern Distributor	Public	5.1	60	42	54	7.3	5.7	47.2	42.0
Northern Distributor	Public	1.4	60	42	54	2.0	1.6	49.2	43.6
Bellambi Ln	Public	0.7	60	42	51	1.0	0.8	50.2	44.4
NRE Access	Private	0.7	60	42	48	1.0	0.8	51.2	45.3
Sub-Total	Both	15.7				18.3	15.3		
Total	Both					51.2	45.3		

The travel time from GNRE to PKCT (return) is estimated to be 51 minutes in peak periods and 45 minutes in non-peak periods. This includes an allowance of 15 minutes at PKCT.

3.4 LAND USE ALONG ROUTES

This section provides an overview of land uses along the road haulage routes. Figure 3.2 highlights the sensitive land uses along all routes.

3.4.1 Port Kembla Road

Port Kembla Road is the access road to the Port Kembla Coal Terminal and is abutted by open space at its northern end, and the port area at its southern end.

3.4.2 Appin Road

Appin Road, for the most part, passes through undeveloped land gazetted as part of Sydney's water catchment area. However, at its western end, Appin Road passes through the semi-rural village of Appin, a residential area.

3.4.3 Mount Ousley Road

Mount Ousley Road passes through mostly non-urban land gazetted as part of Sydney's water catchment. Descending from the escarpment, Mount Ousley Road enters residential areas, albeit separated from them by controlled access conditions, vegetation, sound barriers and earthworks.

3.4.4 Southern Freeway

The Southern Freeway runs north-south through mainly residential areas, some of which pre-date the freeway (Gwynneville) and others that were built around the freeway (Figtree/Mangerton). The Freeway is generally separated from abutting land uses by vegetation, cuttings and/or sound barriers. The Freeway also passes between Wollongong TAFE and the University of Wollongong.

3.4.5 Masters Road

Masters Road is a purpose-built access to the industrial area and port, and thus its abutting land uses are generally industrial. A small part of the Mount St Thomas residential area abuts the road west of Jack Kimble Bridge, however a buffer of vegetation and sound barriers is provided. East of Jack Kimble Bridge, the South Coast Railway Line provides a buffer between the road and the residential areas which it bypasses.

3.4.6 Springhill Road

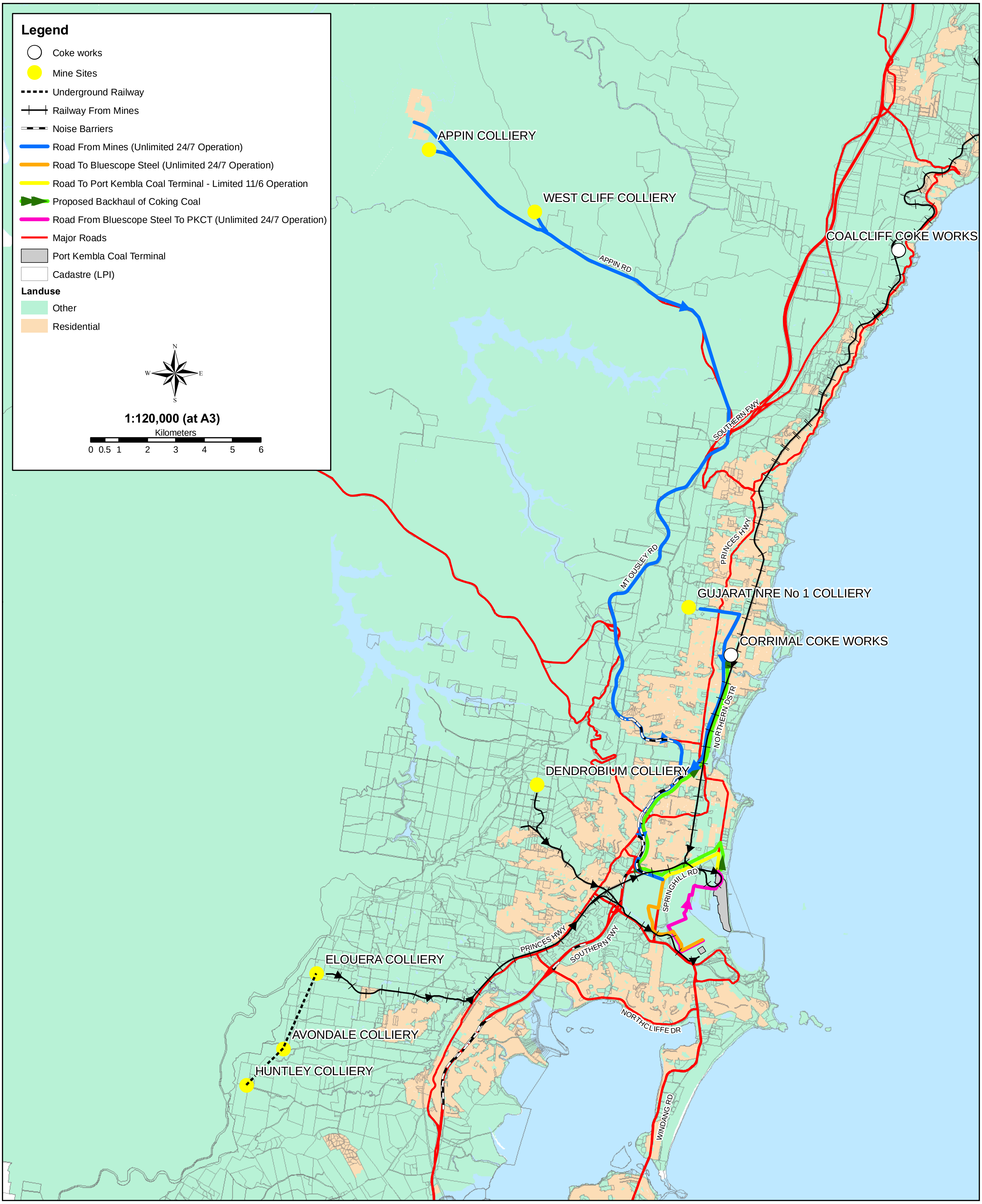
Springhill Road is a purpose-built access road for the industrial area and port. As such, the abutting land uses are industrial, including the Steelworks on the southern side and light industry units on the northern side. North-east of Bridge Street, a significant buffer of parkland is provided, separating Springhill Road and the industrial land uses from the residential areas of Coniston and Wollongong. The land zoning and typical land uses around Springhill Road are detailed in Figure 3.3 and Figure 3.4.

3.4.7 Bellambi Lane

Bellambi Lane is abutted by residential development on both sides, however direct property access is only provided on the southern side. The land zoning and typical land uses around Bellambi Lane are detailed in Figure 3.5 and Figure 3.6.

3.4.8 Northern Distributor

The Northern Distributor runs parallel to the South Coast Railway Line through the northern suburbs of Wollongong, generally adjacent to residential areas. The Distributor also runs through some open space at Corrimal and North Wollongong, and industrial areas at Fairy Meadow and North Wollongong. At Gwynneville it runs adjacent to two high schools and a primary school, between University Avenue and Princes Highway. The Distributor is buffered from abutting land uses by a combination of vegetation and sound barriers along most of its length.



PKCT
PORT KEMBLA COAL TERMINAL

Sensitive Landuse Along Route

REGIONAL CONTEXT

Figure 3.2

Cardno Forbes Rigby

Map Produced by Cardno Forbes Rigby
Date: 28 November 2007
Coordinate System: Zone 56 MGA/GDA 94
GIS MAP REF:
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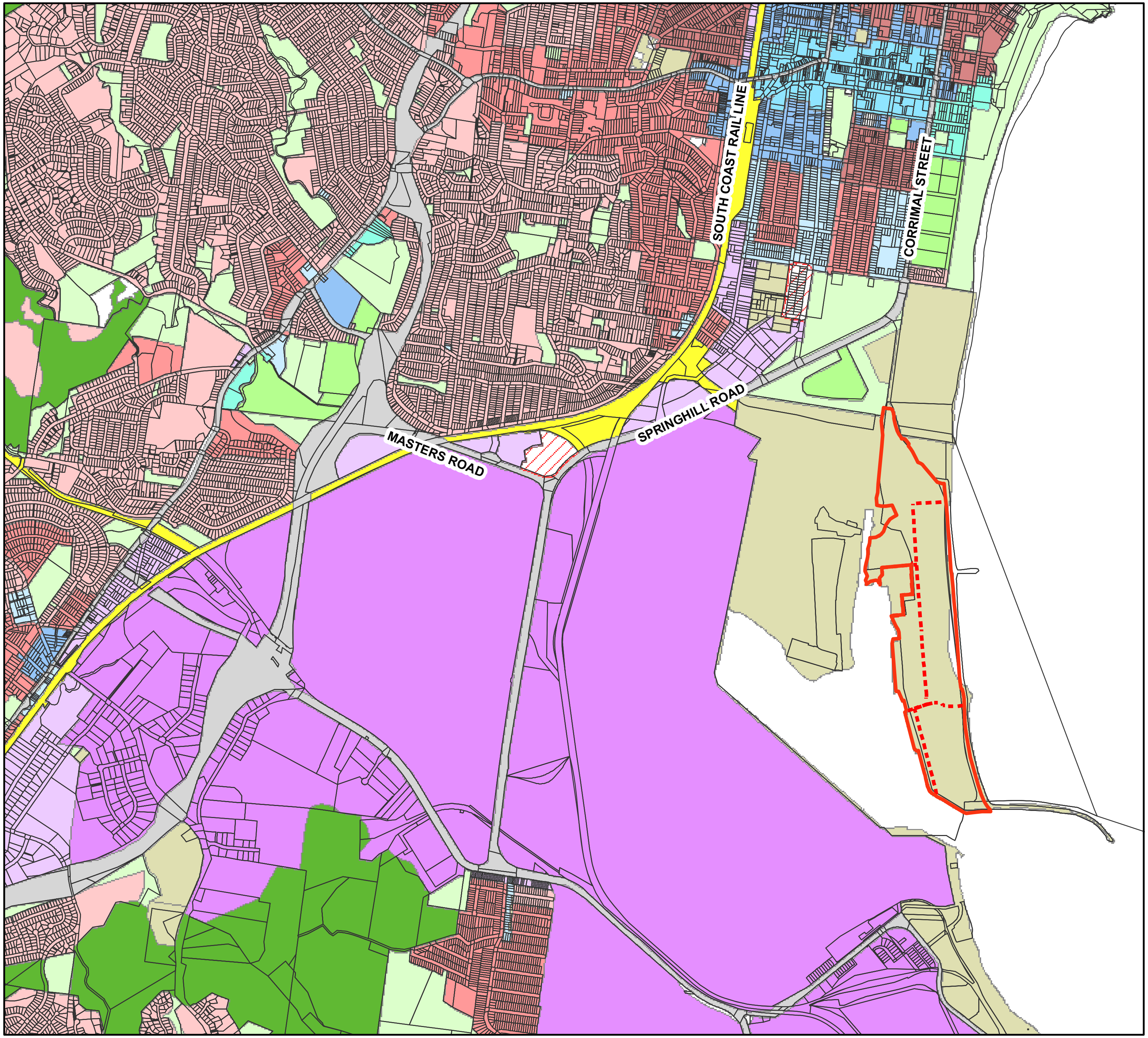

Land Zoning

SPRINGHILL ROAD

Legend Figure 3.3

PKCT Lease Areas

- Site Boundary
- Sub Areas
- Cadastre (LPI)

Wollongong LEP 1990

- 2(a) Residential - Low Density
- 2(b) Residential - Medium Density
- 2(c) Residential - High Density
- 3(a) General Business
- 3(c) Regional Business
- 3(d) Commerical Services
- 4(a) Industrial - Light
- 4(b) Industrial - Heavy
- 6(a) Public Recreation
- 6(b) Private Recreation
- 7(b) Environmental Protection - Conservation
- 6(c) Tourism
- 5(a) Special Uses
- 5(b) Special - Railways
- 5(c) Special - Main Roads
- Deferred

N W E S

Scale 1:30,000 (at A4)

Meters
0 125 250 500 750 1,000

Cardno Forbes Rigby

Map Produced by Cardno Forbes Rigby
Date: 29 October 2007
Coordinate System: Zone 56 MGA/GDA 94
GIS MAP REF:
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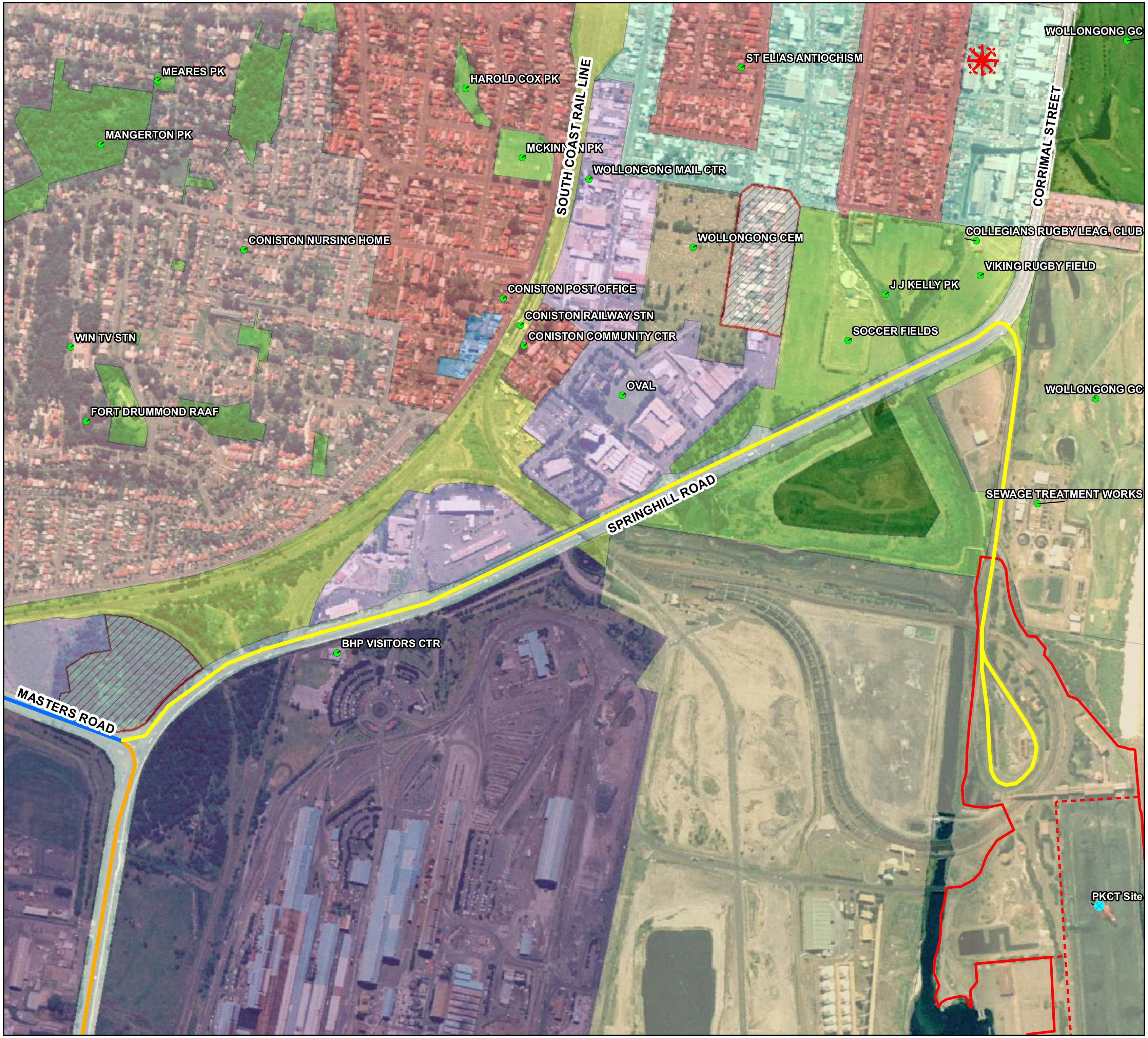

PKCT
PORT KEMBLA COAL TERMINAL

Landuse Along Route

SPRINGHILL ROAD

Legend

- Cultural Points
- Road To Port Kembla Coal Terminal
- Road To Dendrobium Washery
- Road From Mines

Wollongong Broad Landuse (ABS)

- Commerical Services
- Deferred
- Industrial - Heavy
- Industrial - Light
- Main Roads
- Neighbourhood Business
- Private Recreation
- Public Recreation
- Residential - Low Density
- Residential - Medium Density
- Special - Main Roads
- Special - Railways
- Special Uses

PKCT Lease Area

- Site Boundary
- Sub Areas

Figure 3.4

N
W E
S

Scale 1:8,000 (at A3)

Meters
0 50 100 200 300 400

Cardno Forbes Rigby

Map Produced by Cardno Forbes Rigby
Date: 9 August 2007
Coordinate System: Zone 56 MGA/GDA 94
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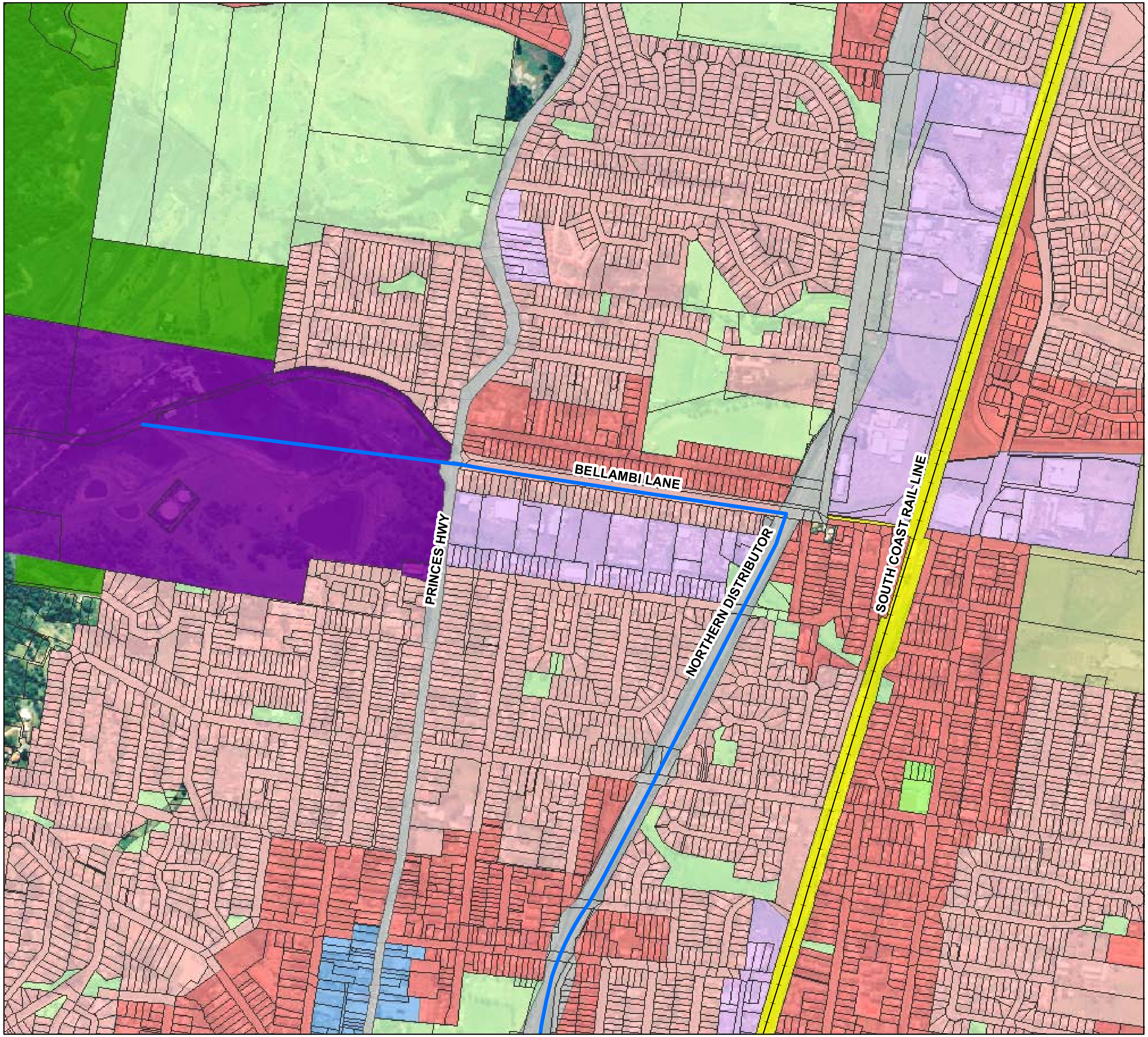


PKCT
PORT KEMBLA COAL TERMINAL

Land Zoning

BELLAMBI LANE

Legend

- Railway (LPI)
- Road From Mines
- Cadastre (LPI)

Wollongong LEP 1990

- 2(a) Residential - Low Density
- 2(b) Residential - Medium Density
- 2(c) Residential - High Density
- 3(a) General Business
- 3(c) Regional Business
- 3(d) Commerical Services
- 4(a) Industrial - Light
- 4(b) Industrial - Heavy
- 4(c) Industrial - Extractive
- 6(a) Public Recreation
- 6(b) Private Recreation
- 7(b) Environmental Protection - Conservation
- 6(c) Tourism
- 5(c) Special - Main Roads
- 5(a) Special Uses
- 5(b) Special - Railways
- Deferred

Figure 3.5

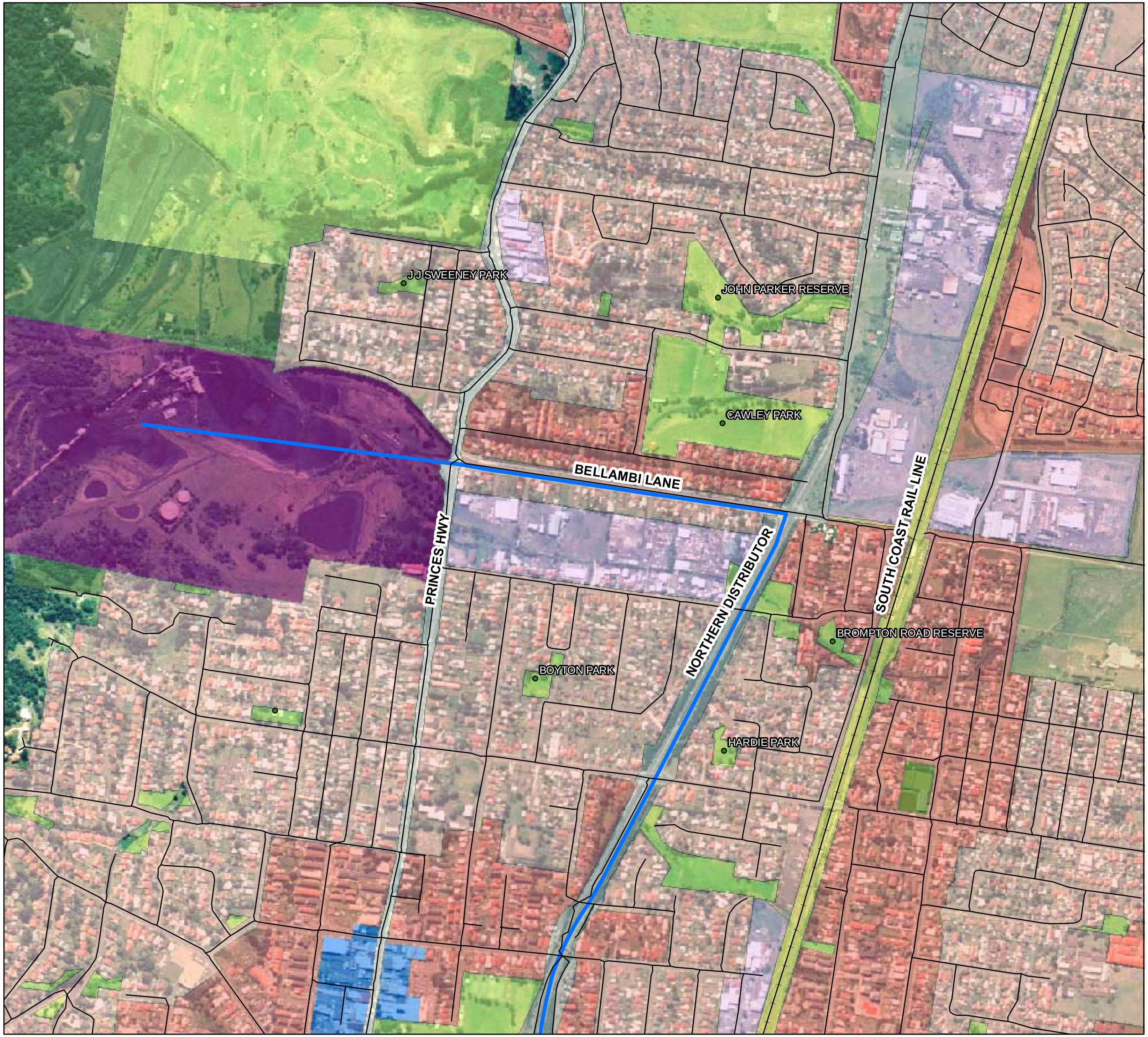
N W E S

Scale 1:8,000 (at A3)

Meters
0 50 100 200 300 400

Cardno Forbes Rigby

Map Produced by Cardno Forbes Rigby
Date: 9 May 2008
Coordinate System: Zone 56 MGA/GDA 94
GIS MAP REF:
108004_01_1815_Bellambi_Lane_Zoning.mxd



Landuse Along Route

BELLAMBI LANE

Figure 3.6

Legend

- Cultural Points
- Local Roads (LPI)
- Railway (LPI)
- Road From Mines

Wollongong Broad Landuse (ABS)

- Deferred
- General Business
- Industrial - Light
- Industrial - Extractive
- Main Roads
- Private Recreation
- Public Recreation
- Environmental Protection - Conservation
- Residential - Low Density
- Residential - Medium Density
- Special - Main Roads
- Special - Railways
- Special Uses

N E S W

Scale 1:8,000 (at A3)

Meters

0 50 100 200 300 400

Cardno Forbes Rigby

Map Produced by Cardno Forbes Rigby
Date: 9 May 2008
Coordinate System: Zone 56 MGA/GDA 94
GIS MAP REF:
108004_01_1814_Bellambi_Lane_Landuse.mxd

3.5 INTERSECTIONS

The following is a brief review of the key intersections along the road haulage routes. The key intersections are all signalised, all other intersections are primarily freeway merges and priority controlled junctions.

Springhill Road/Masters Road intersection features:

- Three-leg signalised intersection with multi-lane storage for all movements;
- Coal traffic moves from west to north and vice versa during non-curfew hours, and west to south and vice versa during curfew hours.

Photograph 3.1 Springhill Road/Masters Road

Springhill Road/Tom Thumb Road intersection features:

- Three-leg signalised intersection with protected turn bays; and
- Coal traffic proceeds straight through intersection.

Photograph 3.2 Springhill Road/Tom Thumb Road

Springhill Road/Port Kembla Road intersection features:

- Three-leg signalised intersection with protected turn bays; and
- Coal traffic moves from west to south and vice versa.

Photograph 3.3 Springhill Road/Port Kembla Road

Princes Highway/Bellambi Lane intersection features:

- Four-leg signalised intersection;
- Major movements are from north to east and vice versa; and
- Opening of the Northern Distributor extension in 2009 should significantly reduce traffic volumes at this intersection.

Photograph 3.4 Bellambi Lane/Princes Highway

Northern Distributor/Bellambi Lane/York Road intersection features:

- Four-leg signalised intersection; and
- Major movements are from west to south and vice versa, but are likely to change with the opening of the Northern Distributor extension in 2009.

Photograph 3.5 Bellambi Lane/Northern Distributor

Other Northern Distributor Junctions

Four-leg signalised intersections are also located at the junctions of the Northern Distributor and the following roads:

- Rothery Street;
- Railway Street; and
- Towradgi Road.

Coal traffic simply passes straight through these intersections without turning. The exception is Corrimal Coke Works traffic which enters/leaves the Distributor at Railway Street.

3.6 PRINCIPLES AND GUIDELINES

3.6.1 Road Classification

There are two main systems for the classification of roads in New South Wales, the functional classification system and the funding classification system. A third system that defines the environmental capacity of residential streets is also a form of classification.

Funding Classification

The RTA has also adopted a "funding related" classification system that is primarily for administrative purposes. The key road classifications under the funding classification system are defined as:

- State Roads – roads performing an important state function and for which the RTA fully funds the maintenance cost. State roads are essentially arterial roads;
- Regional Roads – roads performing a significant regional function and for which the RTA and Council share the costs of maintenance. Regional roads are essentially sub-arterial roads; and
- Local Roads – roads performing a local or collector function and for which the Councils fully fund the maintenance cost. Additional funding is available from the RTA in certain circumstances on grounds of urban amenity and road safety.

The funding road classification of roads in the Study Area is as follows:

- State Roads:
  - Appin Road;
  - Princes Highway;
  - Bellambi Lane (between Princes Highway & Northern Distributor)
  - Mount Ousley Road;
  - Southern Freeway;
  - Masters Road;
  - Springhill Road;
  - Port Kembla Road
  - Lawrence Hargrave Drive; and
  - Northern Distributor.
- Local Roads:
  - Bellambi Lane (west of Princes Highway).

Functional Classification

The functional role or performance of individual roads can be appraised according to the classification of that road within an overall road hierarchy. Changes to traffic flows on the road can then be assessed within the context of the road hierarchy.

Both the NSW Roads and Traffic Authority and Growth Centres Commission have developed guidelines for classification of roads. The RTA published guidelines for the classifications of roads in a functional system in their document "Functional Classification of Roads".

The objectives of these guidelines can be summarised as:

- In planning terms – the classification of streets and development of an operational hierarchy is seen as "an essential component of structural planning at the neighbourhood level; and
- In operational terms – the concept of functional classification is seen as "an endeavour to match the class of road to its use and to the environmental needs of the community".

The RTA document classifies roads according to the role they fulfil and the appropriate volume of traffic that they should convey:

- Arterial Road - is typically a main road carrying in excess of 15,000 vehicles per day and over 1,500 vehicles per hour in the peak period. They predominantly carry traffic from one region to another, forming principal avenues of communication for metropolitan traffic movements.
- Sub-Arterial Road – is typically a secondary road carrying between 5,000 and 20,000 vehicles per day and over 500 and 2,000 vehicles per hour in the peak period. They predominantly carry traffic from one sub-region to another forming secondary inter-regional transport links.
- Collector Road – is typically a minor road carrying between 2,000 and 10,000 vehicles per day and over 250 and 1,000 vehicles per hour in the peak period. They provide a link between local areas and regional road carrying low traffic volumes. At volumes greater than 5,000 vehicles per day, residential amenity begins to decline noticeably.
- Local Road – is typically a local street carrying less than 2,000 vehicles per day and 250 vehicles per hour in the peak period. They provide immediate access to individual houses and carry low traffic volumes.

Details of the characteristics of different functional classifications of roads are provided in Appendix F. In the study area the functional road hierarchy is as follows:

- Arterial Roads:
    - Appin Road;
    - Southern Freeway;
    - Princes Highway;
    - Northern Distributor;
    - Bellambi Lane (between Princes Highway and Northern Distributor);
    - Masters Road;
    - Springhill Road;
    - Lawrence Hargrave Drive; and
    - Mount Ousley Road.
- All other roads are local roads.

Environmental Capacity

The road hierarchy classifications detailed in Appendix F are based purely on road function and capacity. Within more sensitive land use zones, such as residential zones, a more appropriate classification would be based on the environmental capacity concept. The RTA Guide to Traffic Generating Developments (October 2002) gives the guidance on the environmental capacity of residential streets, as detailed in Table 3.5.

Table 3.5 Environmental Capacity Performance Standards on Residential Streets

Road Class	Maximum Speed (kilometres/hour)	Maximum Peak Hour Volume (vehicle/hour)
Collector Street		
Environmental Goal	50	300
Maximum	50	500
Local Street		
Environmental Goal	50	200
Maximum	50	300

Source: RTA Guide to Traffic Generating Developments

3.6.2 Road Capacity

Level of Service (LoS) is an index of the operational efficiency of a roadway or intersection. The analysis is essential in planning and design of the transport network and can influence the number of lanes provided or the arrangement of a traffic control system under study.

LoS can be measured at mid-block or at intersections. As a mid block measure, LoS is a qualitative measure describing the operational conditions on a road and their perception by a driver. At intersections, LoS is considered in terms of average delay experienced by drivers. Intersection LoS is further discussed at Section 3.6.3.

The capacity of major streets within an urban area can be based on an assessment of their operating Level of Service. Level of service is defined by AUSTROADS (1988) as a qualitative measure of the effects of a number of features, which include speed and travel time, traffic interruptions, freedom to manoeuvre, safety, driving comfort and convenience, and operating costs. Levels of service are designated from A to F from best (free flow conditions) to worst (forced flow with stop start operation, long queues and delays) as defined in Table 3.6.

Urban Roads

The typical capacity of urban lanes with interrupted flow is provided in Table 3.6 for each LoS, as defined in the RTA Guide to Traffic Generating Developments. These capacities may increase when priority is given to the major traffic flow at intersections or if there is flaring at intersections to accommodate more traffic. The spacing of intersections will differ with the hierarchy and function of the road.

Table 3.6 Mid-block Level of Service and Capacity

LoS	Description	Hourly flow (vehicles)	
		1 Lane	2 Lanes
A	Free flow - A condition of free flow in which individual drivers are virtually unaffected by the presence of others in the traffic stream. Freedom to select desired speeds and to manoeuvre within the traffic stream is extremely high, and the general level of comfort and convenience provided is excellent.	200	900
B	Stable flow (slight delays) - In the zone of stable flow and drivers still have the reasonable freedom to select their desired speed and to manoeuvre within the traffic stream, although the general level of comfort and convenience is a little less than with LOS A.	380	1400
C	Stable flow (acceptable delays) - Also in the zone of stable flow, but most drivers are restricted to some extent in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience declines noticeably at this level.	600	1800
D	Approaching unstable flow (tolerable delays) - Close to the limit of stable flow and is approaching unstable flow. All drivers are severely restricted in their freedom to select their desired speed and to manoeuvre within the traffic stream. The general level of comfort and convenience is poor, and small increases in traffic flow will generally cause operational problems.	900	2200
E	Unstable flow (congestion; intolerable delays) - Occurs when traffic volumes are at or close to capacity, and there is virtually no freedom to select desired speeds or to manoeuvre within the traffic stream. Flow is unstable and minor disturbances within the traffic stream will cause break-down.	1400	2800
F	Forced flow (jammed)	>1400	>2800

Source: RTA Guide to Traffic Generating Developments

A service volume, as defined by AUSTROADS (1988), is the maximum number of vehicles that can pass over a given section of roadway in one direction during one hour while operating conditions are maintained at a specified level of service. It is suggested that ideally arterial and sub-arterial roads should not exceed service volumes at level of service C. At this level, whilst most drivers are restricted in their freedom to manoeuvre, operating speeds are still reasonable and acceptable delays experienced. However, in urban situations, arterial and sub-arterial roads operating at Level of Service "D" are still considered adequate. It is acceptable to provide road capacity at Level of Service D in the peak hour since overprovision of road capacity is not conducive to promoting alternative transport modes to the car. The LoS for uninterrupted flow conditions along urban roads is identified in Table 3.7.

Table 3.7 Uninterrupted Flow Conditions along Urban Roads Level of Service *

Description	LEVEL OF SERVICE					
	A	B	C	D	E	F
2 Lane Undivided (2U)	760	880	1000	1130	1260	Forced Flows
2 Lane with Clearways and limited access (2CL)	1010	1170	1330	1500	1680	
4 Lane Undivided (13m) (4U)	1260	1470	1680	1890	2100	
4 Lane Undivided with Clearways (4UC)	1510	1760	2010	2270	2520	
4 Lane Divided with Clearways (4DC)	1600	1860	2130	2400	2660	
4 Lane Divided with Clearways, limited access and intersections(4DCl)	2250	2620	3000	3380	3740	
6 Lane Undivided (6U)	2020	2350	2690	3020	3360	
6 Lane Divided with Clearway (6DC)	2440	2840	3250	3660	4060	
6 Lane Divided with Clearways, limited access and intersections (6DCL)	3375	3930	4500	5070	5610	

* One Way Hourly Volumes

Uninterrupted Two-Lane Roads

Uninterrupted Two-Lane Two-Way roads have one lane for use by traffic travelling in each direction. Overtaking of slower vehicles requires the use of the opposing traffic lane when sight distance and gaps in the opposing traffic stream permit. The term 'uninterrupted' describes the flow facilities where traffic flow conditions are the result of interactions between vehicles in the traffic stream, and between vehicles and the geometric and environmental characteristics of the road, and not the result of traffic controls. The Uninterrupted Two-Lane Two-Way roadway capacity is affected by factors such as, terrain, sight distance, lane widths, percentage of heavy vehicles, and directional distribution. Discussion of formula used to determine the capacity and level of service ranges is provided in Appendix G.

Uninterrupted Multi-Lane Roads

Uninterrupted Multi-Lane roads have two or more lanes for use by traffic in each direction. They may be classified as either divided or undivided. Divided is when opposing direction of traffic are physically separated by a median. Undivided is when opposing directions of traffic are not physically separated. The Uninterrupted Multi-Lane roadway capacity is affected by factors such as, design speed, terrain, lane widths, number of lanes, percentage heavy vehicles, driver population, and development environment. Discussion of formula used to determine the capacity and level of service ranges is provided in Appendix H.

Freeways

A freeway is a divided road with two or more lanes for use by traffic travelling in each direction, with no at-grade intersections and with full control of access from abutting property. In addition to the factors affecting an uninterrupted multi-lane road, freeway capacity is also affected by ramps, and weaving areas. Discussion of formula used to determine the capacity and level of service ranges is provided in Appendix I.

3.6.3 Intersection Performance

The capacity of an urban road network is controlled by the capacity of the intersections within that network. Average delay is commonly used to assess the actual performance of intersections, with Level of Service used as an index. An explanation of intersection performance criteria is provided in Appendix J.

3.7 TRAFFIC VOLUMES

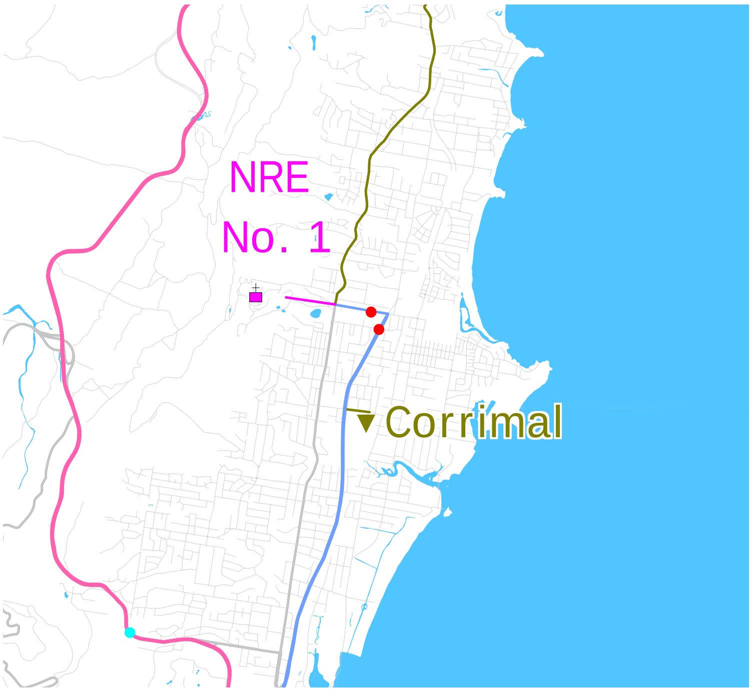
The following sections present traffic volumes for the existing conditions. The focus is road transport to/from the Port Kembla Coal Terminal and hence, where possible, volumes are listed as being either to PKCT or from PKCT. This typically equates to either an eastbound or a southbound journey being towards the Terminal and a northbound or westbound journey being away from the Terminal, for any given stretch of road.

The locations where specific traffic counts were undertaken follow (and are shown on Figure 3.7):

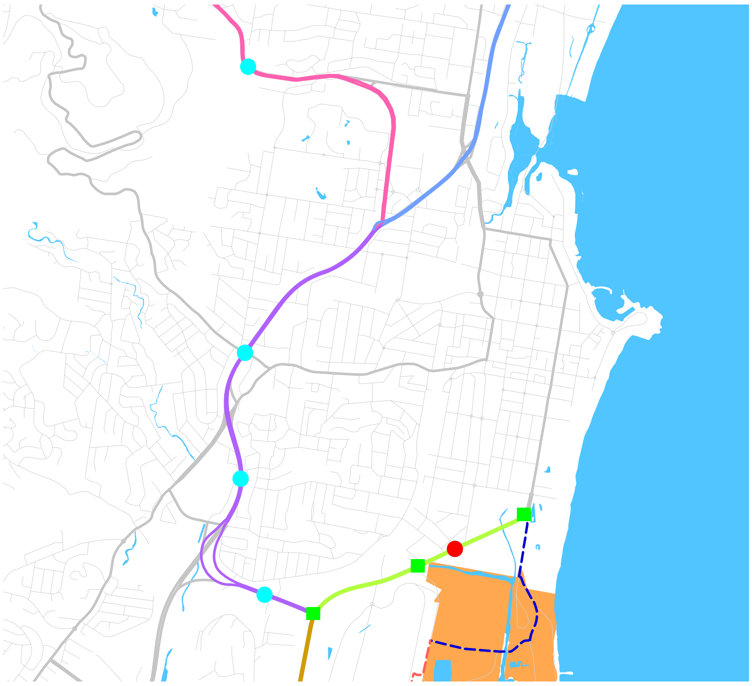
- Appin Road, North of Princes Highway;
- Mount Ousley Road, Mount Ousley between Princess Highway and New Mount Pleasant Road, north of F6 freeway;
- Southern Freeway F6, West Wollongong north of Princes Hwy interchange (N) and under Reserve Rd bridge (S);
- Southern Freeway F6, West Wollongong South of Princess Hwy near footbridge;
- Masters Road, Mt St. Thomas between The Avenue and Springhill Rd;
- Springhill Road, Coniston between Masters Rd and Corrimal St;
- Bellambi Lane, Bellambi between Princes Highway and Gladstone Street; and
- Northern Distributor, Wollongong between Railway Street and Bellambi Lane.

Figure 3.7 Traffic Count Locations

Bulli/Corrimal



Wollongong/Port Kembla



Traffic Counts - 2007

Mid-block

Traffic Counts - 2008

Mid-block

Intersection

3.7.1 Annual Average Daily Traffic Volumes (AADT)

Table 3.8 shows the historical Annual Average Daily Traffic (AADT) volumes on the existing coal haulage routes. This data is published by the RTA.

Table 3.8 AADT Summary Table

Name	Location	2000	2003	2005	2006
Appin Road	Bulli Tops, west of Princes Hwy	8463	9008	10991	9528
Appin Road	Appin, north of Maldon Road	8906	9255	9243	9121
Mount Ousley Road	South of Bulli Tops interchange	31267	34570	31958	-
Mount Ousley Road	2.2km south of Clive Bissell Drive	36822	40285	39799	39881
Southern Freeway	Mt Ousley, south of Mount Ousley Rd	34579	35642	42220	-
Southern Freeway	Gwynneville, Gipps Rd overpass	58758	68681	72310	68945
Masters Road	Mt St Thomas, west of Springhill Rd	25317	25226	-	-
Springhill Road	Mt St Thomas, north of Masters Rd	35226	31147	35179	-
Springhill Road	Coniston, north of Keira St	16184	15582	16600	-
Bellambi Lane	Bellambi, east of Old Princes Hwy	11793	11407	10989	-
Northern Distributor	Towradgi, south of Towradgi Rd	28543	30260	30901	27909
Northern Distributor	Wollongong, south of Old Princes Hwy	43108	38314	-	-
Princes Highway	Russell Vale, north of Keerong Ave	22911	22251	21687	22149
Princes Highway	Bulli, north of Hobart St	24648	24431	25688	-
Princes Highway	Bulli, north of Molloy St	22656	22328	-	-
Princes Highway	Woonona, south of Campbell St	23468	21890	20967	-

Source: Compiled from RTA *AADT Southern Region 2006*.

3.7.2 Average Daily Traffic Volumes (ADT)

This section presents the results of traffic volume counts undertaken at key locations along the coal haulage routes. Mid-block full classification tube counts were carried out in 2007 and 2008 and supplemented by some historical counts. The following traffic count data was utilised in this study:

- Counts undertaken in March 2007 were made available to this study for the following locations:
  - Mount Ousley Rd - Mount Ousley between Princess Highway and New Mount Pleasant Road, north of F6 Freeway;
  - Southern Freeway (northern) - West Wollongong north of Princes Hwy interchange (N) and under Reserve Rd bridge (S);
  - Southern Freeway (southern) - West Wollongong south of Princess Hwy near footbridge;
  - Masters Road - Mt St. Thomas between The Avenue and Springhill Rd; and
  - Springhill Road - Coniston between Masters Rd and Corrimal St.

- Counts were undertaken as part of this study for a two-week period in March 2008 during the trial 24/7 operations at the following locations:
  - Bellambi Lane - Bellambi between Princes Highway and Gladstone Street;
  - Northern Distributor - Wollongong between Railway Street and Bellambi Lane; and
  - Springhill Road - Coniston between Masters Rd and Corrimal St.
- Further counts were undertaken in May 2008 as part of this study at the following locations:
  - Springhill Road - Coniston between Masters Rd and Corrimal St.
- Counts undertaken in February 2002 as part of a Traffic & Road Safety Assessment of Coal Haulage (Transport and Urban Planning, June 2003) were utilised at the following locations:
  - Appin Road - Rosemeadow between Kellerman Drive and Princes Highway;
- RTA weekly data was utilised for the following location:
  - Appin Road – north of the Princes Highway.

The counts undertaken in 2002, 2007 and 2008 were full classification counts with a record of heavy vehicle movements by number of axle pairs. The counts were undertaken for one or two week periods. The counts are classified as per Austroads' vehicle classifications, detailed in Appendix K. Generally classes 1-2 are light vehicles, classes 3-5 are considered rigid vehicles, and classes 6-13 are considered articulated vehicles.

A summary of the average daily traffic volumes is presented in Table 3.9.

Table 3.9 Average Daily Traffic Volumes

Site No.	Name	Location	Year	ADT	AWD	AWE
1	Appin Road	Bulli Tops, west of Princes Hwy	2006	9,339	9,593	8,703
2	Mount Ousley Rd	2.2km south of Clive Bissell Drive	2007	42,221	42,875	40,586
3	Southern Fwy	Mt Ousley, south of Mount Ousley Rd	2007	72,034	75,786	62,655
4	Southern Fwy	Gwynneville, Gipps Rd overpass	2007	69,034	73,350	58,244
5	Masters Road	Mt St Thomas, west of Springhill Rd	2007	23,822	26,539	17,028
6	Springhill Road	Mt St Thomas, north of Masters Rd	2008[1]	15,301	16,089	13,331
			2008[2]	14,849	15,928	12,152
7	Bellambi Lane	Bellambi, east of Old Princes Hwy	2008	12,114	12,855	10,262
8	Northern Distributor	North Wollongong, south of Princes Hwy	2008	21,591	22,840	18,468

1 = March 2008
2 = May 2008
ADT = Average Daily Traffic (vehicles per day)
AWD = Average Weekday Daily Traffic (vehicles per day)
AWE = Average Weekend Daily Traffic (vehicles per day)

Full summary count data for the previously noted count locations is provided in Appendix L. Average weekday and weekend data is summarised in the set of figures and tables following.

Figure 3.8 2006 – Appin Road - Average Daily Traffic Volumes (ADT)

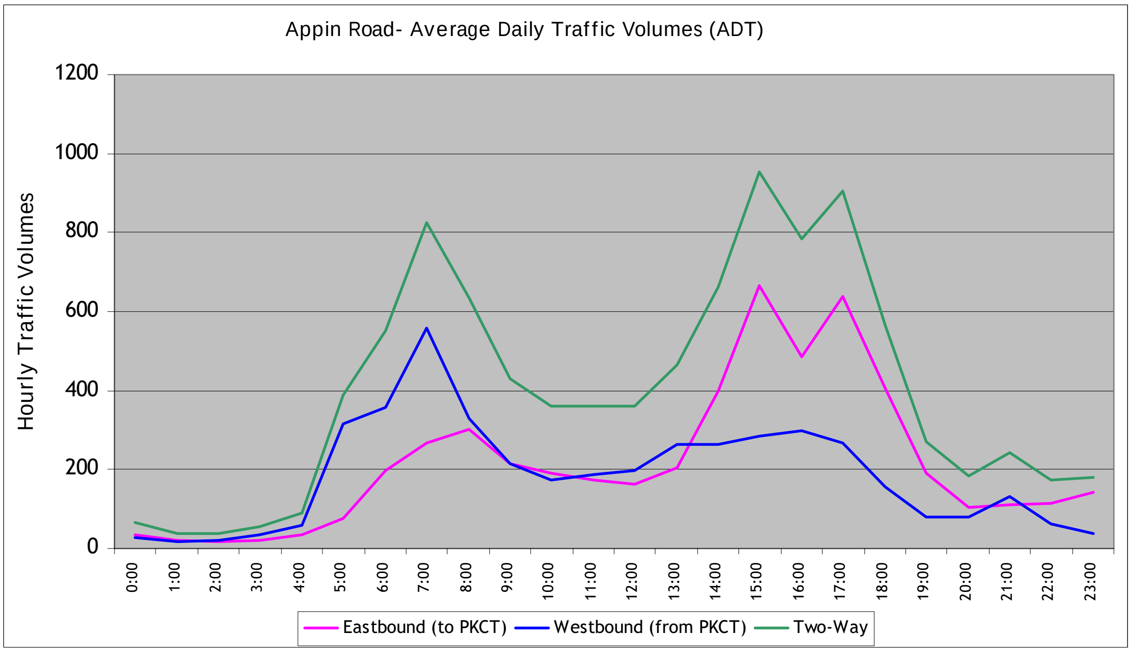


Table 3.10 2002 – Appin Road - Vehicle Class Distribution

Direction	Type of vehicle	Day (7am-10pm)		Night (10pm-7am)		All Day	
		Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
To PKCT	Light	83.0%	97.5%	68.0%	85.3%	80.8%	96.2%
	Rigid	7.7%	1.8%	10.5%	4.9%	8.1%	2.1%
	Articulated	9.4%	0.7%	21.5%	9.8%	11.1%	1.7%
From PKCT	Light	83.5%	97.0%	80.3%	89.7%	82.9%	96.1%
	Rigid	8.8%	2.3%	8.4%	6.0%	8.7%	2.7%
	Articulated	7.7%	0.8%	11.2%	4.3%	8.4%	1.2%
Two-Way	Light	83.2%	97.2%	75.1%	87.8%	81.9%	96.1%
	Rigid	8.2%	2.0%	9.3%	5.5%	8.4%	2.4%
	Articulated	8.5%	0.7%	15.6%	6.7%	9.7%	1.4%

Figure 3.9 2007 – Mount Ousley Road - Average Daily Traffic Volumes (ADT)

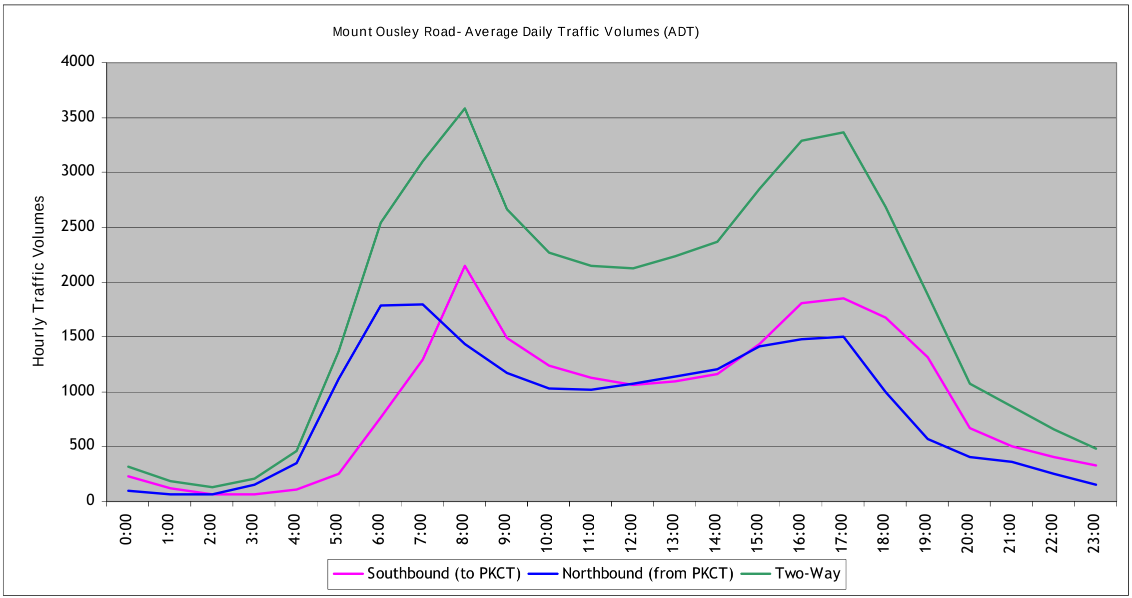


Table 3.11 2007 – Mount Ousley Road - Vehicle Class Distribution

Direction	Type of vehicle	Day (7am-10pm)		Night (10pm-7am)		All Day	
		Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
To PKCT	Light	88.2%	96.2%	74.6%	87.4%	86.8%	95.2%
	Rigid	5.0%	1.7%	5.9%	3.0%	5.1%	1.9%
	Articulated	6.8%	2.1%	19.5%	9.6%	8.1%	3.0%
From PKCT	Light	86.7%	96.3%	81.8%	87.3%	85.8%	95.3%
	Rigid	5.5%	1.8%	5.9%	3.0%	5.6%	1.9%
	Articulated	7.8%	1.9%	12.3%	9.7%	8.6%	2.8%
Two-Way	Light	87.5%	96.2%	79.2%	87.4%	86.3%	95.2%
	Rigid	5.2%	1.8%	5.9%	3.0%	5.3%	1.9%
	Articulated	7.2%	2.0%	14.9%	9.6%	8.4%	2.9%

Figure 3.10 2007 – Southern Freeway (North) - Average Daily Traffic Volumes (ADT)

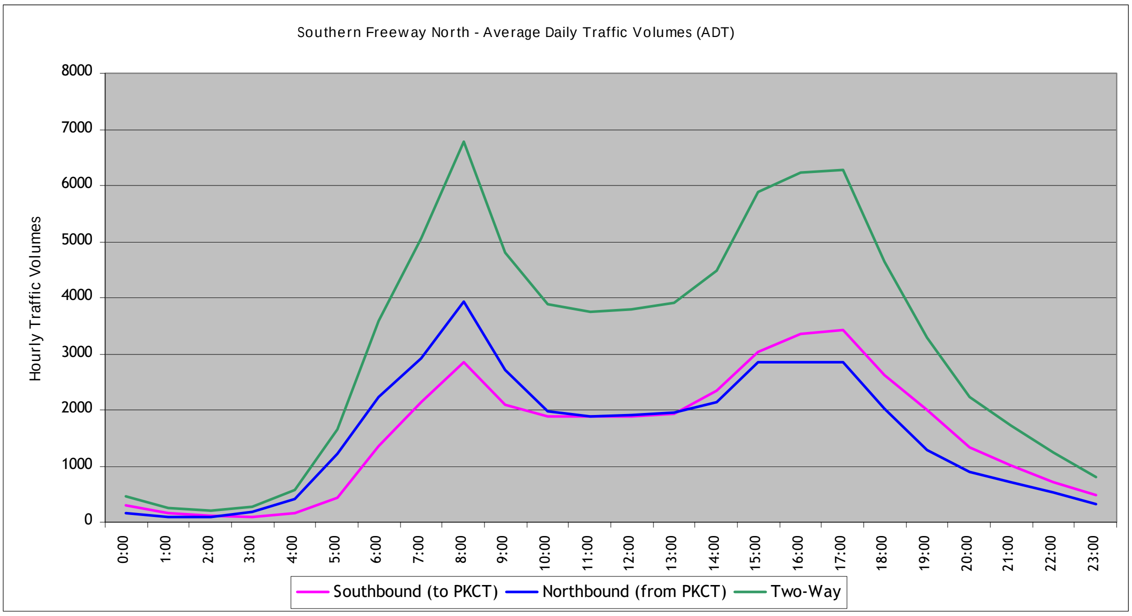


Table 3.12 2007 – Southern Freeway (North) - Vehicle Class Distribution

Direction	Type of vehicle	Day (7am-10pm)		Night (10pm-7am)		All Day	
		Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
To PKCT	Light	90.3%	95.7%	82.9%	90.7%	89.5%	95.2%
	Rigid	5.6%	2.6%	5.2%	2.9%	5.5%	2.6%
	Articulated	4.2%	1.7%	11.8%	6.4%	4.9%	2.2%
From PKCT	Light	90.0%	96.0%	84.2%	89.5%	89.2%	95.4%
	Rigid	5.8%	2.5%	6.2%	3.4%	5.9%	2.6%
	Articulated	4.2%	1.5%	9.6%	7.1%	4.9%	2.0%
Two-Way	Light	90.1%	95.9%	83.7%	90.1%	89.4%	95.3%
	Rigid	5.7%	2.5%	5.8%	3.2%	5.7%	2.6%
	Articulated	4.2%	1.6%	10.5%	6.7%	4.9%	2.1%

Figure 3.11 2007 – Southern Freeway (South) - Average Daily Traffic Volumes (ADT)

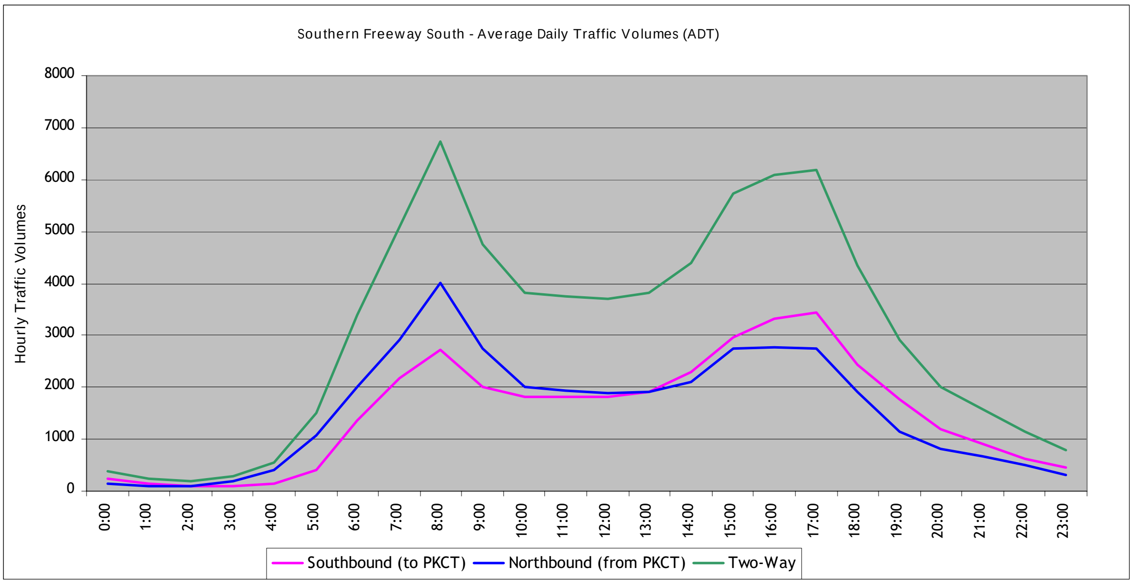


Table 3.13 2007 – Southern Freeway (South) - Vehicle Class Distribution

Direction	Type of vehicle	Day (7am-10pm)		Night (10pm-7am)		All Day	
		Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
To PKCT	Light	90.3%	95.8%	82.5%	90.3%	89.5%	95.2%
	Rigid	5.3%	2.3%	5.4%	2.8%	5.3%	2.3%
	Articulated	4.4%	1.9%	12.2%	6.9%	5.2%	2.5%
From PKCT	Light	91.0%	96.6%	83.9%	89.6%	90.1%	95.9%
	Rigid	4.7%	1.8%	5.7%	3.2%	4.9%	2.0%
	Articulated	4.3%	1.6%	10.5%	7.2%	5.1%	2.1%
Two-Way	Light	90.6%	96.2%	83.3%	90.0%	89.8%	95.6%
	Rigid	5.0%	2.0%	5.5%	3.0%	5.1%	2.1%
	Articulated	4.3%	1.7%	11.2%	7.1%	5.1%	2.3%

Figure 3.12 2007 – Masters Road - Average Daily Traffic Volumes (ADT)

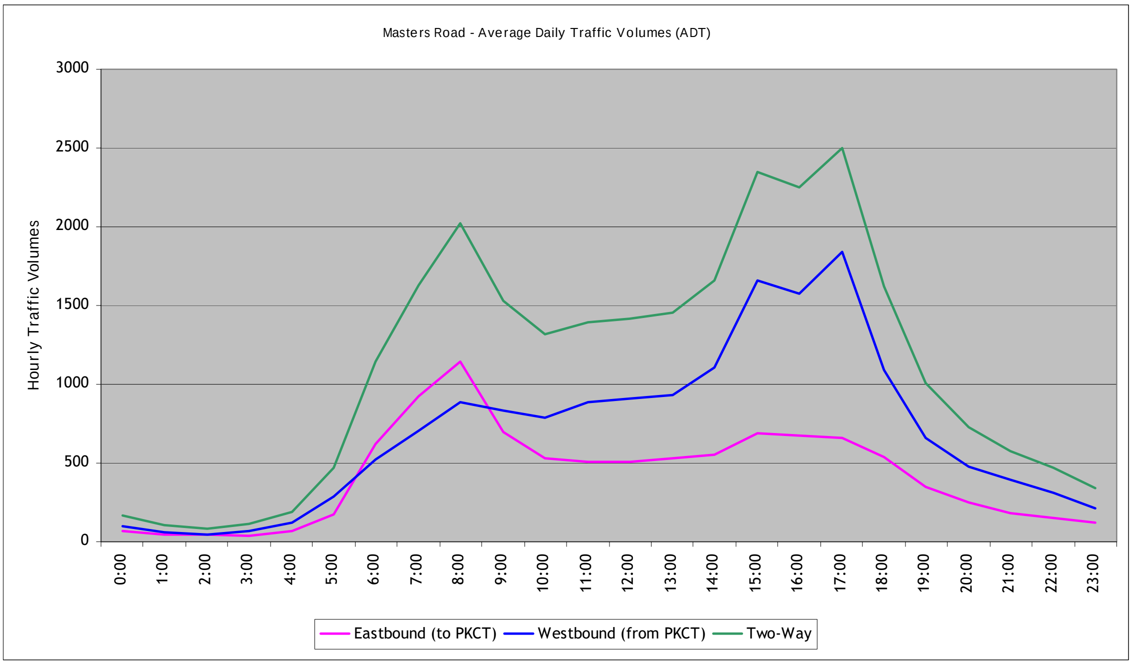


Table 3.14 2007 – Masters Road - Vehicle Class Distribution

Direction	Type of vehicle	Day (7am-10pm)		Night (10pm-7am)		All Day	
		Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
To PKCT	Light	84.3%	90.0%	74.1%	79.6%	82.9%	88.5%
	Rigid	6.9%	4.4%	6.8%	5.5%	6.9%	4.5%
	Articulated	8.8%	5.6%	19.1%	14.8%	10.2%	6.9%
From PKCT	Light	89.9%	94.5%	79.4%	89.4%	88.8%	93.7%
	Rigid	4.8%	2.2%	4.4%	2.3%	4.8%	2.2%
	Articulated	5.3%	3.3%	16.3%	8.3%	6.5%	4.0%
Two-Way	Light	87.8%	92.9%	77.1%	85.8%	86.5%	91.8%
	Rigid	5.6%	3.0%	5.4%	3.5%	5.6%	3.1%
	Articulated	6.6%	4.1%	17.5%	10.7%	7.9%	5.1%

Figure 3.13 May 2008 – Springhill Road - Average Daily Traffic Volumes (ADT)

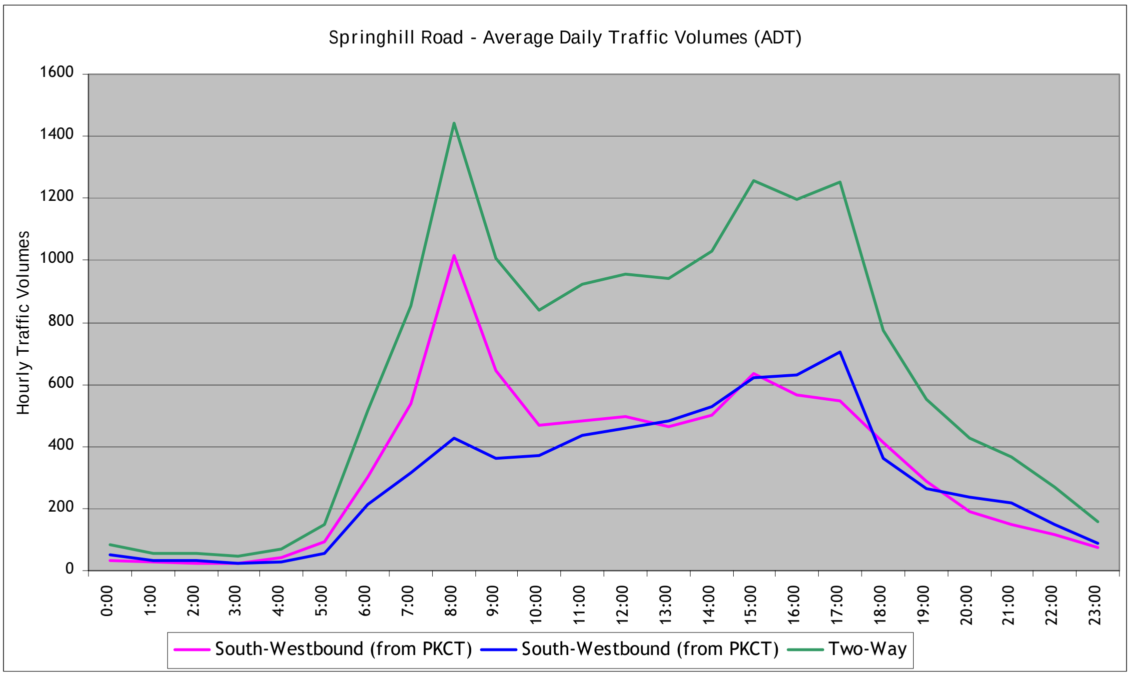


Table 3.15 May 2008 – Springhill Road - Vehicle Class Distribution

Direction	Type of vehicle	Day (7am-10pm)		Night (10pm-7am)		All Day	
		Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
To PKCT	Light	92.6%	97.6%	86.9%	98.6%	92.1%	97.7%
	Rigid	4.0%	1.7%	1.8%	0.9%	3.8%	1.6%
	Articulated	3.4%	0.7%	11.2%	0.6%	4.2%	0.7%
From PKCT	Light	93.5%	97.7%	84.5%	97.3%	92.7%	97.7%
	Rigid	3.5%	1.7%	3.0%	1.7%	3.5%	1.7%
	Articulated	2.9%	0.6%	12.6%	1.0%	3.8%	0.6%
Two-Way	Light	93.1%	97.6%	85.6%	98.0%	92.4%	97.7%
	Rigid	3.7%	1.7%	2.4%	1.2%	3.6%	1.7%
	Articulated	3.2%	0.6%	11.9%	0.7%	4.0%	0.6%

Figure 3.14 March 2008 – Springhill Road - Average Daily Traffic Volumes (ADT)

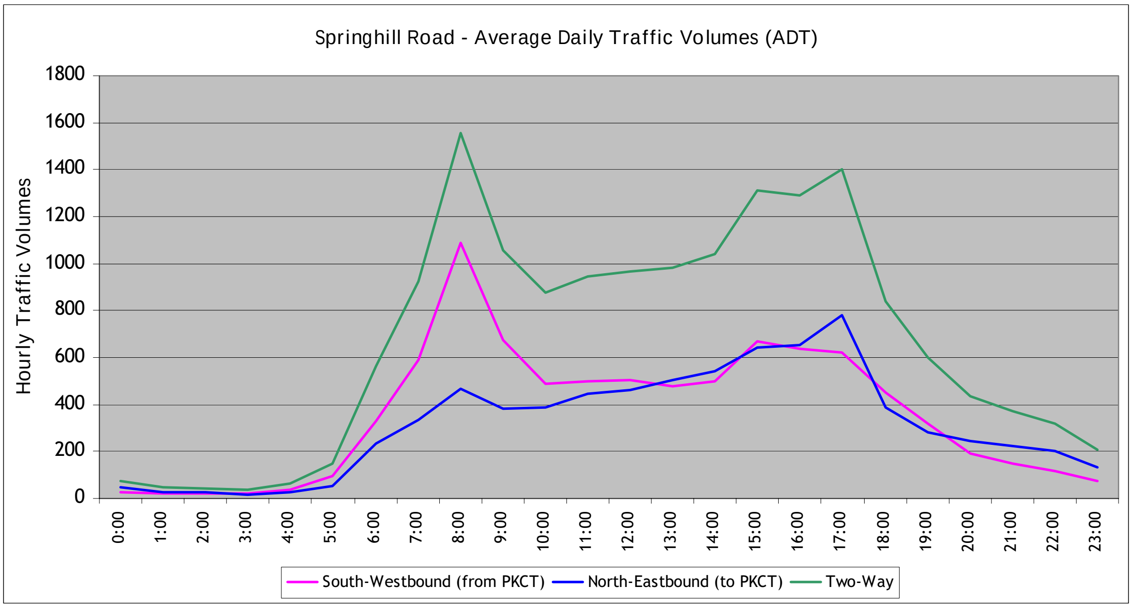


Table 3.16 March 2008 – Springhill Road - Vehicle Class Distribution

Direction	Type of vehicle	Day (7am-10pm)		Night (10pm-7am)		All Day	
		Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
To PKCT	Light	92.5%	97.4%	91.3%	98.3%	92.4%	97.5%
	Rigid	4.3%	1.8%	1.6%	1.3%	4.0%	1.7%
	Articulated	3.2%	0.9%	7.0%	0.5%	3.6%	0.8%
From PKCT	Light	93.5%	97.6%	87.2%	97.2%	93.0%	97.5%
	Rigid	3.7%	1.7%	3.3%	1.8%	3.7%	1.7%
	Articulated	2.8%	0.7%	9.5%	1.0%	3.3%	0.7%
Two-Way	Light	93.0%	97.5%	89.3%	97.8%	92.7%	97.5%
	Rigid	4.0%	1.7%	2.5%	1.5%	3.8%	1.7%
	Articulated	3.0%	0.8%	8.3%	0.7%	3.5%	0.8%

Figure 3.15 2007 – Springhill Road - Average Daily Traffic Volumes (ADT)

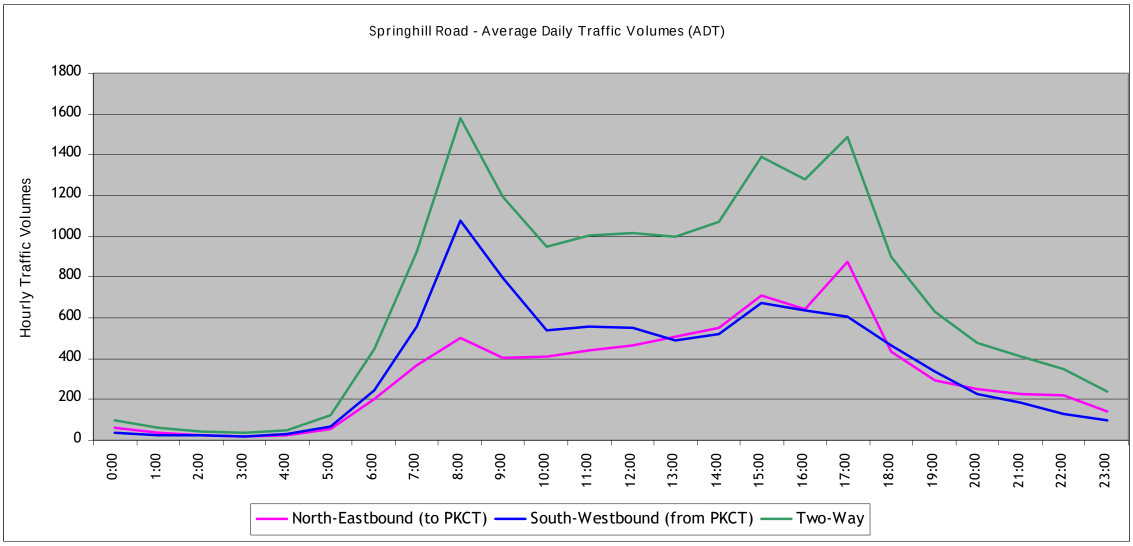


Table 3.17 2007 – Springhill Road - Vehicle Class Distribution

Direction	Type of vehicle	Day (7am-10pm)		Night (10pm-7am)		All Day	
		Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
To PKCT	Light	91.3%	93.9%	88.6%	94.3%	91.0%	94.0%
	Rigid	4.3%	1.9%	1.5%	1.1%	4.0%	1.7%
	Articulated	4.5%	4.2%	9.9%	4.5%	5.0%	4.3%
From PKCT	Light	92.6%	94.9%	85.3%	89.6%	92.1%	94.3%
	Rigid	3.6%	1.4%	2.7%	2.1%	3.5%	1.5%
	Articulated	3.8%	3.7%	12.0%	8.4%	4.4%	4.3%
Two-Way	Light	92.0%	94.4%	87.1%	92.5%	91.6%	94.1%
	Rigid	3.9%	1.6%	2.0%	1.5%	3.7%	1.6%
	Articulated	4.1%	4.0%	10.9%	6.0%	4.7%	4.3%

Figure 3.16 2008 – Bellambi Lane - Average Daily Traffic Volumes (ADT)

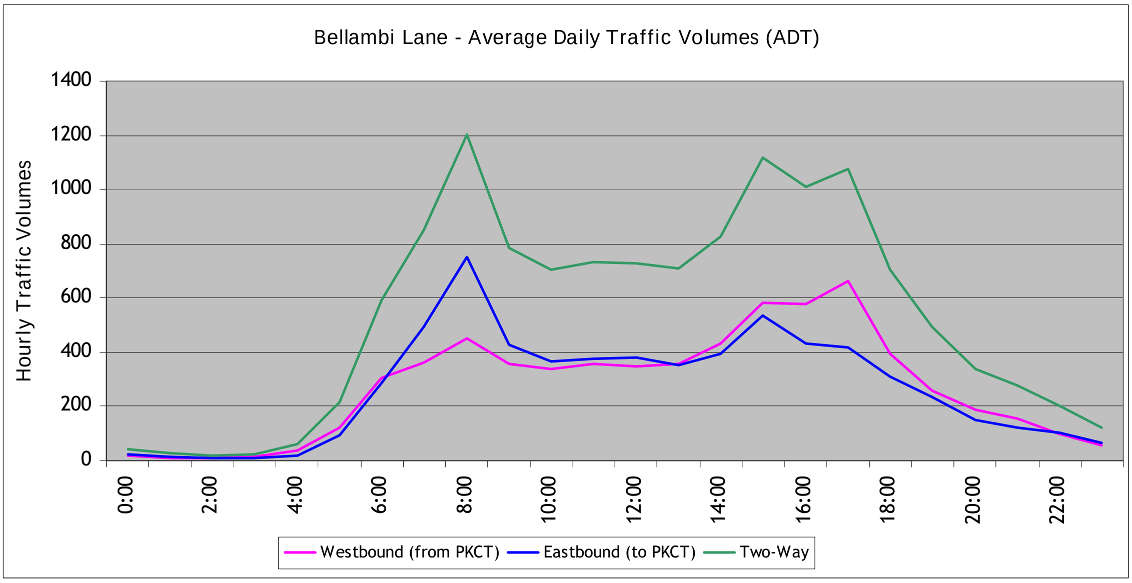


Table 3.18 2008 – Bellambi Lane - Vehicle Class Distribution

Direction	Type of vehicle	Day (7am-10pm)		Night (10pm-7am)		All Day	
		Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
To PKCT	Light	92.3%	96.1%	93.1%	94.8%	92.3%	96.0%
	Rigid	6.3%	2.8%	5.4%	3.7%	6.2%	2.9%
	Articulated	1.4%	1.0%	1.6%	1.5%	1.4%	1.1%
From PKCT	Light	91.2%	95.4%	89.2%	92.4%	91.0%	95.1%
	Rigid	7.4%	3.6%	9.2%	5.8%	7.6%	3.8%
	Articulated	1.5%	1.0%	1.6%	1.8%	1.5%	1.1%
Two-Way	Light	91.7%	95.8%	91.1%	93.5%	91.6%	95.6%
	Rigid	6.9%	3.2%	7.3%	4.8%	6.9%	3.3%
	Articulated	1.4%	1.0%	1.6%	1.7%	1.5%	1.1%

Figure 3.17 2008 - Northern Distributor - Average Daily Traffic Volumes (ADT)

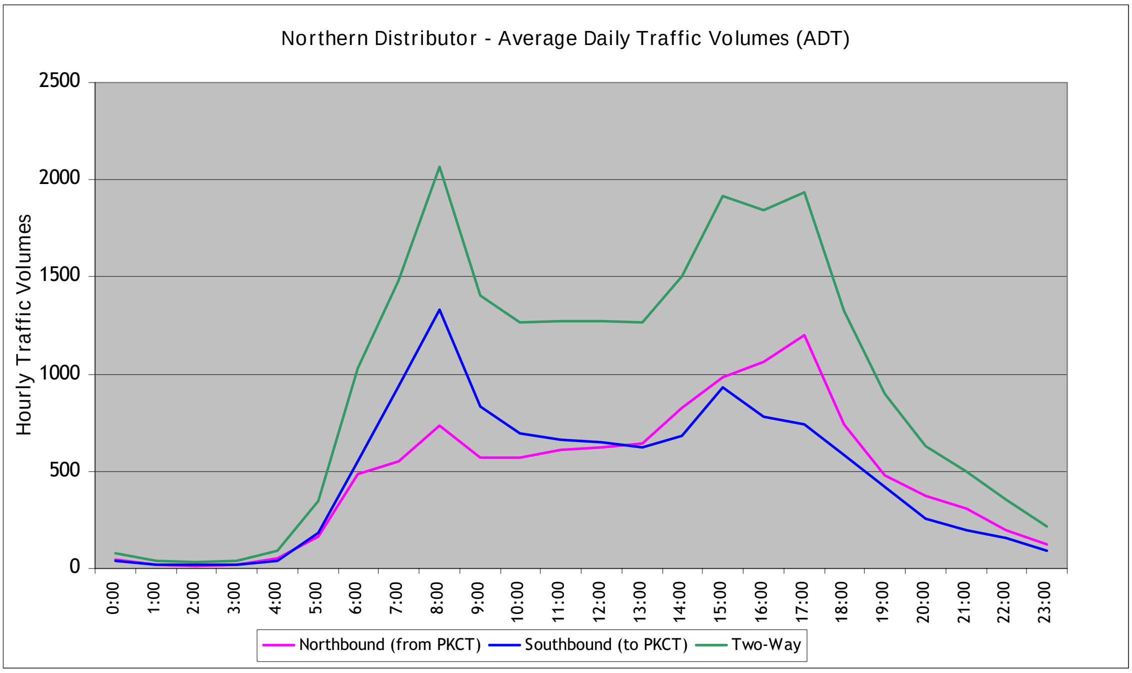


Table 3.19 2008 – Northern Distributor - Vehicle Class Distribution

Direction	Type of vehicle	Day (7am-10pm)		Night (10pm-7am)		All Day	
		Weekday	Weekend	Weekday	Weekend	Weekday	Weekend
To PKCT	Light	93.9%	97.3%	93.9%	95.6%	93.9%	97.2%
	Rigid	4.8%	2.0%	4.9%	3.4%	4.8%	2.1%
	Articulated	1.3%	0.7%	1.2%	1.0%	1.3%	0.7%
From PKCT	Light	90.7%	92.3%	89.1%	92.1%	90.6%	92.2%
	Rigid	7.9%	6.9%	9.6%	7.0%	8.0%	6.9%
	Articulated	1.4%	0.8%	1.3%	0.9%	1.4%	0.8%
Two-Way	Light	92.3%	94.8%	91.5%	93.7%	92.2%	94.7%
	Rigid	6.3%	4.4%	7.3%	5.4%	6.4%	4.5%
	Articulated	1.4%	0.7%	1.2%	0.9%	1.3%	0.8%

3.7.3 Intersection Traffic Surveys

Intersection turning volume surveys were undertaken in May 2008 at key signalised intersections around PKCT. Surveys were undertaken at the following locations:

- Springhill Road/Masters Road;
- Springhill Road/Tom Thumb Road;
- Springhill Road/Port Kembla Road.

Peak hour turning volumes are shown for the AM and PM peak period in Figure 3.18 to Figure 3.23.

Figure 3.18 Existing Traffic Volumes – Springhill Road/Masters Road AM Peak

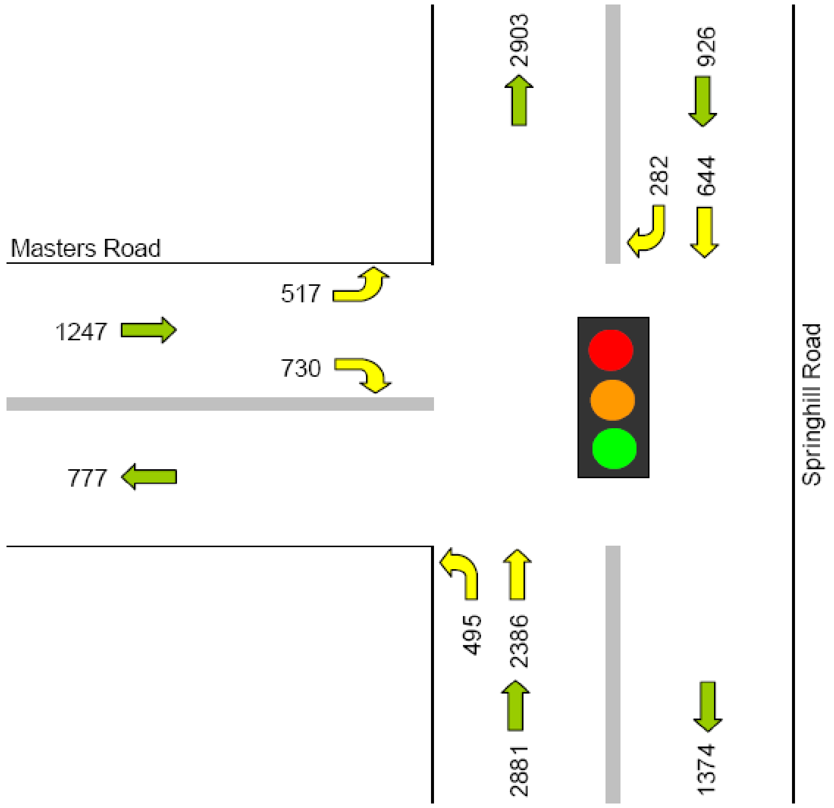


Figure 3.19 Existing Traffic Volumes – Springhill Road/Tom Thumb Road AM Peak

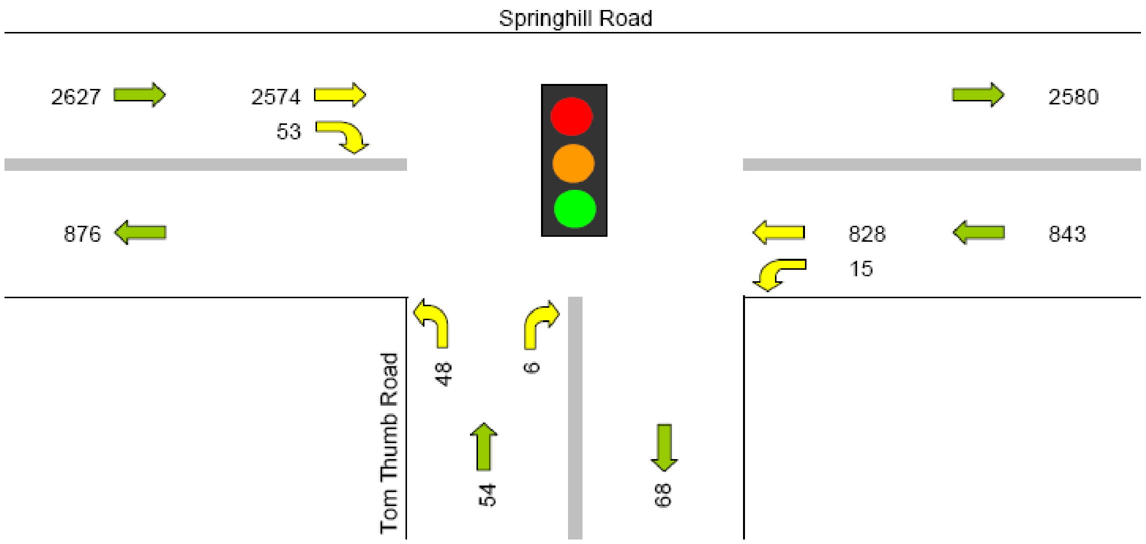


Figure 3.20 Existing Traffic Volumes – Springhill Road/Port Kembla Road AM Peak

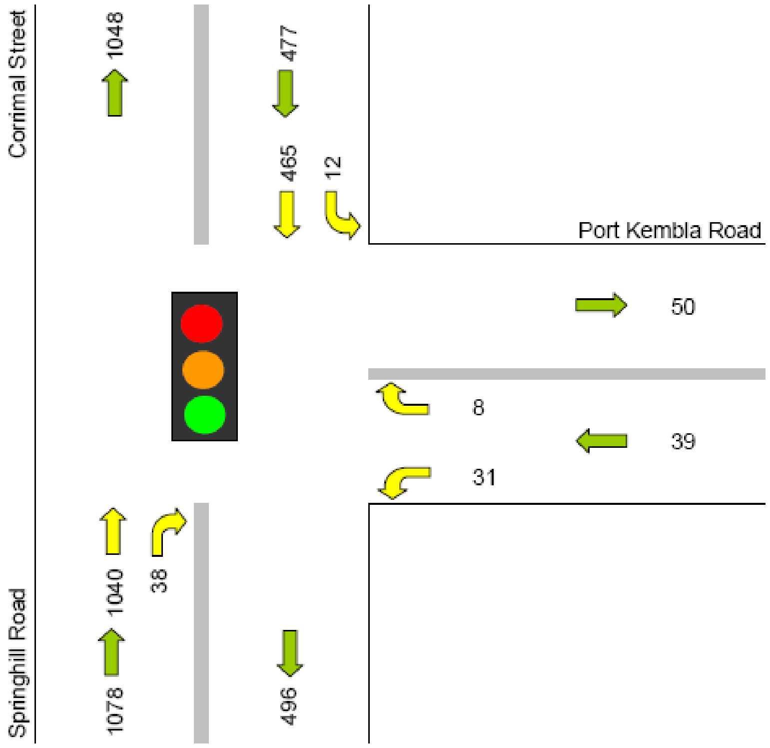


Figure 3.21 Existing Traffic Volumes – Springhill Road/Masters Road PM Peak

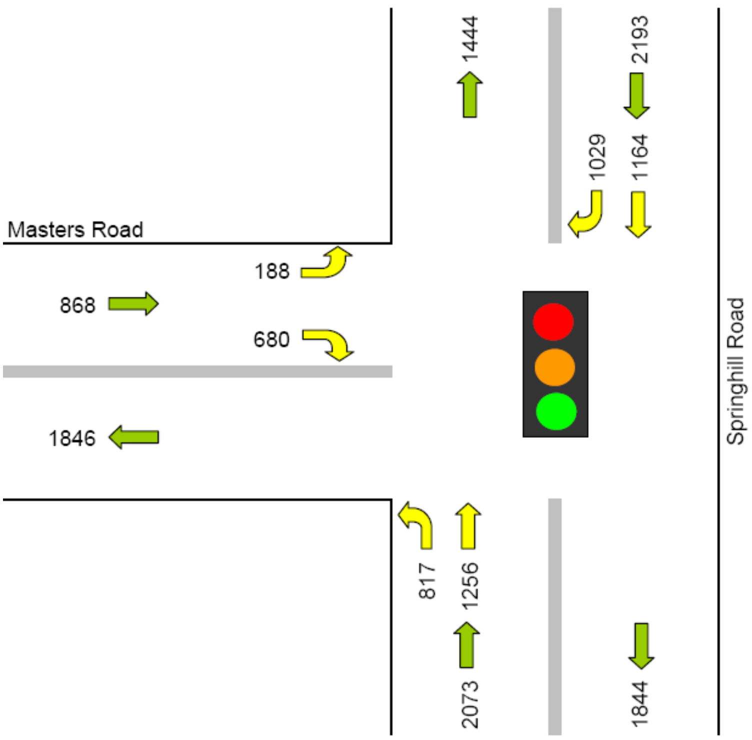


Figure 3.22 Existing Traffic Volumes – Springhill Road/Tom Thumb Road PM Peak

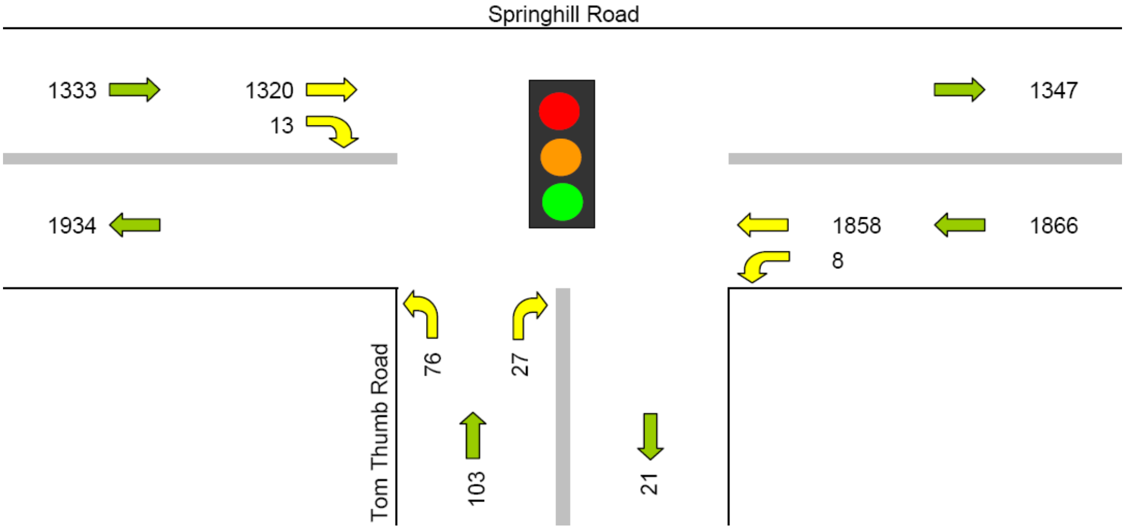
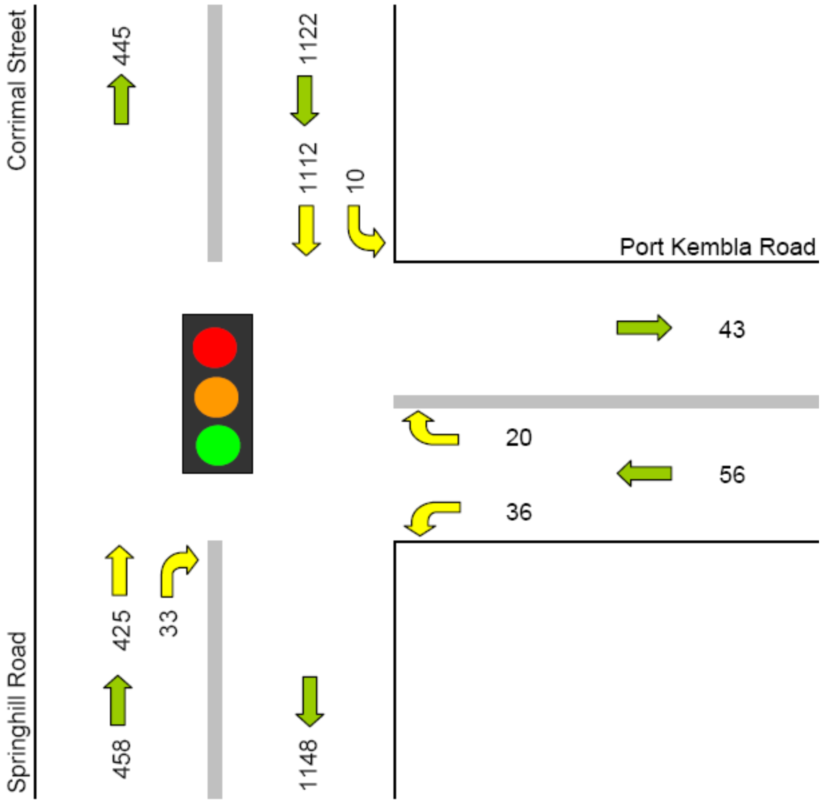


Figure 3.23 Existing Traffic Volumes – Springhill Road/Port Kembla Road PM Peak



3.8 MID-BLOCK CARRIAGEWAY PERFORMANCE

The existing carriageway traffic volumes and the corresponding carriageway performance along the road haulage routes is provided in Appendix M. A summary of the mid-block carriageway level of service is presented in Table 3.20 for the AM and PM peak periods.

Table 3.20 Existing Mid-block Carriageway - Peak Level of Service

Road	From/ To	AM Peak*		PM Peak*	
		To PKCT	From PKCT	To PKCT	From PKCT
Appin Rd	Appin Mine Access to West Cliff Mine Access	B (11.6%)	C (2.1%)	C (0.6%)	B (5.2%)
Appin Rd	West Cliff Mine Access to Dharawal Conserv. Ent.	B (11.6%)	C (2.1%)	C (0.6%)	B (5.2%)
Appin Rd	Dharawal Conserv. Ent. to No. 10A Fire Road	C (11.6%)	D (2.1%)	D (0.6%)	C (5.2%)
Appin Rd	No. 10A Fire Road to Mount Ousley Rd	C (11.6%)	D (2.1%)	D (0.6%)	C (5.2%)
Mount Ousley Rd	Appin Rd to Picton Rd	D (1.1%)	C (1.3%)	C (0.4%)	C (0.5%)
Mount Ousley Rd	Picton Rd to Southern Fwy	D (1.1%)	C (1.3%)	C (0.4%)	B (0.5%)
Southern Fwy	Mount Ousley Rd to Northern Distributor	F (0.9%)	F (0.5%)	F (0.3%)	E (0.4%)
Southern Fwy	Northern Distributor to Princes Hwy	C (1.0%)	D (0.5%)	C (0.3%)	B (0.4%)
Southern Fwy	Princes Hwy to Masters Rd	D (1.0%)	F (0.5%)	E (0.3%)	D (0.4%)
Bellambi Ln	Princes Hwy to Northern Distributor	A (0.7%)	A (0.9%)	A (0.0%)	A (0.3%)
Northern Distributor	Bellambi Ln to Railway St	B (0.4%)	B (0.5%)	A (0.0%)	B (0.2%)
Northern Distributor	Railway St to Southern Fwy	B (0.4%)	B (0.5%)	A (0.0%)	B (0.2%)
Masters Rd	Southern Fwy to Springhill Rd	A (2.2%)	A (2.5%)	A (1.7%)	A (0.5%)
Springhill Rd	Masters Rd to Port Kembla Rd	A (5.3%)	A (2.0%)	A (1.4%)	A (1.6%)
Springhill Rd	Masters Rd to Entry Road	A (5.3%)	A (2.0%)	A (1.4%)	A (1.6%)

* Figures shown in ( ) brackets indicate the proportion of coal trucks as a percentage of average weekday hourly volumes (one-way)

In the AM Peak the assessment shows the following:

- Appin Road northbound (from PKCT) is approaching capacity along the southern half of the route;
- Mount Ousley Road is approaching capacity for southbound traffic (to PKCT);
- The four-lane section of the Southern Freeway between Mount Ousley Road and the Northern Distributor is carrying hourly volumes of over 6700 vehicles per hour and is operating at LoS F;
- The six-lane section of the Southern Freeway between the Northern Distributor and the Prince Highway is carrying similar volumes and is approaching capacity with LoS D in the northbound direction; and
- South of the Princes Highway, the Southern Freeway reduces to 4 lanes again. Southbound traffic is approaching capacity, and northbound traffic is over capacity with LoS F.

In the PM Peak the assessment shows the following:

- Appin Road southbound (to PKCT) is approaching capacity along the southern half of the route;
- Mount Ousley Road is operating well;
- The four-lane section of the Southern Freeway between Mount Ousley Road and the Northern Distributor exceeds capacity with LoS E for northbound traffic and LoS F for southbound traffic;
- The six-lane section of the Southern Freeway between the Northern Distributor and the Prince Highway operates well; and
- South of the Princes Highway, the Southern Freeway reduces to 4 lanes again. Northbound traffic is approaching capacity, and southbound traffic is experiencing delays with LoS E.

All other roads, (Bellambi Lane, Northern Distributor, Masters Road and Springhill Road) have good mid-block performance and operate at LoS A or B.

It should be noted that in those areas where capacity is of most concern the coal trucks represent only a small proportion of the peak hour directional traffic volumes:

- Appin Road: 0.6-2.1%
- Mount Ousley Road: 1.1% ; and
- Southern Freeway: 0.3-1.0%.

3.9 EXISTING INTERSECTION OPERATION

The intersections detailed below were assessed using the SIDRA software package to determine the Degree of Saturation, Average Delay (in seconds) and Level of Service (LoS) at each intersection. The detailed results of this analysis are provided in Appendix N and Appendix O and summarised in Table 3.21.

Table 3.21 Existing Intersection Analyses

Intersection	Control	2008 AM Peak				2008 PM Peak			
		DS	d	Q	LoS	DS	d	Q	LoS
Masters Rd/ Springhill Rd	Signalised	0.859	33.6	277	C	0.732	42.0	172	C
Springhill Rd/ Port Kembla Rd	Signalised	0.339	5.6	28	A	0.741	12.4	63	A
Springhill Rd/ Tom Thumb Rd	Signalised	0.793	14.1	182	A	0.809	16.8	122	B

DS = Degree of Saturation
d = Delay (seconds)
% Q = % Queue Length
LoS = Level of Service

The three intersections tested all operate well during both the AM and PM peak periods:

- Springhill Road/Masters Road:
  - operates at LoS C during both peak periods;
  - with average delays of 34 seconds and 42 seconds per vehicle during the AM and PM peak periods respectively;
  - during the AM peak the critical movement is the right turn from Springhill Road north into Masters Road, with delays of 67 seconds per vehicle; and
  - during the PM peak the critical movement is the right turn from Masters Road into Springhill Road south, with delays of 59 seconds per vehicle;
  - the maximum queue length observed in the AM peak was 277metres on Springhill Road south; and
  - the maximum queue lengths observed in the PM peak were 172metres on Springhill Road north.
- Springhill Road/Port Kembla Road:
  - operates at LoS A during both peak periods;
  - with minimal average delays; and
  - during the AM and PM peak the critical movement is the right turn from Springhill Road west into Port Kembla Road, with delays of 31 seconds per vehicle; and
  - the maximum queue length observed in the AM peak was 28metres on Springhill Road east; and
  - the maximum queue length observed in the PM peak was 63metres on Springhill Road east.
- Springhill Road/Tom Thumb Road:
  - operates at LoS A during the AM Peak and LoS B during the PM Peak;
  - with average delays of 14 seconds and 17 seconds per vehicle during the AM and PM peak periods respectively;
  - during the AM and PM peaks the critical movement is the right turn from Springhill Road west into Tom Thumb Road, with delays of 47 or 32 seconds per vehicle respectively; and
  - the maximum queue length observed in the AM peak was 182metres on Springhill Road east; and
  - the maximum queue length observed in the PM peak was 122metres on Springhill Road east.

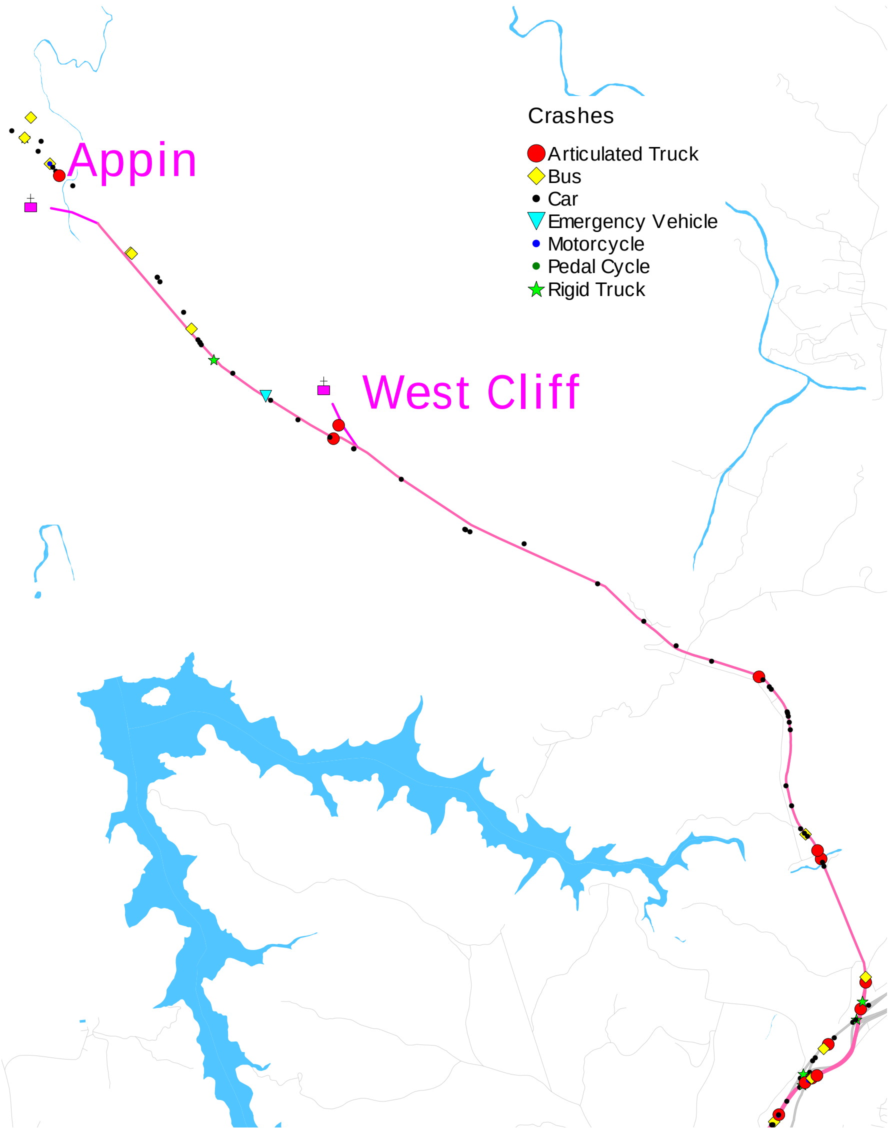
3.10 CRASH DATA

A review of the RTA road crash data history for the road haulage routes was undertaken for the most recent available 5 year period between 2002 and 2007. Summaries of the crash data in relation to the study for each road section are presented from Section 3.10.1 to Section 3.10.9. The complete crash data is presented in Appendix P.

3.10.1 Appin Road between West Cliff Colliery and Mount Ousley Road

A total of 71 crashes occurred along this road section, 3 crashes (4%) resulted in fatalities and 34 resulted in injuries (48%). Four of the crashes (6%) involved rigid trucks and eight crashes (11%) involved articulated vehicles. It is important to note that the 12 crashes involving rigid or articulated trucks resulted in 9 injuries. The 3 fatal crashes reported for Appin Road did not involve heavy vehicles. Refer to Figure 3.24.

Figure 3.24 Crash Summary – Appin Road



3.10.2 Mount Ousley Road between Appin Road and Southern Freeway

There are a high number of accidents for Mount Ousley Road in the last 5 years with a total of 457 accidents documented. 66 (14%) of these involved articulated vehicles and 24 (5.3%) involved heavy rigid vehicles. Seven injuries were recorded for rigid vehicles crashes. 40% of the articulated vehicles crashes resulted in injuries. One fatality crash involving a semi-trailer and pedestrian was recorded near the Picton Road Overpass. To summarise, a total of 3 fatalities, 157 injuries and 297 non-injury crashes occurred on the section of Mount Ousley Road between Appin Road and Southern Freeway. Refer to Figure 3.25, Figure 3.26 and Figure 3.27.

Figure 3.25 Crash Summary – Mount Ousley Road (south of Appin Road)

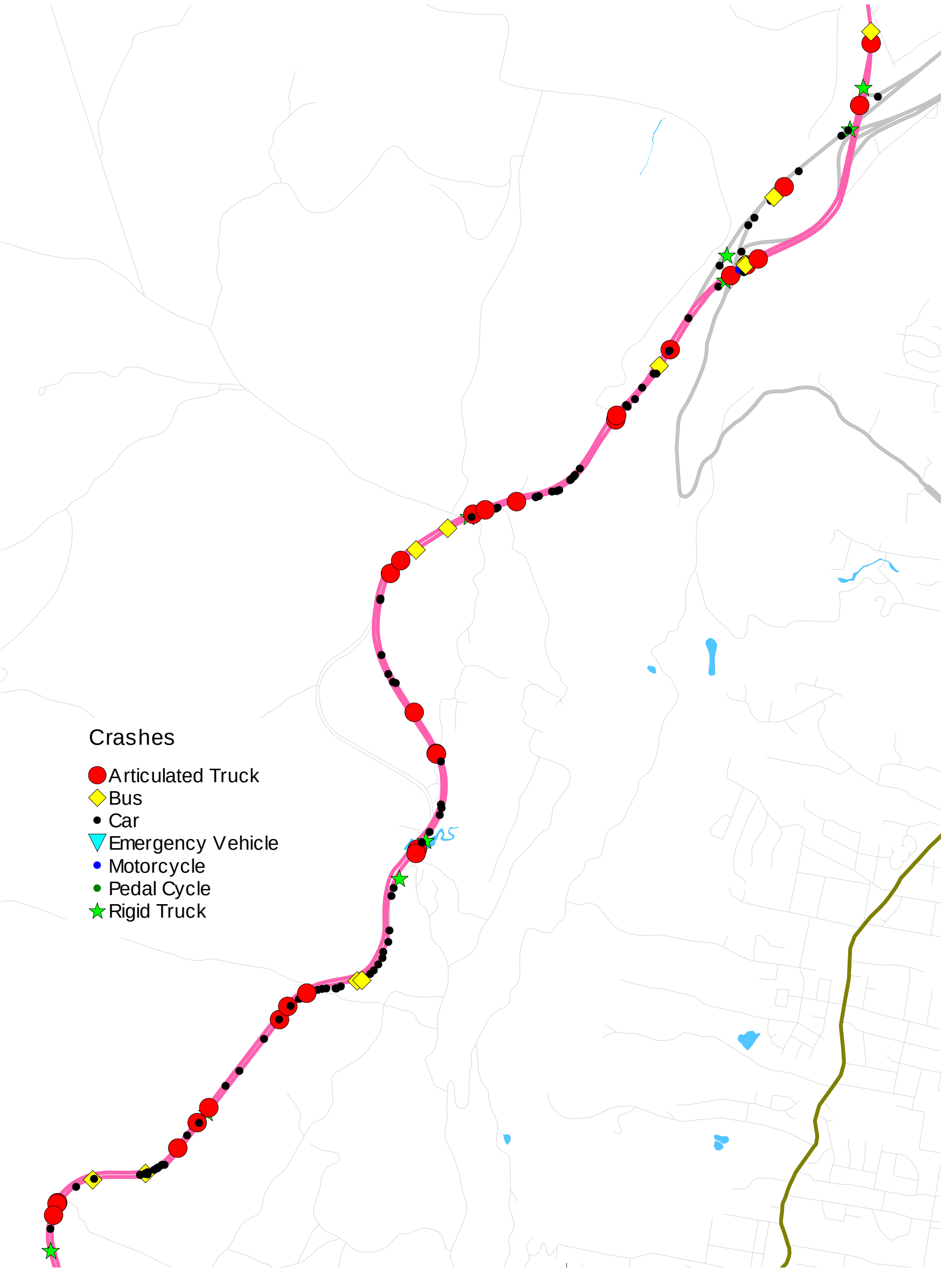


Figure 3.26 Crash Summary – Mount Ousley Road (mid)

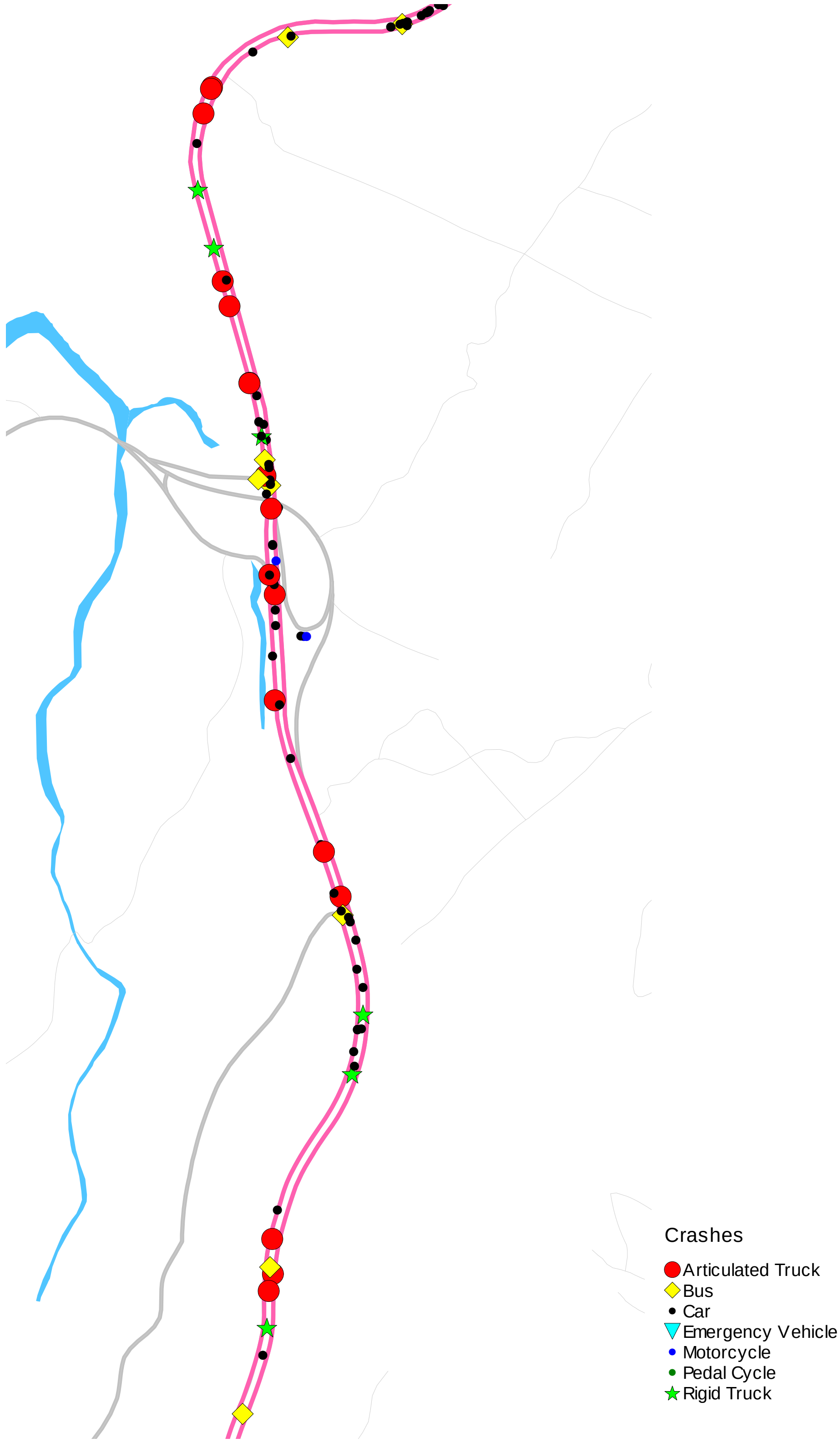
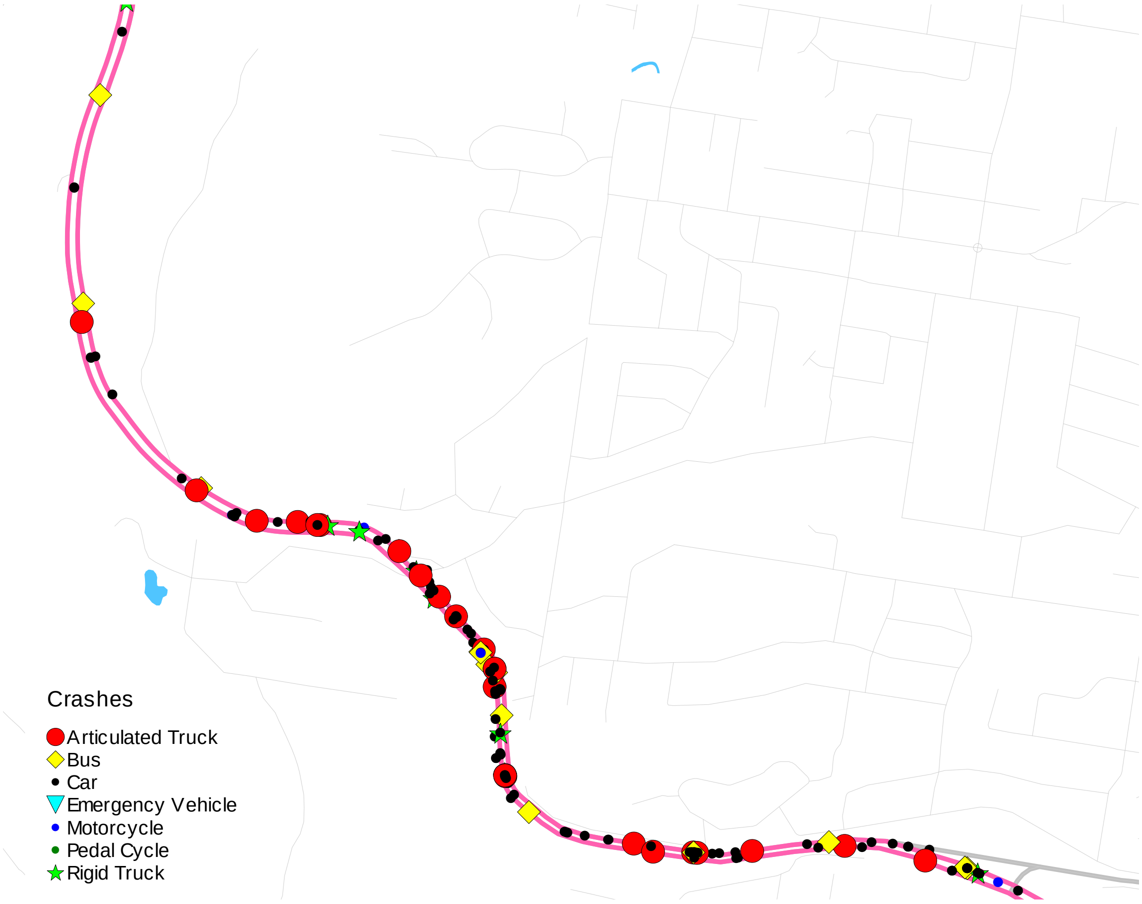


Figure 3.27 Crash Summary – Mount Ousley Road/Southern Freeway (north)



3.10.3 Southern Freeway between Mount Ousley Road and Masters Road

138 accidents were recorded on this section of the Southern Freeway between 2002 and 2007, two resulted in fatalities and 44 resulted in injury. Approximately 6% of the total crashes involved rigid vehicles and another 5% involved articulated vehicles. 4 injuries occurred in accidents involving rigid vehicles (2) and articulated vehicles (2). No fatal heavy vehicle crashes occurred. Refer to Figure 3.28 and Figure 3.29.

Figure 3.28 Crash Summary –Southern Freeway (north)

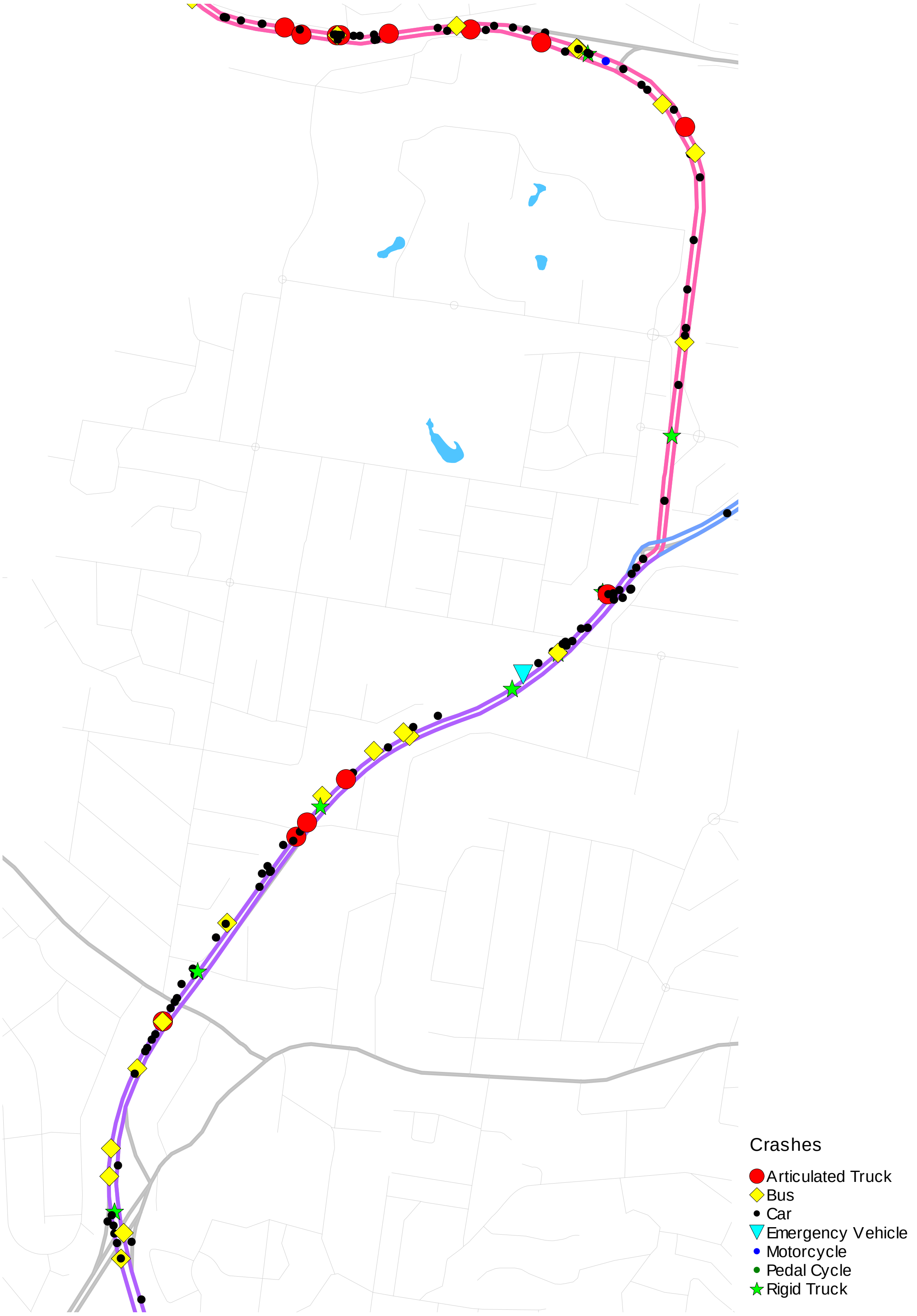
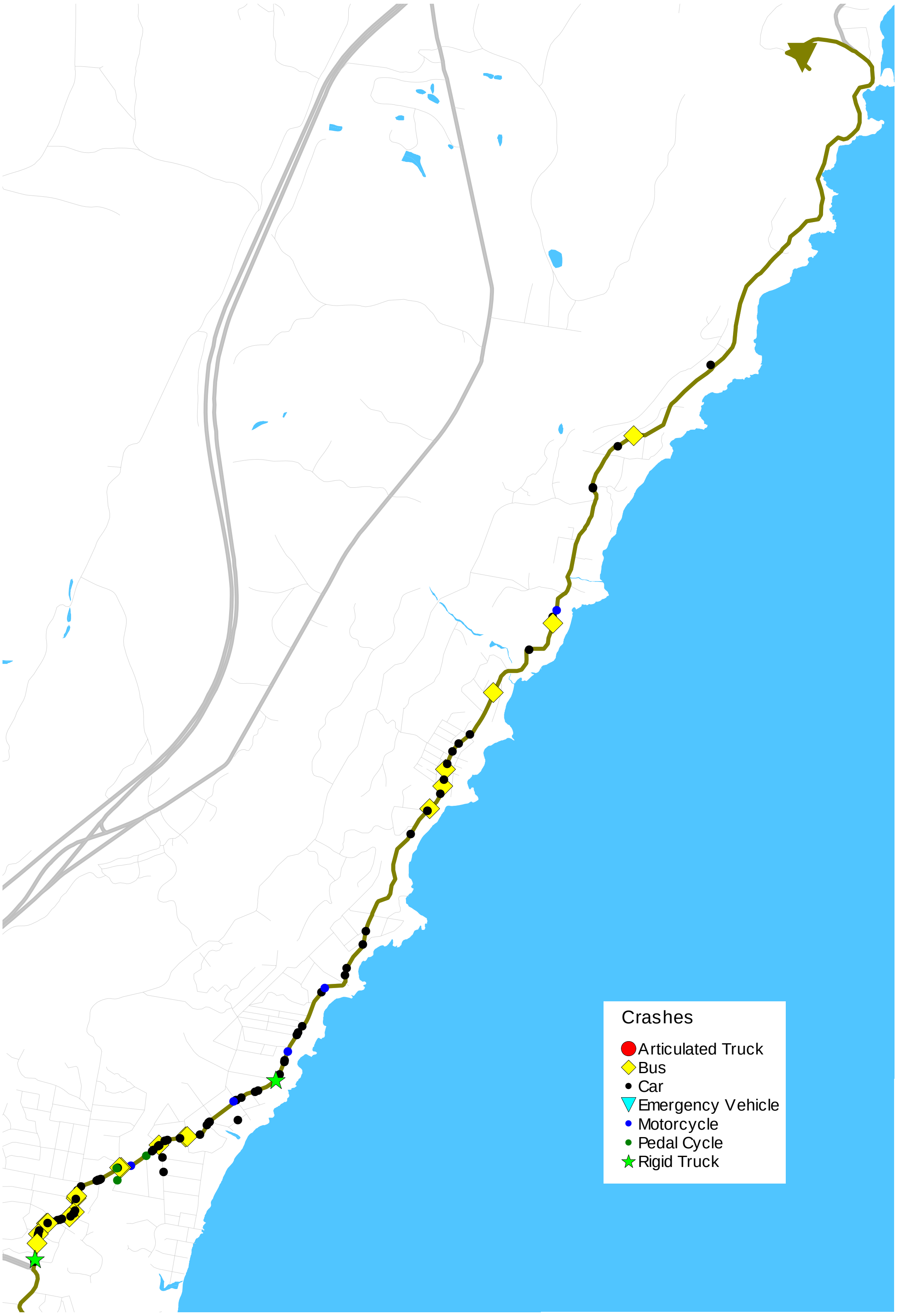


Figure 3.29 Crash Summary – Southern Fwy (south)

3.10.4 Lawrence Hargrave Drive between Coalcliff and Princes Highway

Along Lawrence Hargrave Drive, 134 accidents were documented resulting in 1 fatality and 65 injuries. Only 2 crashes involved heavy rigid vehicles with no crashes recorded involving articulated vehicles. No crashes involving heavy vehicles resulted in fatality or injuries. Refer to Figure 3.30.

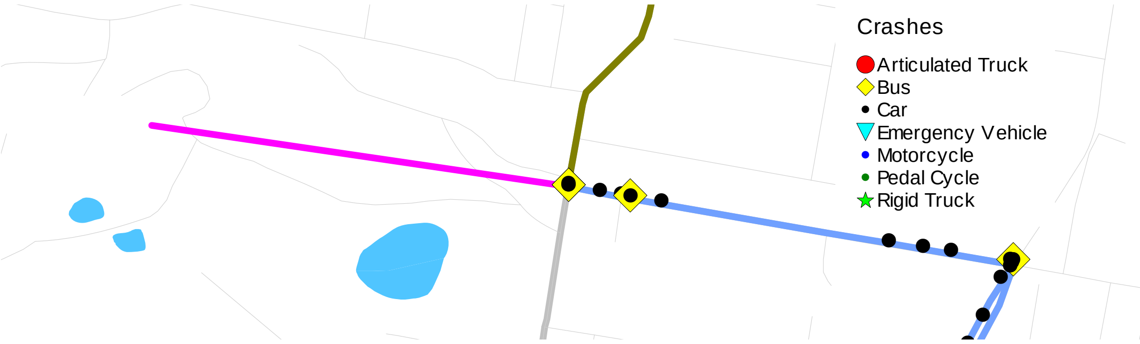
Figure 3.30 Crash Summary – Princes Highway / Lawrence Hargrave Drive



3.10.5 Bellambi Lane between Princes Highway and Northern Distributor

A total of 26 crashes were recorded, with 8 injury crashes and 18 non-injury No rigid or articulated vehicles were involved in crashes along Bellambi Lane. Refer to Figure 3.31.

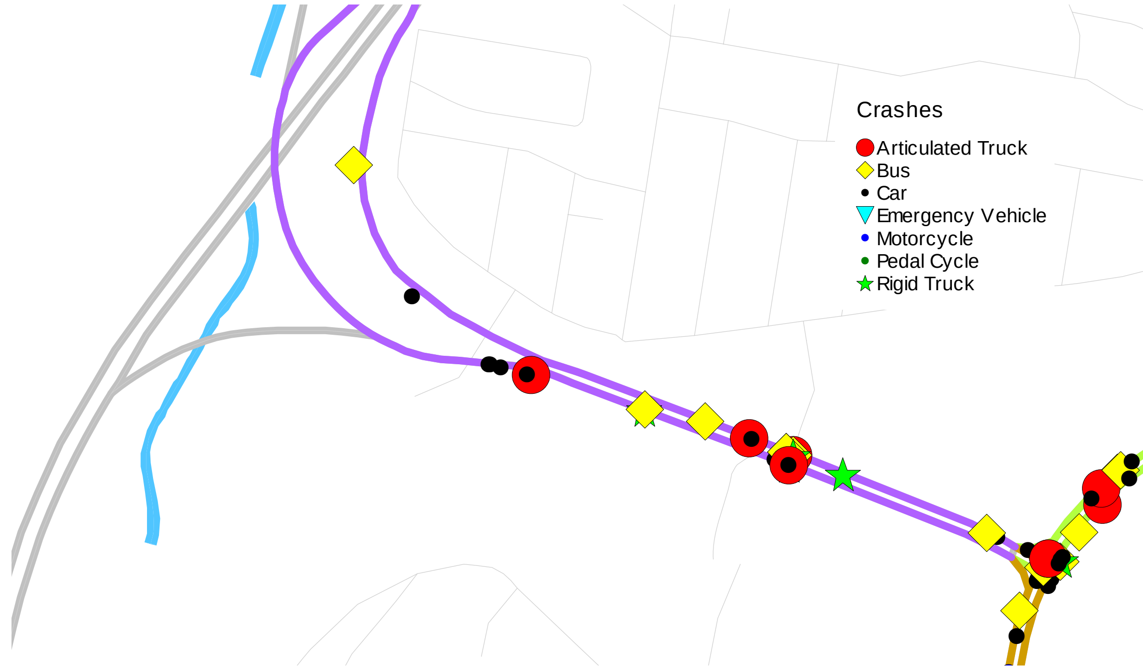
Figure 3.31 Crash Summary – Northern Distributor/Bellambi Lane



3.10.6 Masters Road between Southern Freeway and Springhill Road

There were a total of 38 crashes on Masters Road with one crash resulting in a fatality and 18 in injuries. Four crashes were recorded involving rigid trucks and another four with articulated vehicles. However, only 1 injury was documented for a rigid truck crash with no fatalities. Refer to Figure 3.32.

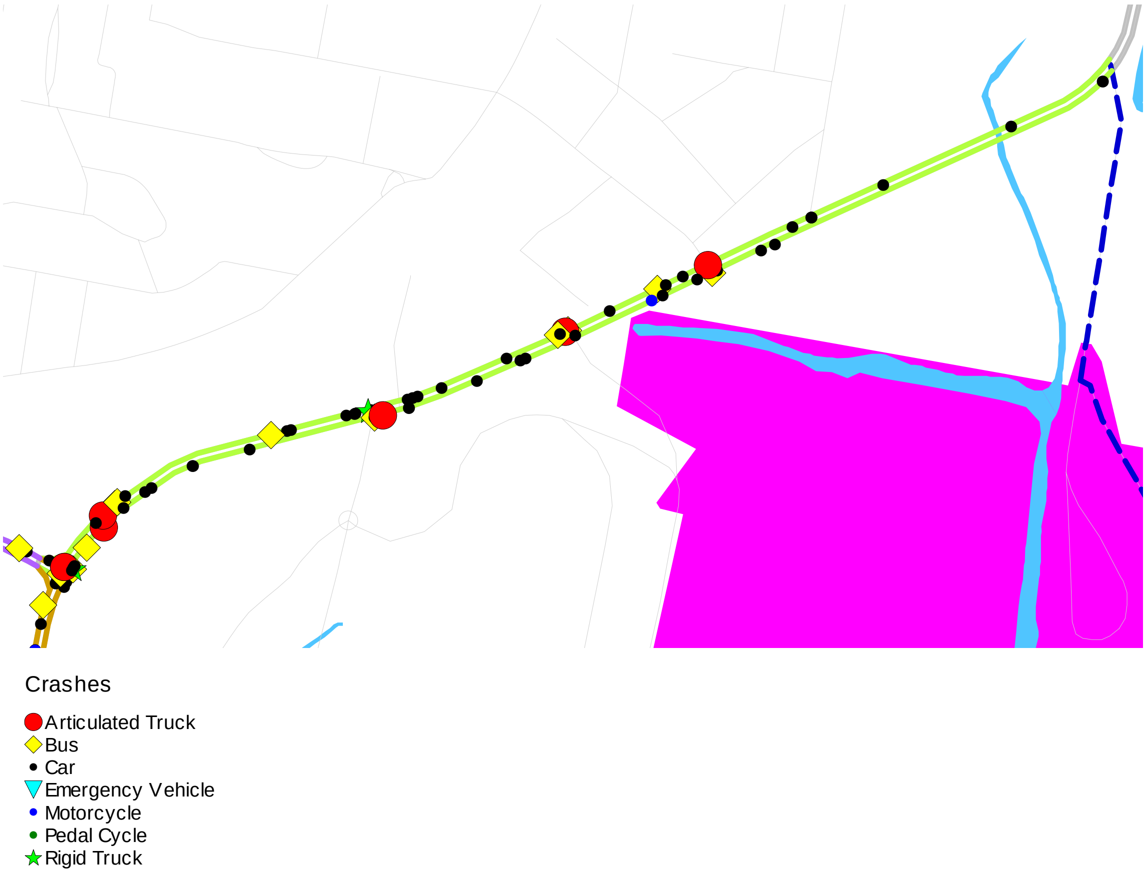
Figure 3.32 Crash Summary – Masters Road



3.10.7 Springhill Road between Masters Road and Port Kembla Road

81 crashes were recorded along Springhill Road between Masters Road and Port Kembla Road. 32 crashes resulted in injuries and no crashes resulted in fatalities. Only 2 crashes were recorded as involving rigid trucks. It is important to note that 7 articulated vehicles were involved in crashes with a light vehicle, 2 of these crashes resulted in injuries to 4 persons. Refer to Figure 3.33.

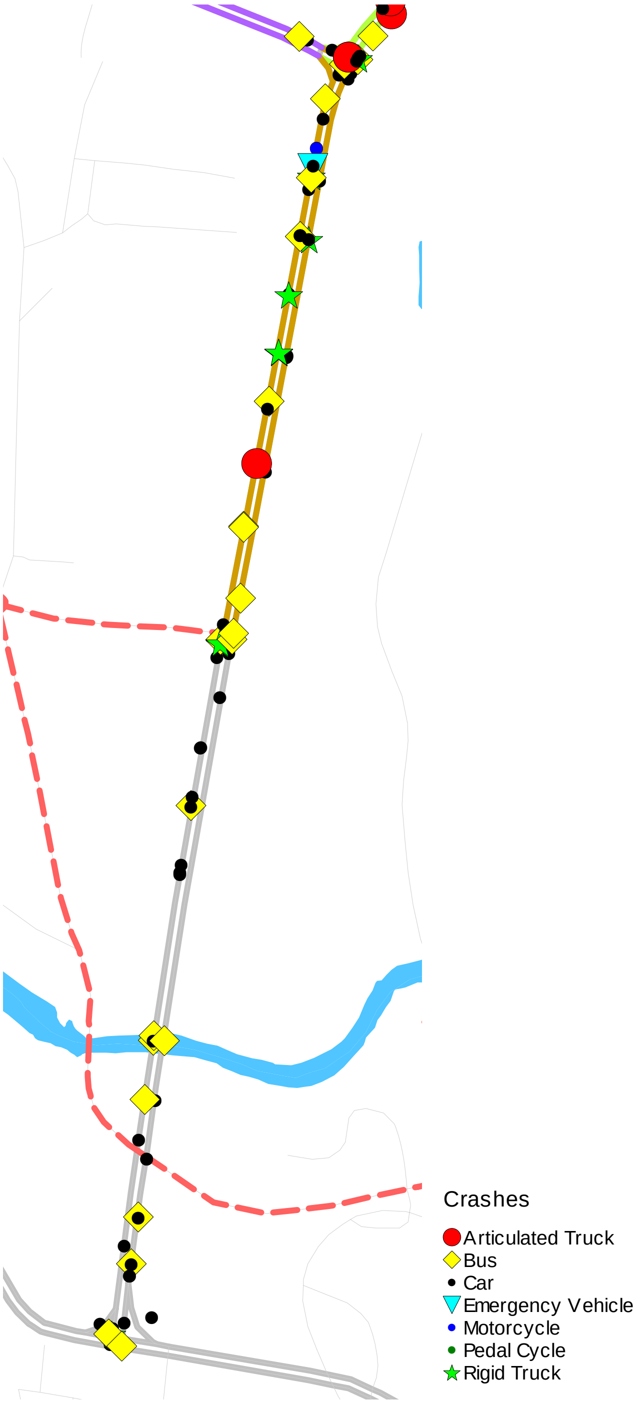
Figure 3.33 Crash Summary – Springhill Road



3.10.8 Springhill Road between Masters Road and Five Islands Road

Out of 105 crashes reported along Springhill Road south of Masters Road, 6 involved rigid trucks and one involved a B-Double. 3 injuries were recorded for accidents involving a rigid truck with no fatalities. A total of 25 crashes resulted in injuries. Refer to Figure 3.34.

Figure 3.34 Crash Summary – Springhill Road



3.10.9 Northern Distributor between Bellambi Lane and Southern Freeway

There were 147 crashes recorded along the Northern Distributor, including 55 injury crashes and 3 fatal crashes. Four crashes involved rigid trucks and three involved articulated trucks. There were 3 fatal crashes over the last 5 years but none involved a heavy vehicle. Only 3 injuries were documented for articulated vehicle accidents. All rigid trucks crashes resulted in vehicles being towed away with no injuries reported. Refer to Figure 3.35 and Figure 3.36.

Figure 3.35 Crash Summary – Northern Distributor/Bellambi Lane

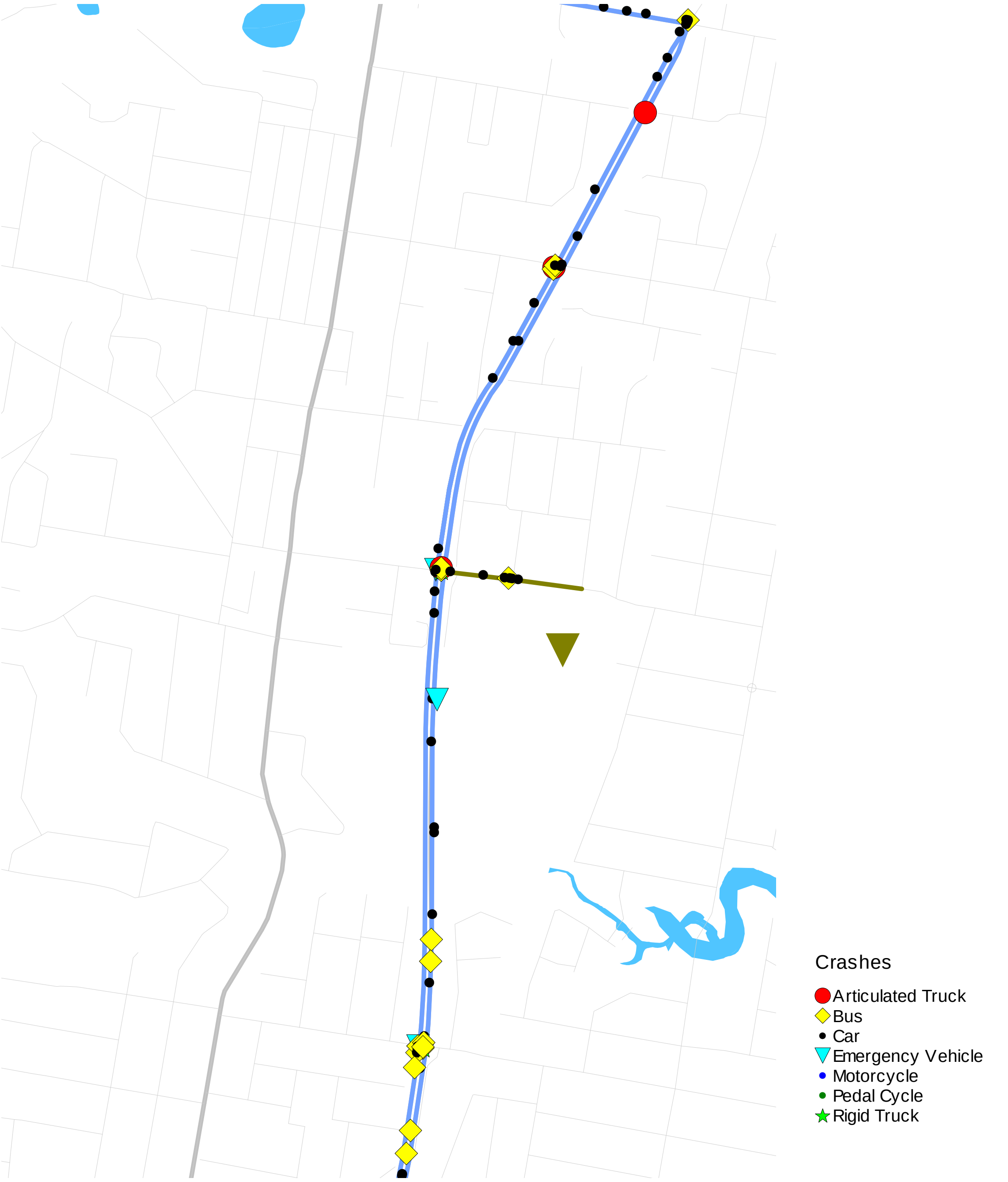
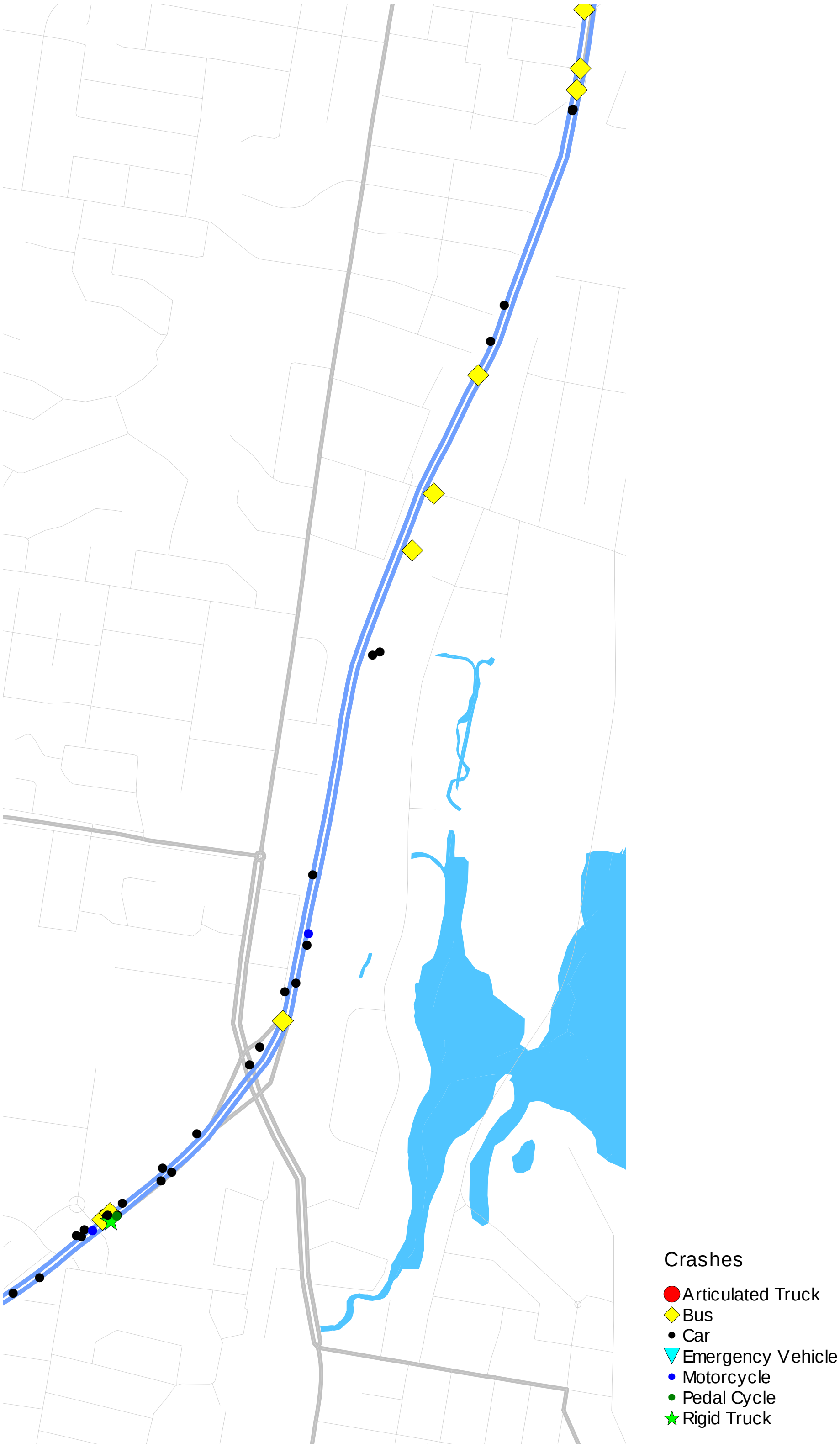


Figure 3.36 Crash Summary – Northern Distributor (south)



3.10.10 Overview

A summary of the recorded crashes is presented in Table 3.22 and on Figure 3.37.

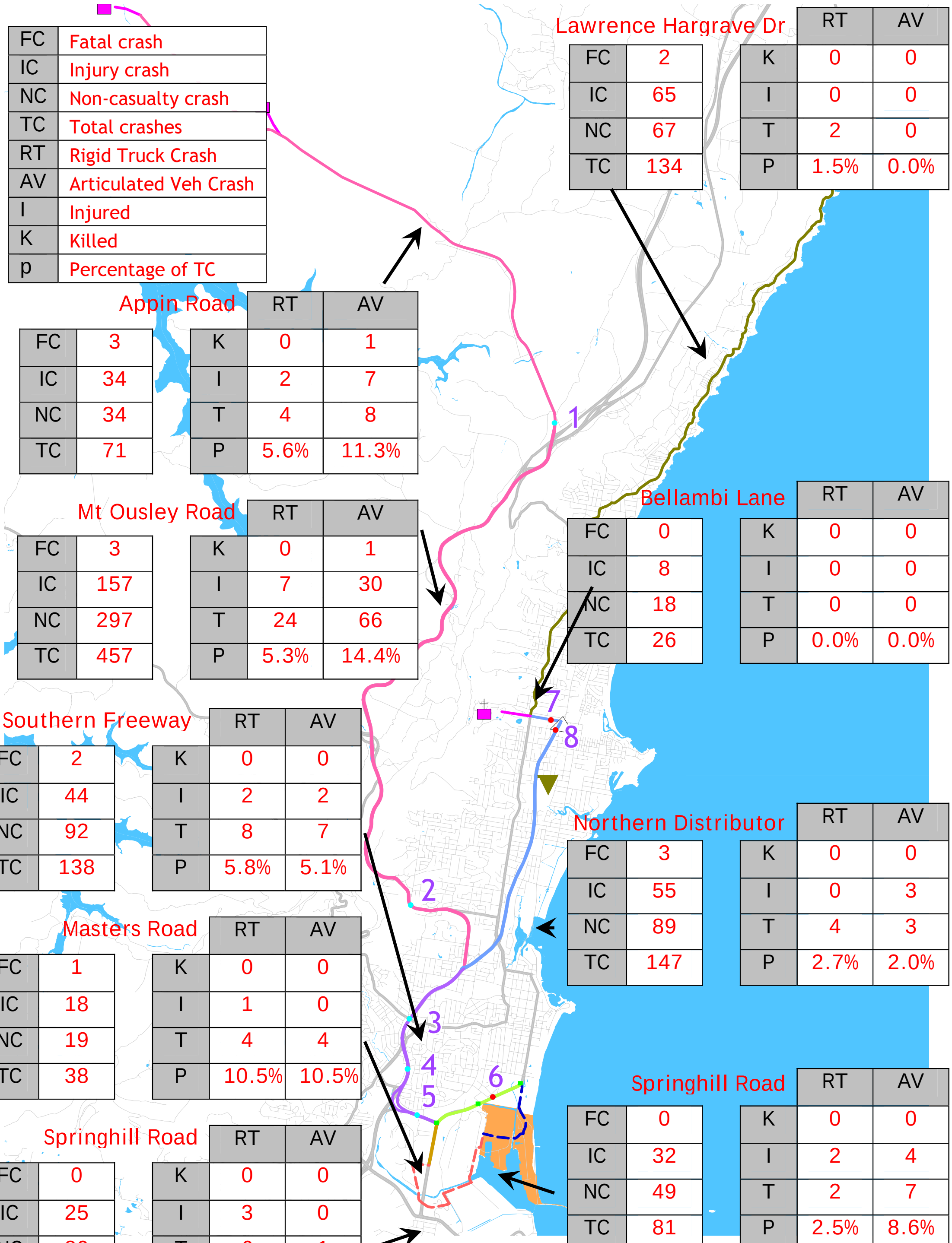
Table 3.22 Summary of Crashes October 2002 – September 2007

Location	All Crashes				Rigid Truck Crashes				Articulated Vehicle Crashes			
	Fatal	Injury	Non-Casualty	Total	No.	% of Total Crashes*	Injured	Killed	No.	% of Total Crashes*	Injured	Killed
Appin Rd, Between Appin & Mt Ousley Rd	3	34	34	71	4	5.6% (7.0%)	2	0	8	11.3% (7.6%) {4.7%}	7	0
Mount Ousley Road, Between Appin Rd & Southern Freeway	3	157	297	457	24	5.3% (4.4%)	7	0	66	14.4% (6.9%) {1.1%}	30	1
Southern Freeway, Between Mount Ousley Rd & Masters Rd	2	44	92	138	8	5.8% (4.9%)	2	0	7	5.1% (4.2%) {0.9%}	2	0
Masters Road, Between Southern Fwy & Springhill Rd	1	18	19	38	4	10.5% (5.1%)	1	0	4	10.5% (7.3%) {2.8%}	0	0
Springhill Road, Between Masters Rd & Port Kembla Rd	0	32	49	81	2	2.5% (3.7%)	2	0	7	8.6% (1.8%) {0.9%}	4	0
Springhill Road, Between Masters Rd & Five Island Rd	0	25	80	105	8	7.6%	3	0	1	1.0%	0	0
Lawrence Hargrave Drive, Between Coalcliff & Princes Highway	2	65	67	134	2	1.50%	0	0	0	0%	0	0
Bellambi Lane, Between Princes Hwy & Northern Distributor	0	8	18	26	0	0% (6.0%)	0	0	0	0% (1.4%) {0.7%}	0	0
Northern Distributor, Between Bellambi Ln & Southern Fwy	3	55	89	147	4	2.7% (6.0%)	0	0	3	2.0% (1.2%) {0.4%}	3	0
Total	14	438	745	1197	56	4.7%	17	0	96	8.0%	46	1

* Percentages in ( ) brackets represents the proportion of heavy vehicles (rigid or articulated) by average weekly traffic volumes. Percentage in { } brackets represents the proportion of PKCT coal trucks by average weekly traffic volumes.

Figure 3.37 2002-2007 Crash Summary

FC	Fatal crash
IC	Injury crash
NC	Non-casualty crash
TC	Total crashes
RT	Rigid Truck Crash
AV	Articulated Veh Crash
I	Injured
K	Killed
p	Percentage of TC



Lawrence Hargrave Dr

			RT	AV
FC	2	K	0	0
IC	65	I	0	0
NC	67	T	2	0
TC	134	P	1.5%	0.0%

Appin Road

			RT	AV
FC	3	K	0	1
IC	34	I	2	7
NC	34	T	4	8
TC	71	P	5.6%	11.3%

Bellambi Lane

			RT	AV
FC	0	K	0	0
IC	8	I	0	0
NC	18	T	0	0
TC	26	P	0.0%	0.0%

Mt Ousley Road

			RT	AV
FC	3	K	0	1
IC	157	I	7	30
NC	297	T	24	66
TC	457	P	5.3%	14.4%

Southern Freeway

			RT	AV
FC	2	K	0	0
IC	44	I	2	2
NC	92	T	8	7
TC	138	P	5.8%	5.1%

Northern Distributor

			RT	AV
FC	3	K	0	0
IC	55	I	0	3
NC	89	T	4	3
TC	147	P	2.7%	2.0%

Masters Road

			RT	AV
FC	1	K	0	0
IC	18	I	1	0
NC	19	T	4	4
TC	38	P	10.5%	10.5%

Springhill Road

			RT	AV
FC	0	K	0	0
IC	32	I	2	4
NC	49	T	2	7
TC	81	P	2.5%	8.6%

Springhill Road

			RT	AV
FC	0	K	0	0
IC	25	I	3	0
NC	80	T	6	1
TC	105	P	5.7%	1.0%

Out of the 1197 recorded crashes, articulated vehicles had the highest injury rate:

- All vehicles - 1 injury per 2.7 crashes;
- Rigid vehicles - 1 injury per 3.3 crashes; and
- Articulated vehicles - 1 injury per 2.1 crashes.

Out of the 1197 recorded crashes, articulated vehicles had a lower fatality rate than the average:

- All vehicles - 1 fatality per 86 crashes;
- Rigid vehicles - 0 fatalities; and
- Articulated vehicles - 1 fatality per 96 crashes.

In general articulated vehicles were observed to be involved in a greater proportion of crashes than they represented volumes of traffic on the road sections:

- Appin Road, between Appin & Mount Ousley Rd – 11.3% of crashes involved AVs, which is higher than the proportion by volume of AV's for this route (7.6%), coal trucks represent 4.7% of total traffic;
- Mount Ousley Road, between Appin Road and Southern Freeway – 14.4% of crashes involved AVs, which is higher than the proportion by volume of AV's for this route (6.9%), coal trucks represent 1.1% of total traffic;
- Southern Freeway, between Mount Ousley Road & Masters Road – 5.1% of crashes involved AVs, which is higher than the proportion by volume of AV's for this route (4.2%), coal trucks represent 0.9% of total traffic;
- Masters Road, between Southern Freeway and Springhill Road- 10.5% of crashes involved AVs, which is higher than the proportion by volume of AV's for this route (7.3%), coal trucks represent 2.8% of total traffic;
- Springhill Road, Between Masters Rd & Port Kembla Rd – 8.6% of crashes involved AVs, which is higher than the proportion by volume of AV's for this route (2.8%), coal trucks represent 0.9% of total traffic; and
- Northern Distributor, Between Bellambi Lane & Southern Freeway – 2.0% of crashes involved AVs, which is higher than the proportion by volume of AV's for this route (1.2%), coal trucks represent 0.4% of total traffic.

In general on the above routes coal trucks represent only a small proportion of the total traffic volumes. There were no crashes along Bellambi Lane involving rigid or articulated vehicles despite the route carrying 7.4% heavy vehicles (0.7% coal trucks).

3.11 ROAD SAFETY AUDIT

3.11.1 Project Details

Three major collieries deliver coal to the Port Kembla Coal Terminal (PKCT) by heavy vehicles:

- West Cliff Colliery (WC) via West Cliff CPP;
- Appin Colliery via West Cliff CPP; and
- Gujarat National Resources Environment (GNRE) No1 Mine.

The road routes used from the mines to PKCT are described in section 3.2 and 3.3 above. Approximately 4 million tonnes of coal is delivered each year from these mines. Haulage is undertaken on a continuous 24 hours per day, 7 day week basis from West Cliff CPP. From GNRE No. 1 Mine coal is delivered 11 hours per day, 6 day week.

The coal is hauled in 3 classes of heavy vehicles, namely six axle articulated vehicles (Class 9), B doubles (Class 10) and trucks with dog trailers (Refer to section 2.2 above for further truck details).

Road safety audits of the existing routes have been undertaken to identify any safety concerns, particularly those affecting coal haulage vehicles. The results are given below.

3.11.2 Road Safety Audit Team

The audit was undertaken by:

- Bob Allen – Senior Engineer and Certified Lead Auditor, Cardno (NSW) Pty Ltd
- Clement Lim - Traffic Engineer and Level 1 Auditor, Cardno Eppell Olsen Pty Ltd

3.11.3 Road Inspections

The route inspections were undertaken as follows:

- Wednesday, 9 April 2008 – Route inspections as coal truck passengers and commentary by truck drivers on the route from West Cliff CPP to PKCT;
- A day time inspection was then undertaken by motor vehicle;
- Thursday, 10 April 2008 – Route inspection by coal trucks and commentary by truck drivers on the route from GNRE No1 mine to PKCT;
- A day inspection of this route was then undertaken by motor vehicle; and
- A night inspection was then undertaken of both routes.

3.11.4 Route Details and Findings – West Cliff CPP to PKCT.

The route has been divided into discrete lengths to enable analysis of the route in some detail. The sections are described in the following sections.

Section 1 – West Cliff Colliery to Wedderburn Road

This access road is a two lane rural road 2.5km long with a speed limit of 60km/h. The road cross-section is 2 lane undivided with sealed pavement and shoulders generally in good condition. It is line marked with 'BB' barrier centreline and 'E1' edge-lines. The grade is flat, and sight distance is satisfactory. The road is not provided with street lighting. The following road safety findings were made:

- Some linemarking is in poor condition or obliterated (see Photograph 3.6);
- The guardrail safety barrier on the right hand side at mine entrance is too low and unsafe; and
- The pavement is badly rutted on the left hand side near Appin Road turnoff causing some trucks to veer onto centreline (see Photograph 3.7).

Photograph 3.6 Road access near mine entrance showing poor or obliterated linemarking

Photograph 3.7 View along access road showing heavy rutting along LHS pavement

Section 2 – Appin Road from West Cliff Mine Access to Mount Ousley Road

The Appin Road section is a 2 lane rural road 11.2km long and 100km/h speed limit. The pavement is asphalt and the shoulder area sealed. Extensive crack sealing and pavement resealing has been carried out recently. Passing/climbing lanes are provided at regular intervals to assist traffic flow. Off-road truck stopping bays are provided, at 4.4km east of the West Cliff mine access turnoff, for eastbound traffic and 4.2km for westbound traffic. Linemarking is in good condition with ‘BB’ barrier and ‘S1’ separation centrelines, ‘E1’ edgelines and ‘C1’ continuity line at merging locations. There is no street lighting provided. Signposting is satisfactory.

There is a major bridge over Loddon River with handrails of ‘G4’ and thrie beam guardrails and narrow bridge warning signs. The width between kerbs is approximately 8m (see Photograph 3.8). This bridge does not meet the required safety standards for the volume of heavy vehicles now using the road. It is understood that the RTA have been aware of this issue in relation to the Loddon River Bridge.

Photograph 3.8 Loddon River Bridge on Appin Road showing narrow width

Section 3 – Mt Ousley Road from Appin Road to Southern Freeway (F6) At Mt Ousley

Mt Ousley Road is an arterial road approximately 13.9km in length from Appin Road to the Southern Freeway (F6) at Wollongong University. The road traverses through hilly country with steep grades and tight curves. The speed limit is 80km/h between Appin Road and Picton Road. The road cross section consists of 2 lanes & shoulder in each direction separated by Type 'F' concrete safety barriers. Between Picton Road and the Southern Freeway (F6) the road is very steep and consists of mainly 3 lanes in each direction, narrow shoulders and Type 'F' median barrier. Guard rail barriers are provided on many sections of shoulder. Linemarking consists of 'L1' lane lines and 'E1' edgelines in good condition. Signposting is very satisfactory. The road is not lit. The speed limit for trucks and buses on this section is 40km/h and these vehicles are limited to the outer 2 lanes.

Emergency stopping bays are provided in both directions just south of Picton Road and a northbound bay approximately 5km north of Picton Road.

The road is generally in good condition however there are a number of pit lids on the outer lane northbound, approx 2.5km south of Picton Road, which have settled causing unsafe conditions for traffic. (See Photograph 3.9).

Photograph 3.9 Pit lids on the northbound outer lane south of Picton Road

Note: Pit lids have settled causing deep ruts

Typical road cross sections of Mt Ousley Road are shown in Photograph 3.10 to Photograph 3.12.

Photograph 3.10 Typical road cross section between Appin Road and Picton Road

Photograph 3.11 Mt Ousley Road Typical road cross section between Picton Road and F6

Photograph 3.12 Mt Ousley Road approaching the F6 freeway junction

Section 4 – Southern Freeway (F6) from Mt Ousley Rd to Northern Distributor (MR 626)

The freeway extends from the intersection with Mt Ousley Road to the grade separated intersection with the Northern Distributor. The length is 1.7km and the road cross section is 4 lanes divided with Type 'F' Median Barrier. The speed limit is 90km/h. Linemarking and signposting is adequate and in good condition. The pavement and shoulders are of asphalt and in good condition.

There is an overbridge over the freeway at University Avenue. Street lighting is provided throughout.

There were no unsafe conditions identified.

Photograph 3.13 Junction of the F6 Freeway and Northern Distributor

Section 5 – Southern Freeway (F6) From Northern Distributor (MR 626) to Masters Road, Fig Tree

This section is 6.8km long and consists of 6 lanes divided with Type 'F' median barrier from the Northern Distributor to Princes Highway. From there on, it is 4 lanes divided between Princes Highway and Masters Road. The speed limits are 90km/h to Princes Highway and then 100km/h to Masters Road. Pavement, linemarking and signposting are adequate and in good condition. Overbridges are provided over the freeway at Reserve Road, McKiera Road, Princes Highway and The Avenue.

Street lighting is provided throughout. Street lighting at the junction of Masters Road and F6 Freeway is considered adequate. This road section was widened and reconstructed in recent years. No unsafe conditions were identified.

Section 6 – Masters Road from Southern Freeway (F6) to Springhill Rd (MR 581), Coniston

Masters Road is an urban arterial road of three lanes in each direction separated by a median island. The terrain is flat. The length is 1.3km and the speed limit is 80km/h. Right turn bays are provided at major intersections. Street lighting is provided throughout.

The road pavement is of asphalt in good condition. Linemarking and signposting is very satisfactory and in good condition. A typical road section is shown in Photograph 3.14.

There were no unsafe conditions on the road.

Photograph 3.14 Masters Road showing typical cross section

Section 7 - Springhill Road (MR 581) Between Masters Road and Port Kembla Road (PKCT Access)

Springhill Road is an urban arterial road of six lanes, divided by a grass median island. The section is 2.3km in length and the terrain is flat. The speed limit is 80km/h. Adequate street lighting is provided throughout. The pavement, linemarking and signposting is adequate and in good condition. Traffic control signals are provided at major intersections and right turn bays at other intersections.

There were no unsafe features identified.

Road haulage along Springhill Road north of Masters Road is only permitted between 6am and 11pm Monday to Saturday. Outside these permitted hours, the coal is delivered to PKCT via Springhill Road south of Masters Road to the entry road to BSL's Port Kembla Steelworks. The section of Springhill Road used is 1km in length and is of similar characteristics as the section of Springhill Road north of Masters Road, see Photograph 3.15.

Photograph 3.15 Springhill Road north of Masters Road

Section 8 - Port Kembla Rd from Springhill Rd to Steelworks Entry

The access is 0.5km in length and consists of 2 lanes undivided. There is no linemarking provided to delineate the travel lanes

3.11.5 Route Details and Findings GNRE No. 1 Mine to Southern Freeway (F6)

The route used by coal trucks from the GNRE No. 1 Mine is via Bellambi Lane and the Northern Distributor (MR 626) to the southern freeway (F6) at the Gwynneville interchange. The route is then identical to that used by the West Cliff haulage vehicles and is described in section 3.11.4 referred to as Section 5 to Section 8. Details of the sections referred to above are identified in the following sections.

Section 1 – Mine access road to Princes Highway (SH1) Russell Vale

The mine access road is 0.6km long and consists of concrete and bitumen pavements of variable width. The roadway is not line marked or adequately signposted, street lighting is not provided.

Section 2 - Bellambi Lane from Princes Highway (SH1) to Northern Distributor (MR626), Bellambi

The road is 0.7km in length on flat terrain and straight alignment. It consists of 4 lanes undivided typically of urban local roads. The road is line marked with a barrier 'BB' centreline and 'L1' lane lines. The speed limit is 60km/h and street lighting is provided.

There were no unsafe conditions identified.

Section 3 – Northern Distributor (MR626) from Bellambi Lane to Southern Freeway (F6) at Gwynneville

The road is 6.4km in length on flat terrain and relatively straight alignment the road cross section is 4 lanes divided with a relatively narrow median with guardrail safety barrier protection. Guardrail and type 'F' barrier are provided on shoulders as necessary for protection of errant vehicles.

Traffic control is provided by traffic control signals at Bellambi Lane, Rothery Street, Railway Avenue, and Towradgi Road and grade separated interchanges at Princes Highway and University Avenue.

The speed limit is 80km/h north of Towradgi Road and 90km/h south of Towradgi Road. Provision is made for cyclists on the road shoulders. The road is provided with street lighting at intersections and interchanges. The road has been built in recent years and the pavement, line making and signposting meet current standards and are in good condition.

There were no unsafe conditions identified Photograph 3.16 and Photograph 3.17 show typical views of the road.

Photograph 3.16 Northern Distributor approaching Towradgi Road Intersection

Note: Traffic Signal Control

Photograph 3.17 Intersection of Northern Distributor and Towradgi Road

3.12 SYDNEY TO WOLLONGONG CORRIDOR ISSUES

AusLink is a major Australian Government initiative designed to achieve better national land transport planning, funding and investment decision making. One of the key components of the AusLink process is the development of a strategy for each corridor of the AusLink National Network. A Corridor Strategy is a statement of the shared strategic priorities of the Australian and State/Territory Governments for the long-term (20-25 year) development of the corridor. A corridor strategy has been developed for the Sydney-Wollongong Corridor and is a collaborative initiative that is jointly owned by:

- Australian Government Department of Transport and Regional Services;
- NSW Department of Planning;
- NSW Roads and Traffic Authority; and
- NSW Ministry of Transport.

The Sydney-Wollongong Corridor Strategy (SWCS) was prepared by a project team comprising representatives from these agencies. This study was reviewed to provide an overview of the issues along the corridor.

Highlights of the review of the Sydney-Wollongong corridor include:

- *"The capacity of most of the road corridor is sufficient to meet current needs, and from a passenger transport perspective is generally performing well.*
- *There is congestion in the morning peak through Wollongong and Mount Ousley Road due to both large numbers of passenger and commercial vehicles such as coal trucks. This congestion leads to peak spreading (in effect increasing the peak period) and slower travel times. Heavy freight vehicles are more adversely impacted than passenger vehicles due to their lower power to weight ratio.*
- *The increase in coal mining in the region and the relocation of a number of import activities from Sydney to Port Kembla will inevitably lead to more trucks on the roads around Wollongong. Given the Illawarra rail corridor has a focus on passenger trains, there is limited scope to increase freight capacity on this route. This places potential constraints on both current and future capacity, and could lead to increasing truck movements.*
- *In terms of maintenance, the corridor is generally in good condition with a regular maintenance routine. There are a couple of locations where maintenance is required outside of the rolling maintenance program, and the proliferation of coal mining could be expected to add subsidence issues on the corridor between Bulli Tops and Wollongong/Port Kembla.*
- *The section of road from Bulli Pass to the top of Mount Ousley exhibits a relatively higher crash history than other sections of the corridor, with a crash rate four times the regional average. This can be largely explained by the convergence of vehicles from Picton Road onto Mount Ousley Road heading to and from Wollongong, coupled with the topographical nature of the link and its undulating terrain.*
- *Fog and wet weather frequently occur along the higher altitude sections of the Sydney to Wollongong corridor, particularly from north of Bulli Tops to halfway down Mount Ousley. These conditions tend to occur seasonally during the early morning and late afternoon, however climatic events can occur at random on any day or time.*
- *Wet weather accidents represent over 66% of all crashes, about 8 times the rate expected for a road of this type. In extreme instances visibility can reduce significantly, such that a preceding vehicle with hazard lights on cannot be seen from 30 to 50 metres away. As sections of the road are 110 km/h here, this exacerbates the safety issues on this section of road. There is a variable message sign (VMS) system between Bulli Tops and Helensburgh that is activated automatically when visibility reduces due to fog or adverse weather. This can also be used for crash management in the event of a crash.*
- *The transport of coal to Port Kembla also creates a number of safety issues. As rail paths are limited and a number of coal mines operate at a distance from rail facilities, there is significant trucking of coal into the port during daylight hours which can create conflicts with passenger vehicles. Despite this, technology has progressed to the point where the safety and operability of B-Double vehicles has improved substantially. Existing weight limits on heavy vehicles also leads to more trucks utilising Mount Ousley Road than is arguably necessary, especially when it is considered that the road is designed to cater especially for this heavy vehicle task, with a separate truck lane on both north and south lanes."*

4 24/7 TRIAL OF COAL TRANSPORTATION BY PUBLIC ROAD TO PKCT

PKCT were given approval to undertake a Trial of 24 hours per day, 7 days per week (24/7) transportation of coal by public road to the Port Kembla Coal Terminal.

4.1 OVERVIEW OF TRIAL

4.1.1 Period

The trial was undertaken for a 6 week period between 3 March 2008 and 14 April 2008. The road transported coal was delivered 24 hours per day 7 days per week from two mines, namely the West Cliff Colliery and Appin Colliery, however, road transported coal was also received 11 hours per day 6 days per week from Gujurat NRE No. 1 Mine.

4.1.2 Objectives

Port Kembla Coal Terminal undertook to prepare a report of the findings of the 24/7 Road Transportation of Coal Trial in the Environmental Assessment as a part of the Part 3A Major Project application.

The aim of the 24/7 Trial was to replicate the proposed spread of hours, days of the week and tonnage throughput forecasts, as far as possible within the current operating environment.

The current operating context significantly impacted on the ability to replicate 24/7 road transportation to PKCT throughout the Trial. However, PKCT were prepared to make a number of commitments through the Trial in the key parameters of hours of the day, days of the week, tonnage throughput forecast and community perceptions, as noted in Table 4.1.

Table 4.1 PKCT 24/7 Trial Aims and Commitments

	Aim	Commitment	Operating Context
Hours of the day	▪ Spread truck deliveries over the full 24 hours of the day ▪ Minimise peak commuter time traffic congestion	▪ Minimum 15% of total deliveries to PKCT at night (i.e. after 6pm and before 7am) ▪ Staggered truck driver shift start and finish times	▪ Current levels of truck fleets and drivers ▪ Current supply arrangements to other customers heavily focussed at night (i.e. BlueScope Port Kembla Steelworks)
Days of the week	▪ Spread truck deliveries over the full 7 days of the Week	▪ Minimum 5% of total deliveries to PKCT on Sundays	▪ Current truck driver shift rosters and employment arrangements ▪ Current maintenance windows for PKCT and truck companies

	Aim	Commitment	Operating Context
Tonnage Throughput	▪ Different delivery rates of projected increased volumes of coal throughput	▪ Minimum one 24 hour periods and maximum seven 24 hour periods of deliveries at 10 mtpa road received coal (i.e. 27,500 tonnes per day)	▪ Low demand period and lack of shipments by road in-loading customers ▪ Ability to mobilise sufficient trucks and drivers
Community Perception	▪ Capture community issues and complaints	▪ PKCT Community Hotline data will be captured	▪ Existing Community Hotline 1800 111 448

4.1.3 Operating Context

A description of the current operating context key issues, which made it difficult and in some cases impractical to change for the Trial period alone, are outlined as follows:

- Current coal supply arrangements of PKCT customers to major domestic steel producer (i.e. BSL Steelworks adjacent to PKCT) are heavily focussed at night time because of current restrictions on deliveries to PKCT 11 hours per day 6 days per week. Therefore there is limited flexibility in the current truck fleet and drivers available to supply PKCT;
- Current train deliveries to BSL are timed to minimise potential conflicts with road coal transportation delivery timetables and most PKCT rail deliveries occur in the afternoon and evening;
- Current truck driver shift rosters and employment arrangements are in place to meet the aforementioned supply arrangements which exist to PKCT and BSL Steelworks;
- Current maintenance windows for both PKCT and truck companies are timed to coincide with the current supply arrangements of coal to PKCT, with road receival maintenance typically occurring on Sundays at PKCT;
- Forecast shipments for road in-loading customers were low for the trial period, and production levels were affected by an extended Longwall Change-out at Appin mine site; and
- Current truck fleets and drivers availability to meet existing supply arrangements and to replicate sustained levels of increased throughput was problematic.

4.2 COAL TRUCK MOVEMENTS

Detailed coal truck movement data was collected during the trial period and is summarised in Appendix Q.

4.2.1 West Cliff CPP

BHPBIC participated in the trial, by delivering to PKCT on a 24 hour 7 day basis from West Cliff CPP. There was typically no increase in the number of trucks from the West Cliff CPP to PKCT, however, attempts were made to distribute deliveries over the 24/7 period, within constraints. Deliveries were increased on Wednesday the 19th of March to attempt to replicate an equivalent of a 10mtpa day.

The main difference during the trial was that the night time trucks which were turning right at Masters Road/Springhill Roads intersection and going through BlueScope and along Tom Thumb Road to PKCT will instead turn left and go to PKCT along Springhill Road and Port Kembla Roads (as during the daytime).

A few key features of the BHPBIC operations during the 42 day (6 week) trial are as follows:

- BHPBIC delivered coal to PKCT on 30 of the 42 days (71%):
  - 27 days; and
  - 28 nights.
- During the trial BHPBIC delivered coal to PKCT on:
  - All Wednesdays and Fridays;
  - 5 of 6 Mondays, Tuesdays and Thursdays;
  - 2 of 6 Sundays; and
  - 1 of 6 Saturdays.
- BHPBIC did not deliver over the Easter Long Weekend (with the exception of the early hours of Good Friday);
- A total of 159,866tonnes of coal was delivered to PKCT in 4,451 loads;
- The average BHPBIC truck load carried 35.9tonnes of coal; and
- On average 32.8% of deliveries occurred at night (6pm to 7am).

4.2.2 Gujarat NRE No. 1 Mine

Gujarat NRE No. 1 Mine was involved in the trial but did not make any alterations to existing delivery times and patterns. A few key features GNRE operations during the 42 day (6 week) trial are as follows:

- GNRE delivered coal on 15 of the 42 days (36%);
- During the trial GNRE delivered coal to PKCT on:
  - 4 of 6 Tuesdays, Fridays and Saturdays;
  - 3 of 6 Thursdays; and
  - No Mondays, Wednesdays and Sundays.
- GNRE did not deliver over the Easter Long Weekend;
- A total of 46,971tonnes of coal was delivered to PKCT in 1,463 loads;
- The average truck load from GNRE carried 32.1tonnes of coal;
- An average of 14.4 deliveries departed the mine at night (6pm to 7am) – all of which occurred between 5am and 7am.

4.3 ASSESSMENT

The assessment period provided an excellent opportunity to collect data on both coal truck movements from each of the mines and subsequently undertake traffic volumes counts. This allowed the determination of background traffic volumes (without coal trucks) to a high level of certainty.

The data collections provided information on:

- Daily coal truck delivery patterns;
- Average truck loads;
- Background traffic volumes.

5 FUTURE TRAFFIC VOLUMES

5.1 2008 BASE TRAFFIC

In order to develop future traffic scenarios there was a need to establish the base background traffic volumes excluding the PKCT coal truck traffic. PKCT coal truck traffic is defined as the public road based coal truck traffic between West Cliff CPP, GNRE No. 1 mine and PKCT (including return trips). Once the 2008 background traffic without PKCT coal truck traffic was established growth factors were applied to the background traffic before adding the potential future PKCT coal truck traffic under a variety of scenarios.

Background traffic volumes were determined at eight key locations along the routes:

- Appin Road, North of Princes Highway;
- Mount Ousley Road, Mount Ousley between Princess Highway and New Mount Pleasant Road, north of F6 freeway;
- Southern Freeway F6, West Wollongong north of Princes Hwy interchange (N) and under Reserve Rd bridge (S);
- Southern Freeway F6, West Wollongong south of Princess Hwy near footbridge;
- Masters Road, Mt St. Thomas between The Avenue and Springhill Rd;
- Springhill Road, Coniston between Masters Rd and Corrimal St;
- Bellambi Lane, Bellambi between Princes Highway and Gladstone Street; and
- Northern Distributor, Wollongong between Railway Street and Bellambi Lane.

Coal truck data for each of the count periods was obtained. This consisted of departure times for coal trucks from the West Cliff CPP or GNRE No. 1 Mine. Utilising the estimated travel times between the mines and PKCT, determined in Section 3.3.3, the number of coal trucks at each count location by time of day for each direction was estimated. By subtracting the PKCT coal truck volumes from the heavy vehicle volumes at each location the background traffic volumes (with no PKCT trucks) for each count location was established.

A summary of the existing average daily background traffic volumes, with no PKCT coal trucks is presented in Table 5.1. The full summary figures are also presented in Appendix L.

Table 5.1 Existing Background Traffic Volumes (No PKCT Coal Trucks)

Site No.	Name	Year	ADT	AWD	AWE
1	Appin Road	2006	8,898	9,049	8,520
2	Mount Ousley Road	2007	41,768	42,272	40,509
3	Southern Freeway (north)	2007	71,372	75,092	62,071
4	Southern Freeway (south)	2007	68,371	72,656	57,660
5	Masters Road	2007	23,159	25,845	16,444
6	Springhill Road	2008[1]	14,928	15,603	13,240
		2008[2]	14,719	15,752	12,136
7	Bellambi Lane	2008	12,029	12,768	10,179
8	Northern Distributor	2008	21,506	22,754	18,385

[1] = March 2008
[2] = May 2008
ADT = Average Daily Traffic (vehicles per day)
AWD = Average Weekday Daily Traffic (vehicles per day)
AWE = Average Weekend Daily Traffic (vehicles per day)

5.2 BACKGROUND TRAFFIC GROWTH

In order to determine the projected growth of background traffic on the road haulage routes a review of historical data and of current planning documents was undertaken.

5.2.1 Sydney-Wollongong Corridor Strategy

The Sydney-Wollongong Corridor Strategy (SWCS) study was reviewed to determine the likely future traffic growth projections along the corridor.

Description of the Sydney-Wollongong Corridor

The Sydney-Wollongong corridor connects the industrial, commercial and residential areas of Wollongong and the Illawarra to Sydney and the broader AusLink Network. The key road links in the corridor from Sydney to Wollongong are:

- the Princes Highway from its intersection with King Georges Road at Blakehurst;
- the Southern Freeway (F6) to Bulli Tops;
- Mount Ousley Road to its intersection with the F6 at Mount Ousley; and
- the Southern Freeway (F6) to its intersection with the Northern Distributor at Gwynneville.

The road links south of Gwynneville to Port Kembla are currently not on the AusLink National Network, but were included in the strategy following agreement by Council of Australian Governments to extend AusLink planning to regional ports.

Most Likely Future Scenario - Expected growth

The SWCS presented the most likely future scenario for growth along the corridor. It identified a strong growth in demand for the movement of freight and passengers along the Sydney-Wollongong corridor. Movements of freight between Sydney and Wollongong are forecast to increase by 235% by 2025.

Key features of SWCS growth scenario are:

- Strong growth in the tonnage of freight moved by both road and rail. The total quantity of freight (both bulk and non-bulk) moving between Sydney and Wollongong is forecast to increase by 3.3% per annum;
- Total traffic volume is projected to grow by 2.0% per annum until 2025, with heavy vehicle traffic growing at a slightly faster pace of 2.7% per annum.
- Commuter traffic increasing along the Sydney-Wollongong corridor will lead to increasing congestion at key points. Mount Ousley Road is already at capacity in the morning peak and this is expected to worsen. By 2016 the road is expected to be 20% over capacity;

It is important to note that the SWCS study states:

"Total traffic volume is projected to grow by 2.0% per annum until 2025, with heavy vehicle traffic growing at a slightly faster pace of 2.7% per annum. A large number of these trucks will only operate during the day due to the State Environment Planning Policy 7 (SEPP 7) regulation where export coal trucks are only allowed to operate between 7.00 am and 6.00 pm Monday to Sat. This will cause increasing conflict with commuter and local traffic around the roads leading to Wollongong and Port Kembla, such as Mount Ousley Road and Picton Road."

Port Kembla was identified as a key driver of demand on the Sydney-Wollongong corridor. With the exception of some pockets of localised congestion such as Mount Ousley Road and the northern sections of the Princes Highway approaching Sydney, it was noted that the Sydney-Wollongong road corridor will be generally sufficient to meet forecast demand over the next 20 years.

The annual average growth rates for Mount Ousley Road and the Southern Freeway was assumed to be 2.0% per annum for light vehicle traffic and 2.7% per annum heavy vehicle traffic.

5.2.2 Northern Distributor Extension Studies

The proposal for the Wollongong Northern Distributor Extension (NDE) involves construction of a four-lane dual carriageway distributor road with controlled accesses from Bellambi Lane to the Princes Highway near Molloy Street.

Traffic modelling of the Wollongong road network was undertaken by Gabites Porter for the NDE study for the years 2016 and 2026. Data from these traffic models was obtained from the RTA for use in this study, refer to Appendix R. No data for the Northern Distributor south of Bellambi Lane or on Bellambi Lane was made available for the 2016 model. A summary of key results is provided in Table 5.2.

Table 5.2 Projected Traffic Volumes 2018 and 2026

Road	From PKCT			To PKCT			Two-way		
	AM	PM	Daily	AM	PM	Daily	AM	PM	Daily
Actual 2008[3]									
ND[1]	736	984	11,397	1,332	931	11,443	2,068	1,914	22,840
Bellambi Lane[2]	451	581	6,491	751	535	6,363	1,202	1,116	12,855
Modelled 2008[4]									
ND[1]	325		6,468	951		14,033	1,276		20,501
Bellambi Lane[2]	163		2,167	773		7,449	936		9,616
Modelled 2018[4]									
ND[1]	1,355		18,790	1,320		21,003	2,675		39,793
Bellambi Lane[2]	469		5,617	484		6,285	953		11,902
Modelled 2026[5]									
ND[1]	1,129	2,209	20,474	2,740	1,625	22,873	3,869	3,834	43,347
Bellambi Lane[2]	197	307	2,868	372	268	3,558	569	575	6,426

[1] Northern Distributor south of Bellambi Lane
[2] Bellambi Lane, west of ND
Source: [3] 2008 Actual volumes (not modelled)
[4] Northern Distributor Extension Noise Mitigation Study (Wilkinson Murray, May 2006)
[5] RTA Traffic model outputs

Traffic projections on the road network in the vicinity of the NDE for 2008 (prior to opening) and 2018 (10 years after opening) were obtained from the Gabites Porter Traffic models and referenced in the Northern Distributor Extension Noise Mitigation Study (Wilkinson Murray, May 2006). Data from this report is presented in Appendix S and a summary of key results is also provided in Table 5.2 with corresponding annual growth rates presented in Table 5.3.

The modelling data provided by Wilkinson Murray showed significant anomalies in the directional split of traffic both on Bellambi Lane and the Northern Distributor south of Bellambi Lane. The 2008 actual volumes compared with the RTA's modelled 2026 volumes gave the most reasonable outcomes. Hence the annual average growth rate for Northern Distributor was assumed to be 5.0% per annum for all traffic.

Discussions were held with the RTA in relation to traffic volumes along Bellambi Lane immediately after the Northern Distributor opens in 2009. It was considered that Bellambi Lane would experience a significant reduction in traffic volumes immediately after the NDE opens and then have a steady annual growth consistent with the broader Wollongong Network. The RTA advised that 1% per annum would be reasonable. Assuming a 1% per annum growth from 2009 to 2026 enabled an estimation of the 2009 traffic volumes on Bellambi Lane (5,490 vehicles per day two-way) to be determined based on the modelled 2026 volumes (6,400 vehicles per day). From 2009 onwards a 1% per annum growth along Bellambi Lane was assumed.

5.2.3 Historical Traffic Patterns

Annual Average Daily Traffic (AADT) volume data along the existing coal haulage routes between 2005 and 2006 was reviewed. The average annual growth, shown as percentage growth per annum, is presented in Table 5.3.

Table 5.3 AADT Annual Growth Rates (Linear)

Name	Location	2000 to 2005	2000 to 2006
Appin Road	Bulli Tops, west of Princes Hwy	6.0%pa	2.1%pa
Mount Ousley Road	2.2km south of Clive Bissell Drive	1.6%pa	1.4%pa
Southern Freeway	Mt Ousley, south of Mount Ousley Rd	4.3%pa	-
Southern Freeway	Gwynneville, Gipps Rd overpass	4.6%pa	2.9%pa
Masters Road	Mt St Thomas, west of Springhill Rd	-	-
Springhill Road	Mt St Thomas, north of Masters Rd	0.0%pa	-
Bellambi Lane	Bellambi, east of Old Princes Hwy	-1.4%pa	-
Northern Distributor	Wollongong, south of Old Princes Hwy	1.7%pa	-0.3%pa

Source: Compiled from RTA *AADT Southern Region 2006*.

The following annual average growth rates per annum for light vehicle traffic were assumed:

- Appin Road 2.1%pa;
- Southern Freeway south of Gwynneville – 2.9%pa;
- Masters Road – 0.0%pa[1]; and
- Springhill Road – 0.0%pa[1].

5.2.4 Expansion of Cargo Handling Facility

Port Kembla Port Corporation (PKPC) submitted an application for expansion of the General Cargo Handling Facility (GCHF) as a Major Project under State Environmental Planning Policy (Major Projects) 2005. A review of the Environmental Assessment Report prepared to document the proposed expansion was undertaken (Port Kembla Port Corporation Proposed Expansion of General Cargo Handling Facility, Environmental Assessment Final Report, Sinclair Knight Merz (SKM) December 2005). It is understood that approval of the proposal has been granted.

It has been assumed that additional traffic will be generated from the proposed GCHF expansion. The traffic generated from the expansion is considered to be in an addition to the background traffic growth.

[1] The long term trend at these locations shows significant fluctuation, but a general decline. The adoption of zero growth was considered more appropriate than either a negative growth rate or a small positive growth as exhibited on nearby roads.

Based on the SKM report (page 57), the following assumptions were made:

- 250 trips (125 in and 125 out) for light vehicles in 2006; and
- 270 trips (135 in and 135 out) for light vehicles in 2016.

The SKM report (Table 4-11) provided an indication of the total daily increases in traffic volumes (light and heavy) for 2006 and 2016 as a result of the expansion of the GCHF at the locations identified in Table 5.4. The heavy vehicle volumes at each location were derived based on the total volumes less light vehicle volumes as provided in Table 5.4.

Table 5.4 Increased Daily Traffic as a Result of Expansion of PKPC GCHF

Name	Location	2006		2016	
		Light	Heavy	Light	Heavy
Mount Ousley Road	2.2km south of Clive Bissell Drive	151	387	174	521
Southern Freeway	Gwynneville, Gipps Rd overpass	151	387	174	520
Springhill Road	Mt St Thomas, east of Keira St	35	89	35	89
Masters Road	Mt St Thomas, west of Springhill Rd	180	460	204	610

The light vehicle trips were assumed to occur in the 2 hours up to and after each shift change (i.e. 6:00am, 2:00pm and 10:00pm). Based on the graph provided in Fig 4-4 of the SKM report, the hourly % of HV trucks was estimated to be:

- 3.3% per hour between 12am and 6am;
- 6% per hour between 6am and 6pm;
- 1.2% per hour between 6pm and 10pm; and
- 1.7% per hour between 10pm and 12am.

The additional hourly distribution of trucks and light vehicles at the above locations for 2006 and 2016 were the determined.

The 2006 estimates were assumed to be equivalent to 2008 as the expansion of the facility has not yet occurred. The 2006 additional traffic volumes as a result of the expansion of the PKCP GCHF were added to the 2008 background traffic volumes. The 2006 and 2016 estimates were interpolated to determine 2013 traffic volumes and were added to the 2013 background volumes. The 2016 estimates were added to the 2018 background volumes.

5.3 TRAFFIC GROWTH RATES

The assumed traffic growth rates for background traffic are provided in Table 5.5.

Table 5.5 Assumed Background Traffic Growth Rates (% per annum)

Name	Location	Basis	%pa	
			Light Veh	Heavy Veh
Appin Road	Bulli Tops, west of Princes Hwy	AADT (2000-2006)[1]	2.1%	2.8%
Mount Ousley Road	2.2km south of Clive Bissell Drive	Sydney-Wollongong Corridor Strategy	2.0%	2.7%
Southern Freeway	Mt Ousley, south of Mount Ousley Rd		2.0%	2.7%
Southern Freeway	Gwynneville, Gipps Rd overpass	AADT (2000-2006)[1]	2.9%	3.9%
Masters Road	Mt St Thomas, west of Springhill Rd	AADT (2000-2005)[2]	0.0%	0.0%
Springhill Road	Mt St Thomas, north of Masters Rd	AADT (2000-2005)[2]	0.0%	0.0%
Bellambi Lane[3]	Bellambi-E Of Old Princes Hwy	NDE Modelling	1.0%	1.0%
Northern Distributor	North Wollongong, south of Princes Hwy	NDE Modelling	5.0%	5.0%

[1] Light Vehicle % growth assumed to be as per AADT 2000-2006, however heavy vehicle growth is assumed to be higher in the same ratio as the rates for the SWCS

[2] AADT data showed fluctuating volumes with a general decline, a 0% growth was assumed instead.

[2] Growth rate applies from 2009.

In addition to the above growth rates one-off increases as a result of the proposed expansion of the PKPC GCHF were added to the relevant background traffic volumes. Furthermore a one-off reduction in traffic volumes along Bellambi Lane was assumed between 2008 and 2009 as a result of the opening of the NDE.

5.4 FUTURE BACKGROUND TRAFFIC

Applying the annual growth rates of traffic determined in Section 5.3 to the base 2008 traffic volumes (with no PKCT coal trucks) and adding on the additional traffic as a result of the expansion of the PKPC GCHF yielded an estimate of the base background traffic volumes for 2008, 2009, 2013 and 2018 (with no PKCT coal trucks).

These average daily background traffic volumes are summarised in Table 5.6 and detailed in Appendix T.

Table 5.6 Projected Daily Background Traffic Volumes

Site No.	Name	2008		2009		2013		2018	
		AWD	AWE	AWD	AWE	AWD	AWE	AWD	AWE
1	Appin Road	9,444	8,890	-	-	10,477	9,835	11,515	10,780
2	Mount Ousley Road	43,694	41,866	0	0	48,302	46,166	52,857	50,425
3	Southern Freeway (north)	77,182	63,867	0	0	85,212	70,392	93,191	76,857
4	Southern Freeway (south)	75,364	59,889	0	0	86,635	68,669	97,849	77,407
5	Masters Road	26,479	17,115	0	0	26,588	17,224	26,653	17,289
6	Springhill Road	15,731	13,377	0	0	15,731	13,377	15,731	13,377
7	Bellambi Lane	12,774	10,196	5,447	4,349	5,663	45,18	5,933	4,740
8	Northern Distributor	22,756	18,400	23,880	19,309	28,415	22,981	34,081	27,549

6 FUTURE ROAD RECEIVALS

6.1 OVERVIEW

The change in operating hours for road deliveries would be instigated within a short time after approval of the Part 3A application. This would be brought into action gradually based on constraints such as coal truck driver availability, coal truck fleet management issues and requirement for the delivery of coal.

The future road deliveries of coal to PKCT will increase over time as the PKCT output increases.

The increase in coal delivered to PKCT by road to a maximum of '10mtpa' is to gradually increase over 5 to 10 years depending on outputs of BHP Billiton Illawarra Coal's Appin and West Cliff Collieries and Gujarat NRE's No. 1 Mine.

6.2 PORT KEMBLA COAL TERMINAL

The future expected '10mtpa' of coal delivered to the PKCT road receival area will be a combination of coal delivered from three sources:

- BHP Billiton Illawarra Coal's Appin and West Cliff Collieries via West Cliff CPP;
- Gujarat NRE's No. 1 Mine; and
- BHP Billiton Illawarra Collieries via Dendrobium CPP.

Modelling has been undertaken to determine the coal truck movements received at PKCT by public road under future output scenarios.

It should be noted that not all coal received at PKCT road receival follows the public road transport corridors as some is washed at Dendrobium CPP within BSL and only hauled the short internal roads route to PKCT. As such the coal delivered from Dendrobium CPP via BSL has been excluded from the public road system modelling.

The detailed information in relation to the split of coal delivered from the above sources is considered commercially sensitive. Advice has been provided from BHP Billiton Illawarra Coal, Gujarat NRE No. 1 Mine and PKCT in relation to the future outputs and sources. This detailed information is not presented in this report due to the commercial nature of the information but has been considered in the modelling of future coal deliveries.

6.2.1 WEST CLIFF & APPIN COLLIERIES

BHP Billiton Illawarra Coal will immediately benefit from delivering coal by public road during the full 24 hours due to their high output level. The total future output of coal delivered to PKCT by road for the next 5 to 10 years has been estimated by BHP Billiton Illawarra Coal for each scenario year.

Two scenarios for hours of operation have been considered for assessment of future deliveries from the West Cliff CPP to PKCT:

- 11/6 - where deliveries occur 24/7 but are restricted from using Springhill Road between Masters Road and Port Kembla Road outside 7am to 6pm Monday to Saturday; and
- 24/7- where deliveries occur 24/7 with no restrictions on operating hours.

For the future assessment of the 11/6 operations the following has been assumed in relation to night time coal deliveries (6pm to 7am):

- 20% of weekday truck movements will be at night; and
- 15% of weekend truck movements will be at night.

Generally future coal delivery patterns under a 24/7 scenario are assumed to be similar as they were under the 2008 24/7 Trial and the SEPP 7 Relaxation Emergency provision periods in 2007, in terms of the daily distribution of traffic. The total volume will differ but the distribution by time of day will be similar.

For the purposes of future assessment of the 24/7 operations the following has been assumed in relation to night time coal deliveries (6pm to 7am):

- 35% of weekday truck movements will be at night; and
- 30% of weekend truck movements will be at night.

These are considered to be conservative estimates of the night time-coal truck volumes, which may in fact be slightly lower than these assumptions. As night-time is the most sensitive period for noise assessment, it was considered reasonable to use these conservative assumptions.

6.2.2 GUJARAT NRE NO.1 MINE

PKCT's second major road customer, Gujarat NRE (GNRE) does not presently have an output level requiring increased operating hours. GNRE are expected to increase output over the next three years. At some point during this time increased operating hours will be required to meet shipping demands. Further growth of coal delivered to PKCT by road will occur over the next 5 to 10 years. Growth estimates have been provided by Gujarat NRE (GNRE). The proposal to increase operating hours in this application will allow PKCT to meet GNRE's requirements.

Four scenarios for hours of operation have been considered for assessment of future deliveries from GNRE to PKCT:

- Current – represents the current situation where although PKCT restrictions are for 11/6 (11 hours per day / 6 days per week) GNRE typically only deliver to PKCT 4 days per week for 11 hours a day (11/4);
- 11/6 - where deliveries occur 7am to 6pm Monday to Saturday;
- 15/5-10/2 operations, where deliveries occur:
  - 7am and 10pm Monday to Friday;
  - 8am to 6pm Saturday and Sunday; and
- 24/7- where deliveries occur 24/7 with no restrictions on operating hours.

With increased output GNRE will make changes to their operations to meet the demand for coal deliveries to ships within PKCT. GNRE have advised the following:

- In the near future they expect to continue with 110 – 120 truck movements per delivery day even with increased delivery amounts, however, it is anticipated that deliveries will occur on weekdays (between 6.45am and 5pm) and Saturday mornings (between 6.45am and 1pm) from September 2008;
- GNRE expect to use the same size ships, Panamax (70,000 tonnes) but with more regular visits;
- Will continue to only deliver between 6.45am – 5pm until they have permission to deliver on extended hours such as 15/6 or 24/7;
- If 24/7 was granted, GNRE would not need to fully utilise this arrangement until 2009, but would be capable of meeting shipping arrangements consistent with 11/6 constraints on trucking operations.

Under 11/6 restrictions no coal trucks would deliver coal from GNRE to PKCT at night (6pm to 7am).

Under 24/7, coal delivery patterns are assumed to be similar as they are today in terms of the day time distribution of traffic. The total volume will change but the distribution by time of day will be similar. With greater increases in output and a change to 24/7 operations, for the purposes of future assessment the following has been assumed in relation to night time coal deliveries (6pm to 7am) from GNRE to PKCT:

- 35% of weekday truck movements at night; and
- 30% of weekend truck movements at night.

Furthermore it has been assumed that during night time deliveries (6pm to 7am) there will be an even distribution of truck movements.

Alternate and interim arrangements such as 11/7, 15/5-10/2, 15/6 and 15/7 for 2009 and beyond, could be effectively utilised to allow GNRE to ramp up operations to meet shipping requirements as initial steps before going full 24/7.

With greater increases in output and a change to 15/5-10/2 operations, for the purposes of future assessment the following has been assumed in relation to night time coal deliveries (6pm to 7am) from GNRE to PKCT:

- 15% of weekday truck movements were at night; and
- No weekend truck movements were at night.

Furthermore it has been assumed that during night time deliveries (6pm to 10pm) there will be an even distribution of truck movements.

6.2.3 ILLAWARRA COKE COMPANY

No change to operations or volume of coal/coke deliveries is proposed. As a result the truck movements to/from the ICC Cokeworks are considered as part of the background heavy vehicle traffic volumes in this assessment.

6.2.4 DENDROBIUM COAL PREPARATION PLANT

Output from the Dendrobium CPP to PKCT is expected to increase over the coming years. This output is included within the future expected '10mtpa' of coal delivered to the PKCT road receival area.

Assessment of potential coal truck movements from Dendrobium CPP to PKCT by public road was undertaken to illustrate the potential traffic impact on Springhill Road.

One scenario for hours of operation has been considered for assessment of future deliveries from Dendrobium CPP to PKCT via public roads:

- 24/7- Where deliveries occur 24/7 with no restrictions on operating hours.

Coal delivery patterns are assumed to be similar to BHPBIC delivery pattern, hence similar daily distribution of traffic. For future assessment of the 24/7 operations the following has been assumed in relation to night time coal deliveries (6pm to 7am):

- 35% of weekday truck movements will be at night; and
- 30% of weekend truck movements will be at night.

The assessment of the impact of the Dendrobium CPP traffic on public roads has been highlighted in key sections through out the report.

6.2.5 BLUESCOPE STEEL LIMITED

Any change in volume of coke deliveries from BSL to PKCT via Tom Thumb Road will not impact on the assessment of future truck volumes on public roads.

6.2.6 AUSTRALIAN STEEL MILL SERVICES

Any change in volume of slag deliveries from ASMS to PKCT via Tom Thumb Road (and other internal roads) will not impact on the assessment of future truck volumes on public roads.

6.3 FUTURE COAL TRUCK MOVEMENTS

Several future coal delivery options have been considered against a range of forecast years to determine potential coal truck movements to PKCT by public road.

6.3.1 Coal Delivery Options

There are a total of ten coal delivery options which are defined in terms of PKCT road receival output per annum and operational days/hours.

Output Options

The output options considered are:

- '0mtpa' - represents no coal truck deliveries by road to PKCT;
- '4mtpa' – is the notional name for the current situation where total coal delivered to PKCT by public road is just under 4mtpa and total coal received at the PKCT road receival area is closer to 5mtpa;
- '5mtpa' – is the notional name for the estimated total coal delivered to PKCT by road in one year's time. The actual volume is slightly less than 5mtpa, but is referred to as '5mtpa'. This is for the purposes of assessing Bellambi Lane and Northern Distributor in the year after the Northern Distributor extension is opened (2009); and
- '10mtpa' - represents the maximum estimated total coal delivered to PKCT by road for this proposal.

Operational Options

The operational options considered are:

- None – represents no coal truck deliveries by road to PKCT and hence no delivery days;
- Current – represents the current situation where although PKCT restrictions are for 11/6 (11 hours per day / 6 days per week):
  - GNRE typically only deliver to PKCT 4 days per week for 11 hours a day (11/4); and
  - BHPBIC deliver to PKCT 24/7 (24 hours per day / 7 days per week) where deliveries outside 11/6 restrictions occur through BSL;
- 11/6 (11 hours per day / 6 days per week) – represents what is permissible under current restrictions:
  - GNRE deliver to PKCT 11/6;
  - BHPBIC deliver to PKCT 24/7 where deliveries outside 11/6 restrictions occur through BSL;
- 24/7&15/5-10/2 (combination of 24 hours per day / 7 days per week plus 15 hours Monday to Friday and 10 hours Saturday and Sunday) – represents future operations where road restrictions occur on Bellambi Lane and no road restrictions on road receival hours at PKCT:
  - GNRE deliver to PKCT 15/5-10/2;
  - BHPBIC deliver to PKCT 24/7.
- 24/7 (24 hours per day / 7 days per week) – represents future operations sought with no restrictions on road receival hours at PKCT:
  - GNRE deliver to PKCT 24/7;
  - BHPBIC deliver to PKCT 24/7.

Combinations of operational and output options have been considered. These are summarised in Table 6.1.

Table 6.1 Future Coal Truck Delivery Options

No.	Operation Hours/Days	PKCT Road Receival Output (mtpa)[1]	Option Name	Description
A	None	‘0mtpa’	0mtpa @ No CT	Background (no coal trucks)
B_x	Current	‘4mtpa’	4mtpa @ Current[2]	Base Case (Existing)
B	11/6	‘4mtpa’	4mtpa @ 11/6	Base Case (Permissible)
C	11/6	‘5mtpa’[3]	5mtpa @ 11/6	Base Case with 5mtpa
D	11/6	‘10mtpa’	10mtpa @ 11/6	Base Case with 10mtpa
E	24/7&15/5-10/2	‘4mtpa’	4mtpa @ 24/7&15/5-10/2	Base Case @ 24/7&15/5-10/2 with 4mtpa
F	24/7&15/5-10/2	‘5mtpa’	5mtpa @ 24/7&15/5-10/2	Base Case @ 24/7&15/5-10/2 with 5mtpa
G	24/7&15/5-10/2	‘10mtpa’	10mtpa @ 24/7&15/5-10/2	Base Case @ 24/7&15/5-10/2 with 10mtpa
				Base Case @ 24/7&15/5-10/2 with 10mtpa plus Dendrobium CPP
H	24/7	‘4mtpa’	4mtpa @ 24/7	Base Case @ 24/7 with 4mtpa
I	24/7	‘5mtpa’	5mtpa @ 24/7	Base Case @ 24/7 with 5mtpa
J	24/7	‘10mtpa’	10mtpa @ 24/7	Base Case @ 24/7 with 10mtpa

[1] Nominal Names for output scenarios representing the total road receival tonnage per annum
[2] Current delivery operations for GNRE at 11/4
[3] Output assumed in 2009 for the purposes of assessing Bellambi Lane and ND after the extension opens

The first option (Option A) has no coal truck operation with zero output from the collieries. This option provides the baseline traffic volume of the roads along the haulage routes.

Options B, C and D are the 11 hours per day, six days per week operations (11/6) with ‘4mtpa’, ‘5mtpa’ and ‘10mtpa’ PKCT output capacity (total by road) per annum respectively:

- Option B_x is the current operation hours of Gujarat NRE, delivering coal 11 hours per day, four days per week, with the projected ‘4mtpa’ output;
- Option B is the current permissible situation with Gujarat NRE, delivering coal 11 hours per day, six days per week, with the projected ‘4mtpa’ output;
- Option C represents the situation if current operating constraints remain unchanged but total road receival out put is increased to ‘10mtpa’ by 2009;
- Option D represents the situation if current operating constraints remain unchanged but total road receival out put is increased to ‘10mtpa’.

Options E, F and G are the 24 hours per day, seven days per week operations at BHPBIC and 15 hours per day Monday to Friday with 10 hours per day Saturday and Sunday operations at GNRE (24/7&15/5-10/2) with the projected ‘4mtpa’, ‘5mtpa’ and ‘10mtpa’ PKCT output capacity (total by road) per annum respectively.

Options H, I and J are the 24 hours per day, seven days per week operations (24/7) with the projected '4mtpa', '5mtpa' and '10mtpa' PKCT output capacity (total by road) per annum respectively.

6.3.2 Coal Truck Movements

The future coal truck movements for each option have been estimated in the following manner:

- For each option, the number of operating days per year from each location (West Cliff CPP and GNRE No. 1 Mine) is calculated based on the multiplying the number of operating days per week by 52 (weeks per year);
- The total annual coal tonnage from each location (West Cliff CPP and GNRE No. 1 Mine) is divided by the number of operating days to determine the estimated coal tonnage per operating day;
- Weekdays have been assumed to have the same output rate per day as weekends;
- By considering the proportion of coal assumed to be delivered by night the tonnage of coal to be delivered by day or night was estimated (if no night time deliveries, then 0 tonnes of coal a day are assumed to be delivered at night), where:
  - Day time for coal delivery is assumed to be 7:00am to 6:00pm; and
  - Night time for coal delivery is assumed to be 6:00pm to 7:00am.
- The number of coal truck movements from each location is then calculated by dividing the output capacity (by day and by night) by an average coal truck haulage capacity (based on historical data, which is assumed to be:
  - 36.5 tonnes for BHPBIC; and
  - 31.8 tonnes for Gujarat NRE No. 1 Mine;
- The projected output capacities determines the amount of coal needed to be delivered per hour per day, and hence the number of trucks per hour per day per year.
- The number of trucks is distributed throughout the day and night periods per hour for average weekdays and weekends. This is based on the assumptions detailed in Section 6.2.1 and Section 6.2.2.

West Cliff CPP

A summary of the estimated coal trucks road deliveries from West Cliff CPP to PKCT by day and hour for each option is presented in Table 6.2. More detailed coal delivery outputs from West Cliff CPP to PKCT are provided in Appendix U.

Table 6.2 West Cliff Coal Truck Deliveries by Option[2]

	Options						
	A	B_x/B	E/H	C	F/I	D	G/J
PKCT Road Receival Output	'0mtpa'	'4mtpa'		'5mtpa'		'10mtpa'	
Operation Hours/Days	None	11/6*	24/7	11/6*	24/7	11/6*	24/7
Avg. Day (trucks/year)	0	76,990		78,630		116,990	
Avg. Day (trucks/week)	0	1,476		1,508		2,244	
Avg. Day (trucks/day)	0	211		215		321	
Avg. Weekday (trucks/hr)	0	15.3	12.7	15.7	12.7	23.3	18.9
Avg. Weeknight (trucks/hr)	0	3.2	5.8	3.3	5.8	4.9	8.6
Avg. Weekend day (trucks/hr)	0	16.3	13.7	16.6	13.7	24.8	20.4
Avg. Weekend night (trucks/hr)	0	2.4	5.0	2.5	5.0	3.7	7.4

* Deliveries occur 24/7 but are restricted from using Springhill Road east of Masters Road outside 11/6

Increasing overall PKCT road receival output from '4mtpa' to '10mtpa' will increase daily coal truck movements departing West Cliff CPP by 110 coal trucks per day to 321 coal trucks per day.

[2] Coal Truck deliveries represent one round trip delivery to PKCT and return to the mine. In two-way traffic volume terms the values are doubled.

Gujarat NRE No. 1 Mine

A summary of the estimated coal trucks road deliveries from GNRE No. 1 Mine to PKCT by day and hour for each option is presented in Table 6.3. More detailed coal delivery outputs from GNRE No. 1 Mine to PKCT are provided in Appendix V.

Increasing overall PKCT road receival output from '4mtpa' to '10mtpa' will increase daily coal truck movements departing GNRE No. 1 Mine by between 235-285 coal trucks per day to 301-352 coal trucks per day. The variation depends on the number of delivery days per week considered (i.e. 6 or 7 days per week).

Table 6.3 GNRE No. 1 Mine Coal Truck Deliveries by Option[3]

	Options										
	A	Bx	B	E	H	C	F	I	H	F	J
PKCT Road Receival Output	'0mtpa'	'4mtpa'				'5mtpa'			'10mtpa'		
Operation Hours/Days	None	Current	11/6	15/5-10/2	24/7	11/6	15/5-10/2	24/7	11/6	15/5-10/2	24/7
Avg. Day (trucks/year)	0	20,880				25,150			110,040		
Avg. Day (trucks/week)	0	400				482			2110		
Avg. Weekday (trucks/day)	0	100	67	63	57	80	76	69	352	333	301
Avg. Weekend (trucks/day)	0	100	67	42	57	80	51	69	352	222	301
Avg. Weekday (trucks/hr)	0	9.1	6.1	4.9	3.4	7.3	5.9	4.1	32.0	25.7	17.8
Avg. Weeknight (trucks/hr)	0	0.0	0.0	2.4	1.5	0.0	2.9	1.9	0	12.5	8.1
Avg. Weekend day (trucks/hr)	0	9.1	6.1	4.2	3.6	7.3	5.1	4.4	32.0	22.2	19.2
Avg. Weekend night (trucks/hr)	0	0.0	0.0	0	1.3	0.0	0.0	1.6	0	0	7.0

[3] Coal Truck deliveries represent one round trip delivery to PKCT and return to the mine. In two-way traffic volume terms the values are doubled.

Dendrobium CPP

The assessment of Dendrobium CPP coal truck movements was based on option G. Dendrobium CPP delivering 24/7 to PKCT at a maximum output capacity based on the '10mtpa' scenario by the year 2013.

A summary of the estimated coal trucks road deliveries from Dendrobium CPP to PKCT by day and hour for each option is presented in Table 6.4.

Increasing overall PKCT road receival output from '4mtpa' to '10mtpa' will increase daily coal truck movements departing Dendrobium CPP by 76 coal trucks per day to 167 coal trucks per day.

Table 6.4 Dendrobium CPP Truck Deliveries by Option[4]

	Options		
	B*	G	H*
PKCT Road Receival Output	'4mtpa'	'10mtpa'	'4mtpa'
Operation Hours/Days	24/7	24/7	24/7
Avg. Day (trucks/year)	33,151	61,100	33,151
Avg. Day (trucks/week)	636	1,172	636
Avg. Day (trucks/day)	91	167	91
Avg. Weekday (trucks/hr)	6.6	9.9	5.4
Avg. Weeknight (trucks/hr)	1.4	4.5	2.4
Avg. Weekend day (trucks/hr)	7.0	10.7	5.8
Avg. Weekend night (trucks/hr)	1.0	3.9	2.1

* Presented for comparison purposes

Summary

A summary of the estimated coal trucks road deliveries from GNRE No. 1 Mine and WCCPP to PKCT by day and hour for each option is presented in Figure 6.1 and Figure 6.2.

[4] Coal Truck deliveries represent one round trip delivery to PKCT and return to the mine. In two-way traffic volume terms the values are doubled.

Figure 6.1 Daily Coal Trucks by Option

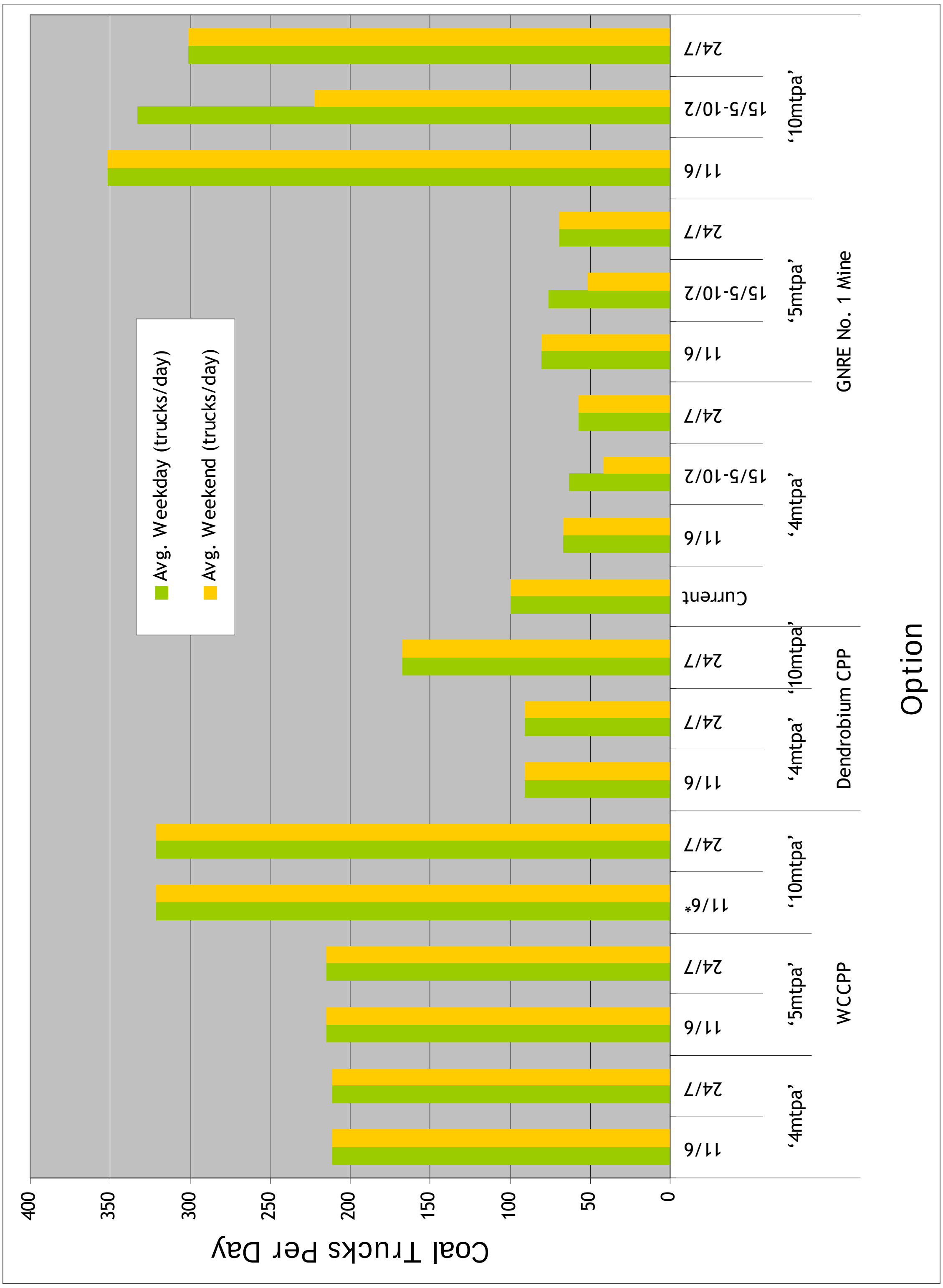
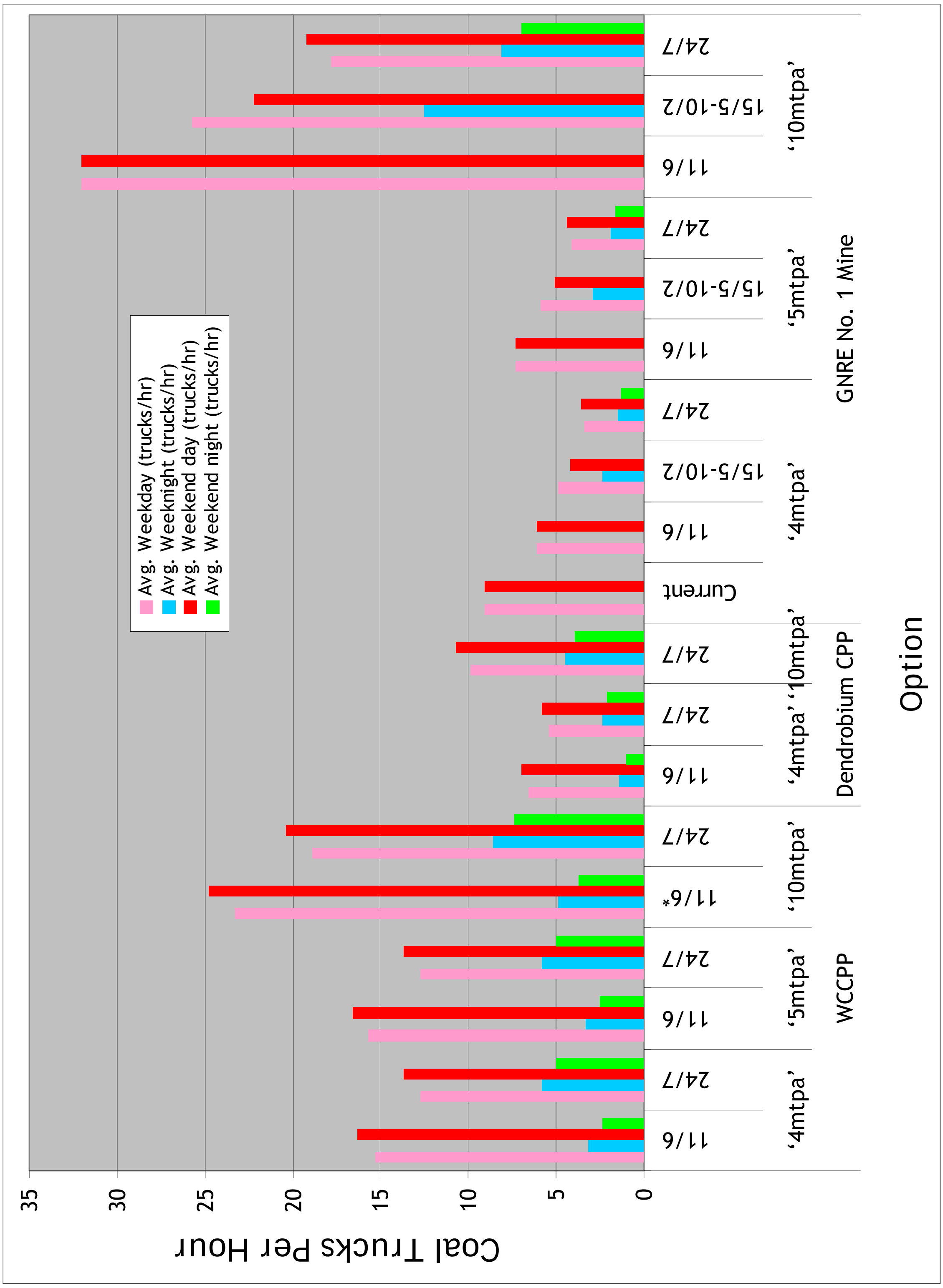


Figure 6.2 Hourly Coal Trucks by Option



6.3.3 Hourly Changes in Coal Truck Movements

A comparison of each new proposed coal truck hourly movement profile against the hourly movements under the current permissible operations/output (Option B) was undertaken. This showed the resulting increases or decreases in coal trucks movements on public roads by hour of the day. These hourly changes are represented graphically in:

- Average Weekday:
  - Figure 6.3 – Appin Road/Mount Ousley Road ('4mtpa & '10mtpa');
  - Figure 6.4 – Bellambi Lane/Northern Distributor ('4mtpa & '10mtpa');
  - Figure 6.5 – Bellambi Lane/Northern Distributor ('4mtpa & '5mtpa'); and
  - Figure 6.6 - Southern Freeway (North/South)/Masters Road/Springhill Road ('4mtpa & '10mtpa').
- Average Weekend:
  - Figure 6.7- Appin Road/Mount Ousley Road ('4mtpa & '10mtpa');
  - Figure 6.8 - Bellambi Lane/Northern Distributor ('4mtpa & '10mtpa');
  - Figure 6.9 - Bellambi Lane/Northern Distributor ('4mtpa & '5mtpa'); and
  - Figure 6.10 - Southern Freeway (North/South)/Masters Road/Springhill Road ('4mtpa & '10mtpa').

If overall PKCT road receival output were to remain at '4mtpa':

- Under the 24/7 and 24/7&15/5-10/2 proposals, generally:
  - day time hourly coal truck volumes will decrease;
  - night time hourly coal truck volumes will increase;

If overall PKCT road receival output were to increase to '10mtpa':

- Remaining at 11/6 operation, generally:
  - Weekday day time hourly coal truck volumes will increase;
  - Weekday night time hourly coal truck volumes will effectively remain unchanged;
- Under the 24/7&15/5-10/2 proposal:
  - Appin Road/Mount Ousley Road weekday day time hourly coal truck volumes will increase slightly and night time hourly coal truck volumes will increase more significantly;
  - Southern Freeway/Masters Road/Springhill Road weekday day time hourly coal truck volumes will increase with the night time hourly coal truck volume increase less notable;
  - Bellambi Lane/Northern Distributor – weekday day time hourly coal truck volumes will increase more substantially than night time hourly coal truck volumes.
- Under the 24/7 proposal:
  - Appin Road/Mount Ousley Road weekday day time hourly coal truck volumes will increase slightly and night time hourly coal truck volumes will increase more significantly;
  - Southern Freeway/Masters Road/Springhill Road weekday day time and night time hourly coal truck volumes will increase relatively consistently through out the day;
  - Bellambi Lane/Northern Distributor day time and night time hourly coal truck volumes will increase relatively consistently throughout the day (slightly higher during the day than at night).

Figure 6.3 AWD Change in Coal Truck Volumes – Departing WCCPP ('4mtpa' & '10mtpa')

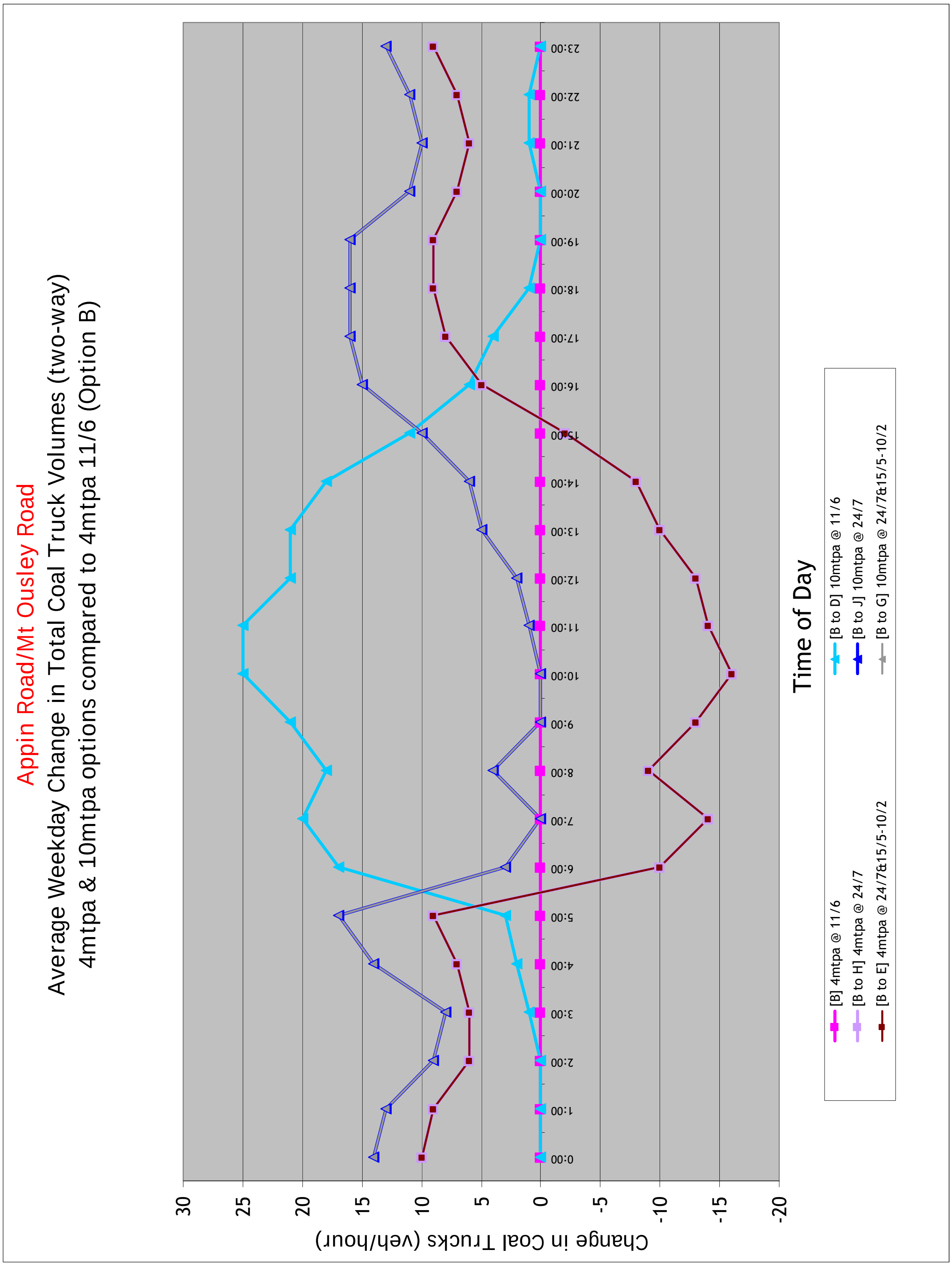


Figure 6.4 AWD Change in Coal Truck Volumes – Departing GNRE (‘4mtpa’ & ‘10mtpa’)

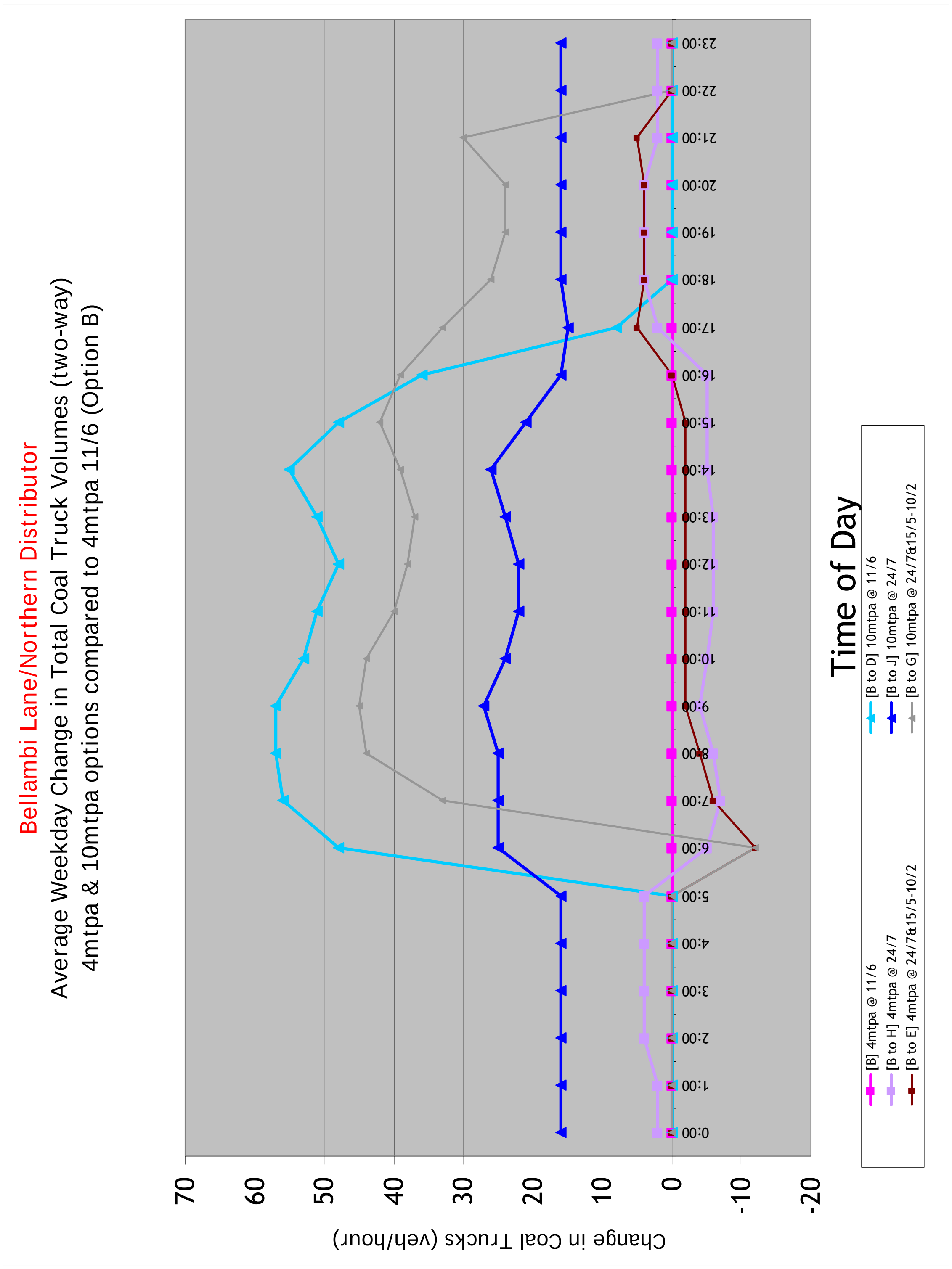


Figure 6.5 AWD Change in Coal Truck Volumes – Departing GNRE (‘4mtpa’ & ‘5mtpa’)

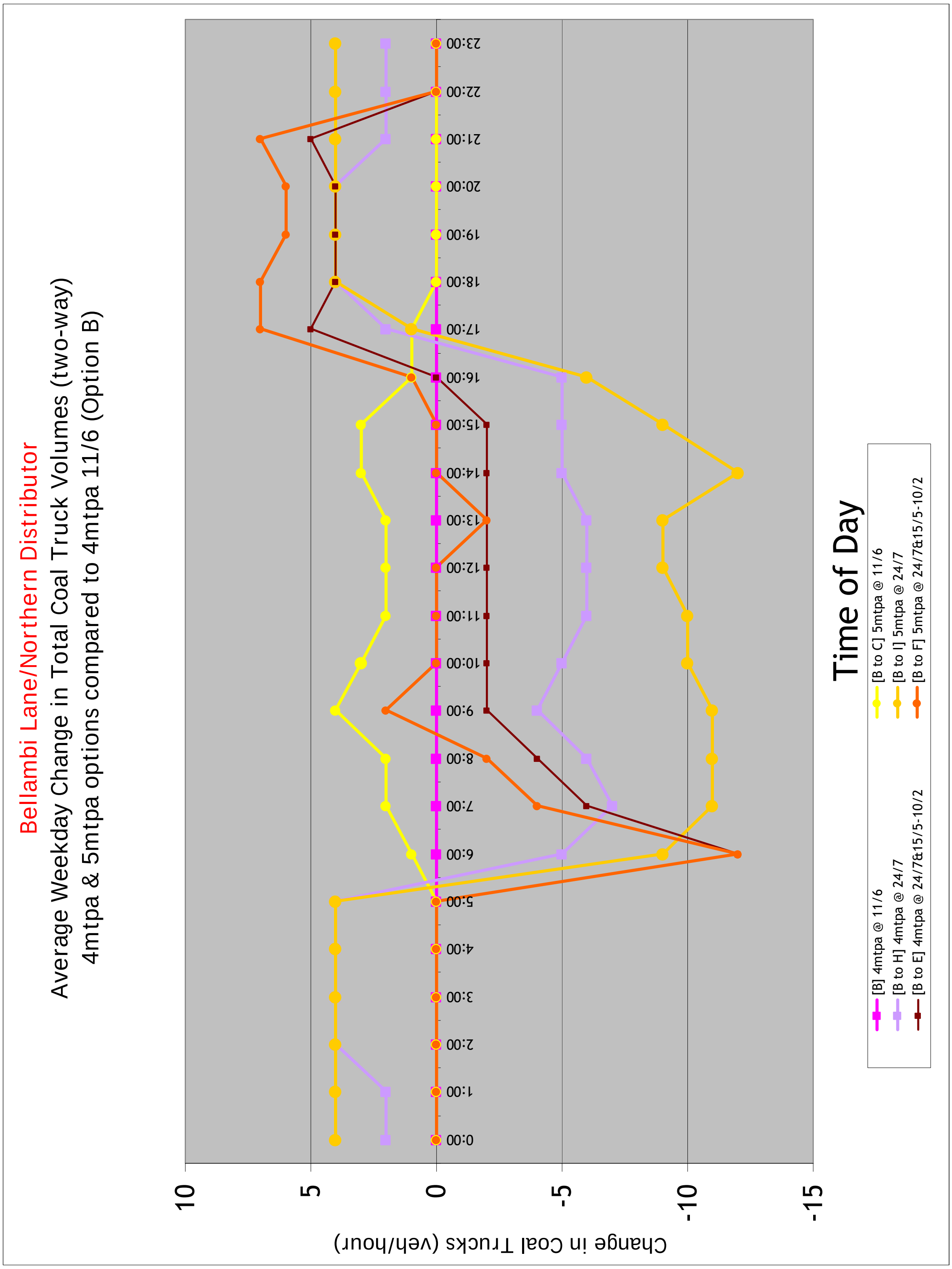


Figure 6.6 AWD Change in Coal Truck Volumes – Arriving at PKCT ('4mtpa' & '10mtpa')

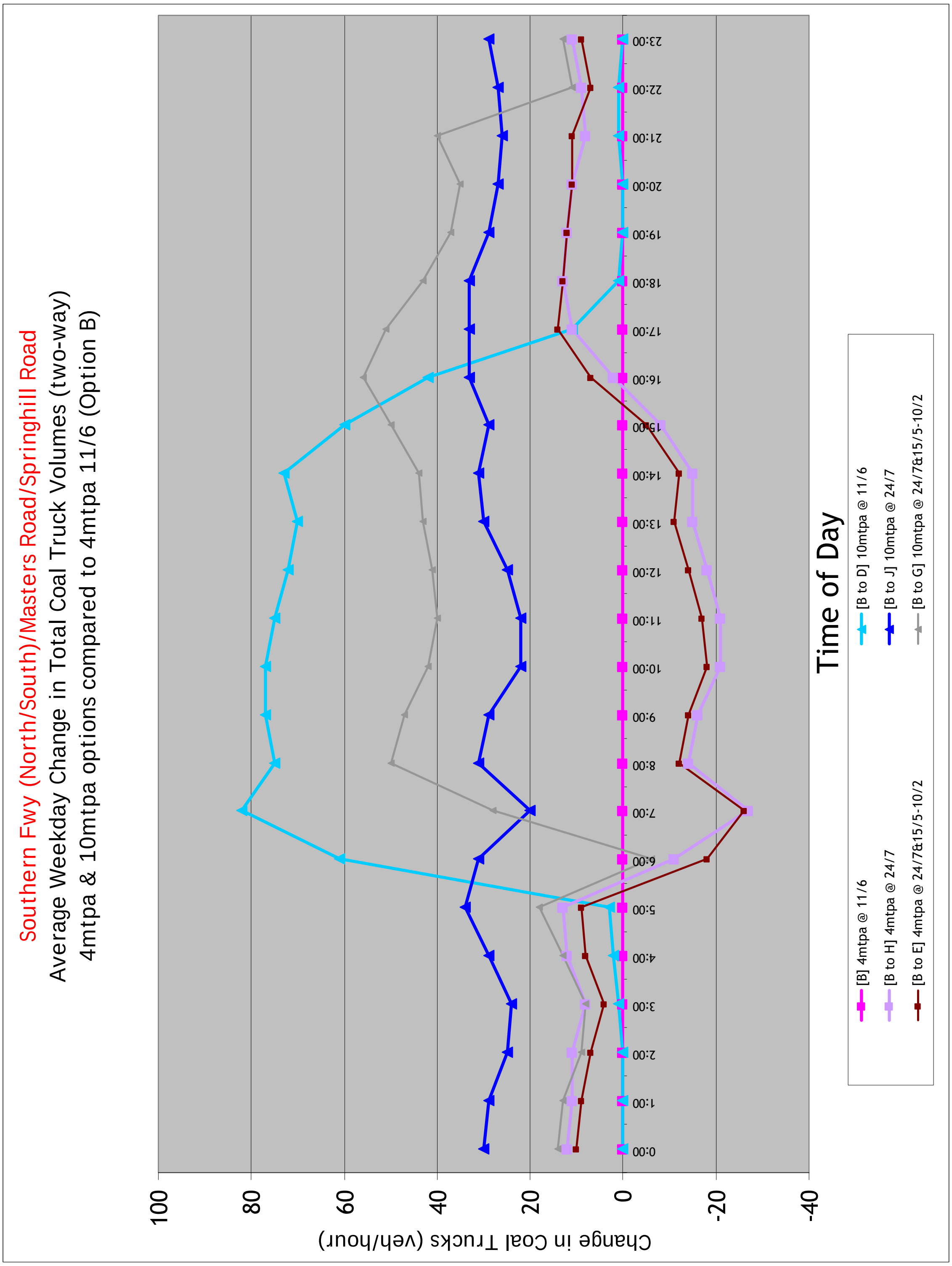


Figure 6.7 AWE Change in Coal Truck Volumes – Departing WCCPP (‘4mtpa’ & ‘10mtpa’)

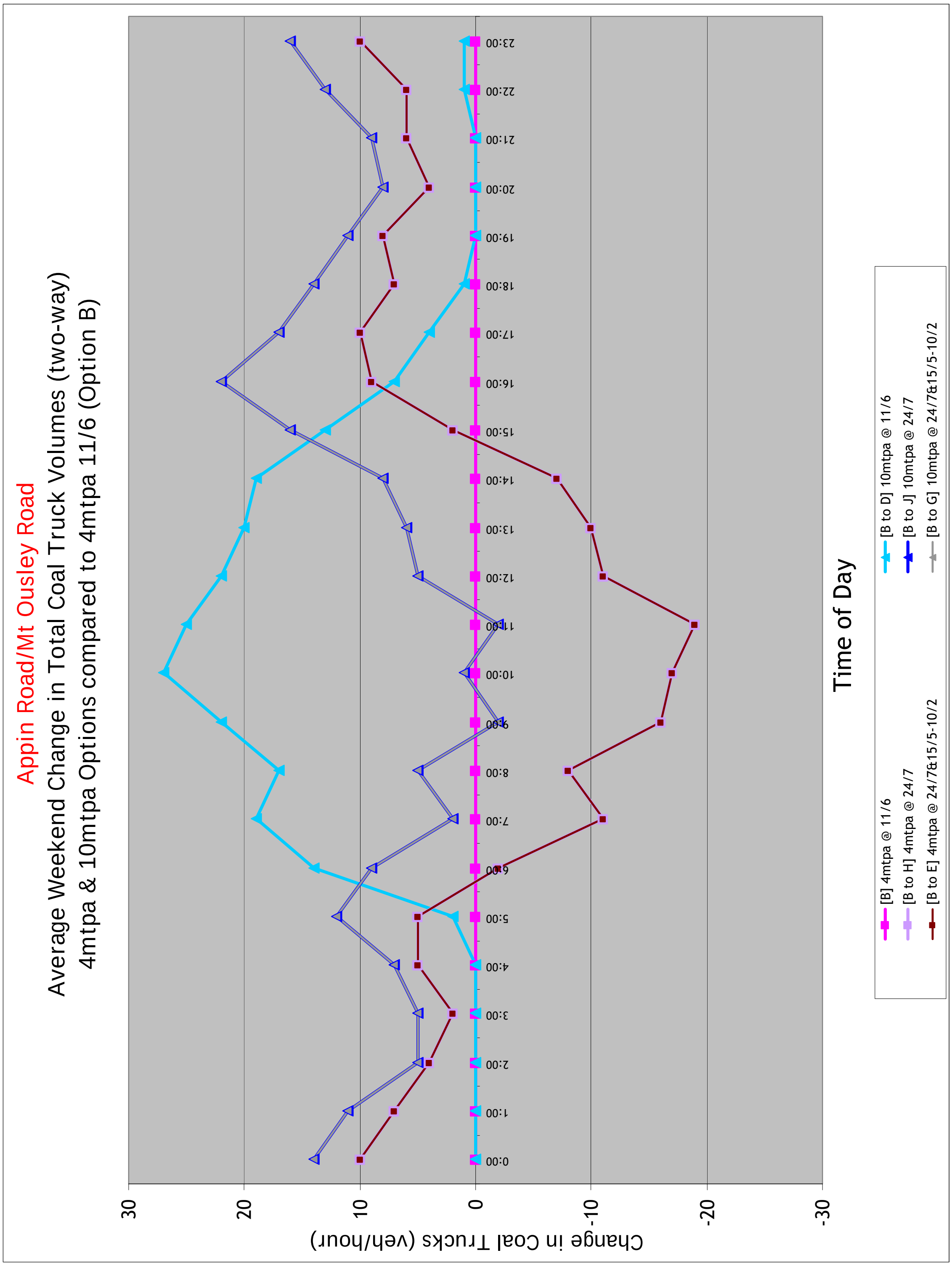


Figure 6.8 AWE Change in Coal Truck Volumes – Departing GNRE (‘4mtpa’ & ‘10mtpa’)

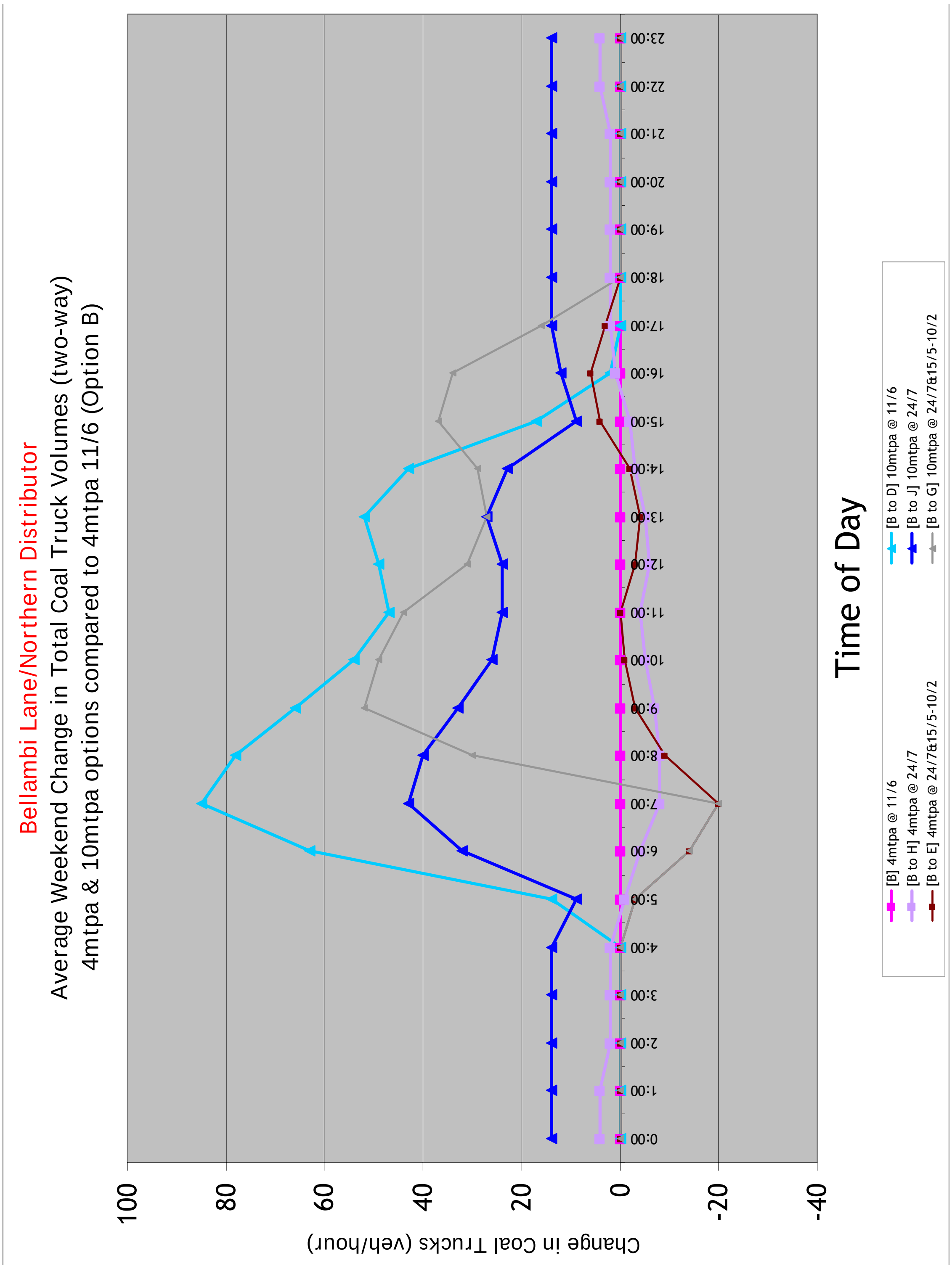


Figure 6.9 AWE Change in Coal Truck Volumes – Departing GNRE ('4mtpa' & '5mtpa')

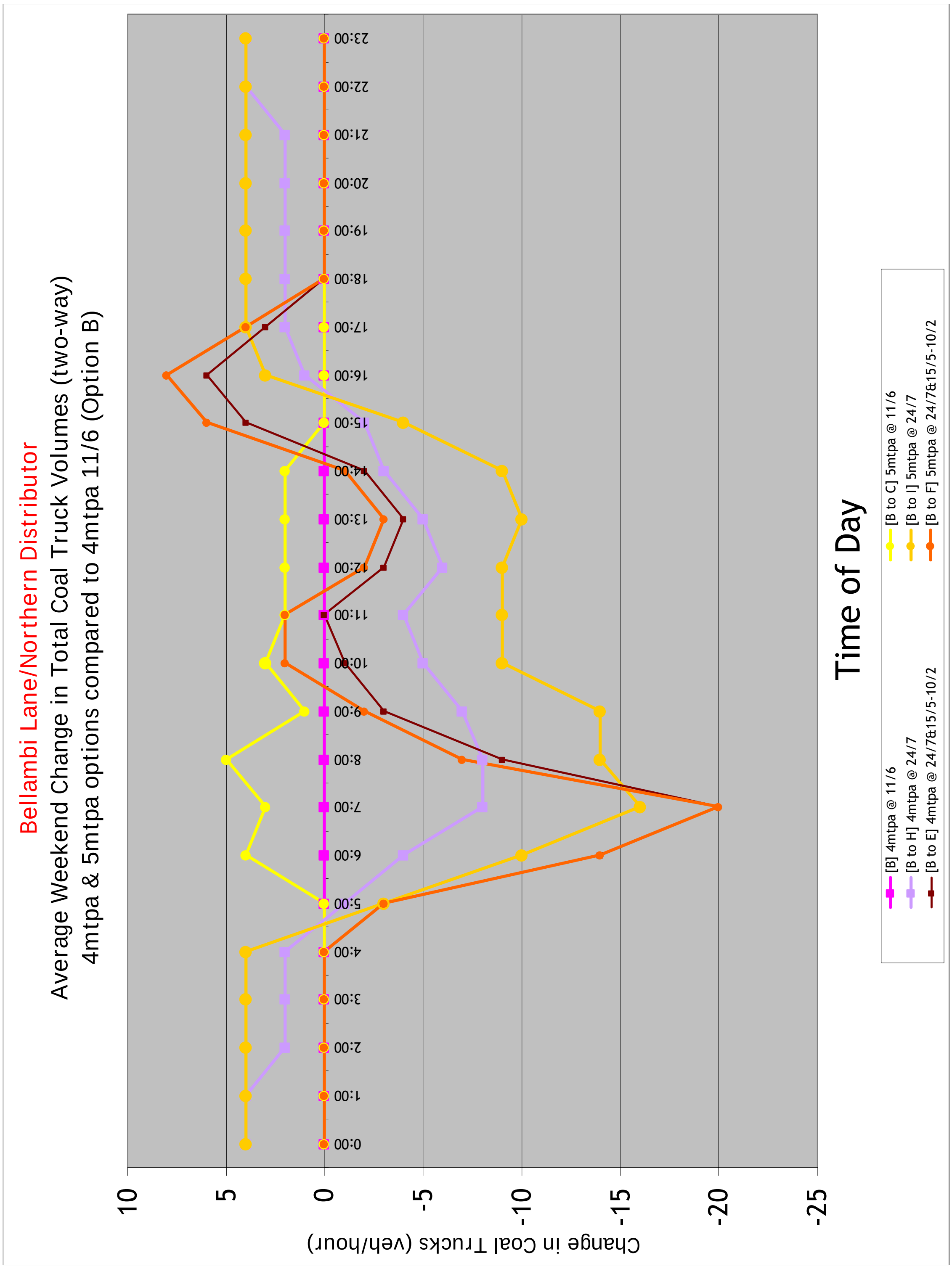
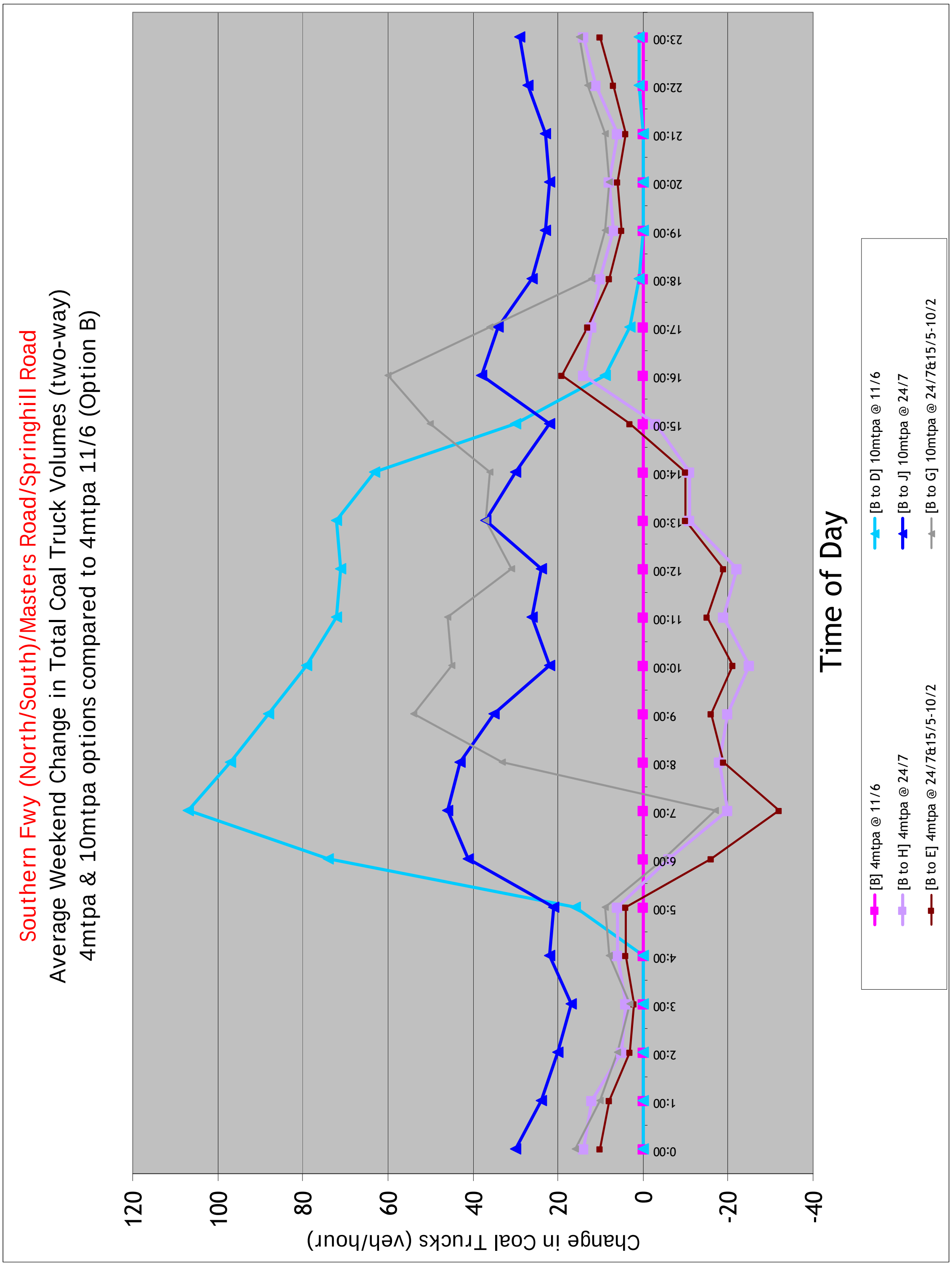


Figure 6.10 AWE Change in Coal Truck Volumes – Arriving at PKCT('4mtpa' & '10mtpa')



6.3.4 Coal Truck Delivery Scenarios

In order to assess the impact of future coal deliveries on the public road network the number of coal truck movements against background traffic volumes must be determined. The following years are considered for assessment of coal truck impacts:

- 2008 – existing year;
- 2009 – year of opening of Northern Distributor extension;
- 2013 – 5 year future scenario; and
- 2018 - 10 year future scenario.

Table 6.5 presents a summary of the combination of options considered in each year.

Table 6.5 Future Coal Truck Delivery Options by Year Matrix – Scenario Number

Year	Options										
	A	B_x	B	C	D	E	F	G	H	I	J
2008	1	2	3			4			5		
2009	6	7	8	9			10			11	
2013	12		13		14	15		16*	17		18
2018	19		20		21	22		23	24		25

* Scenario 16 – considered with Dendrobium CPP coal trucks on public roads for comparison

1 Scenario Number

There are a total of 25 scenarios for evaluation, these scenarios are defined in more detail in Table 6.6.

Table 6.6 Future Coal Truck Delivery Scenarios

Background Traffic Year	Scenario No.	CT Option	Operation	Output	Scenario Name
2008	1	A	No CT	‘0mtpa’	2008 Background
	2	B_x	Current[5]	‘4mtpa’	2008 Base Case (Existing)
	3	B	11/6	‘4mtpa’	2008 Base Case (Permissible)
	4	E	24/7&15/5-10/2[6]	‘4mtpa’	2008 Base Case @ 24/7&15/5-10/2[5]
	5	H	24/7	‘4mtpa’	2008 Base Case @ 24/7
2009	6	A	No CT	‘0mtpa’	2009 Background
	7	B_x	Current[4]	‘4mtpa’	2009 Base Case (Existing)
	8	B	11/6	‘4mtpa’	2009 Base Case (Permissible)
	9	C	11/6	‘5mtpa’	2009 Base Case with ‘5mtpa’
	10	F	24/7&15/5-10/2[5]	‘5mtpa’	2009 Base Case @ 24/7&15/5-10/2[5] with ‘5mtpa’
	11	I	24/7	‘5mtpa’	2009 Base Case @ 24/7 with ‘5mtpa’
2013	12	A	No CT	‘0mtpa’	2013 Background
	13	B	11/6	‘4mtpa’	2013 Base Case (Permissible)
	14	D	11/6	‘10mtpa’	2013 Base Case with ‘10mtpa’
	15	E	24/7&15/5-10/2[5]	‘4mtpa’	2013 Base Case @ 24/7&15/5-10/2[5]
	16	G	24/7&15/5-10/2[5]	‘10mtpa’	2013 Base Case @ 24/7&15/5-10/2[5] with ‘10mtpa’
					* 2013 Base Case @ 24/7&15/5-10/2[5] with ‘10mtpa’ with Dendrobium CPP on public roads
	17	H	24/7	‘4mtpa’	2013 Base Case @ 24/7
	18	J	24/7	‘10mtpa’	2013 Base Case @ 24/7 with ‘10mtpa
2018	19	A	No CT	‘0mtpa’	2018 Background
	20	B	11/6	‘4mtpa’	2018 Base Case (Permissible)
	21	D	11/6	‘10mtpa’	2018 Base Case with ‘10mtpa’
	22	E	24/7&15/5-10/2[5]	‘4mtpa’	2018 Base Case @ 24/7&15/5-10/2[5]
	23	G	24/7&15/5-10/2[5]	‘10mtpa’	2018 Base Case @ 24/7&15/5-10/2[5] with ‘10mtpa’
	24	H	24/7	‘4mtpa’	2018 Base Case @ 24/7
	25	J	24/7	‘10mtpa’	2018 Base Case @ 24/7 with ‘10mtpa

[5] Current operations reflect, PKCT 11/6 restrictions and the fact that GNRE currently typically operate 11/4
[6] 24/7&15/6 – represents BHPBIC operating at 24/7 and GNRE operating at 15/6

7 TRAFFIC IMPACT ASSESSMENT

7.1 FUTURE TRAFFIC WITH COAL TRUCKS

The future traffic with coal trucks under each scenario defined in Section 6.3.4 was determined.

7.1.1 Definitions

For the purposes of this assessment the following definitions have been made:

- Public roads - are defined to be publicly owned roads and not privately owned roads that may be currently available for public use;
- Road receivals - are defined to be any coal and coke transported to the final PKCT destination by road (public or private); and
- Coal Truck traffic is considered to be coal trucks travelling along public roads moving coal between PKCT (including return journey) and:
  - West Cliff CPP; and
  - Gujarat NRE No. 1 Mine.
- For coal deliveries
  - Day is considered to be 7:00am to 6:00pm;
  - Night is considered to be 6:00pm to 7:00am;
- For noise assessment
  - Day is considered to be 7:00am to 10:00pm; and
  - Night is considered to be 10:00pm to 7:00am.

7.1.2 Summary of Coal Truck Movements

The future coal truck volumes departing the mines under each scenario is summarised in Figure 7.1. This shows that the highest day time hourly departure volumes will occur with the '10mtpa' output scenarios. This is most pronounced if operating hours remain unchanged (11/6). With the 24/7 and 24/7&15/5-10.2 options the day time volumes are reduced with corresponding increases in night time hourly volumes.

To highlight the changes in coal truck movements against the permissible '4mtpa' 11/6 scenario, Figure 7.2 shows the hourly volume changes for each scenario considered.

Figure 7.1 Total Coal Truck Volumes Departing the Mines for PKCT

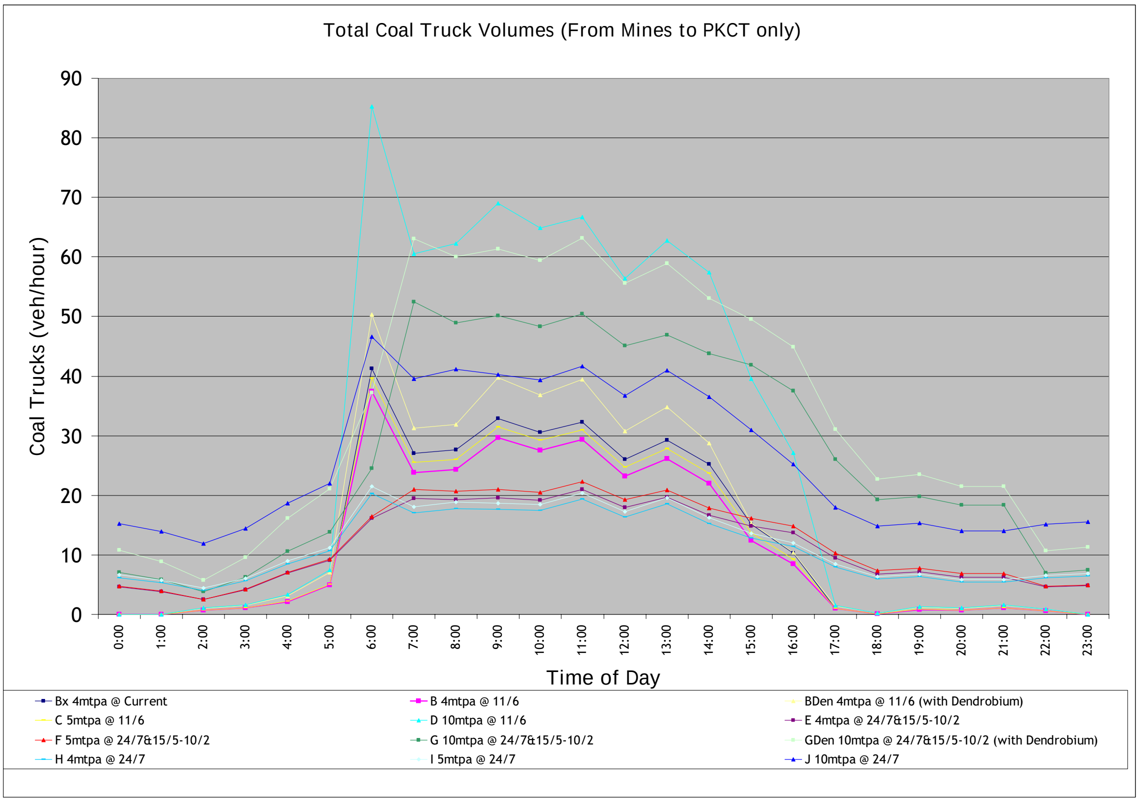
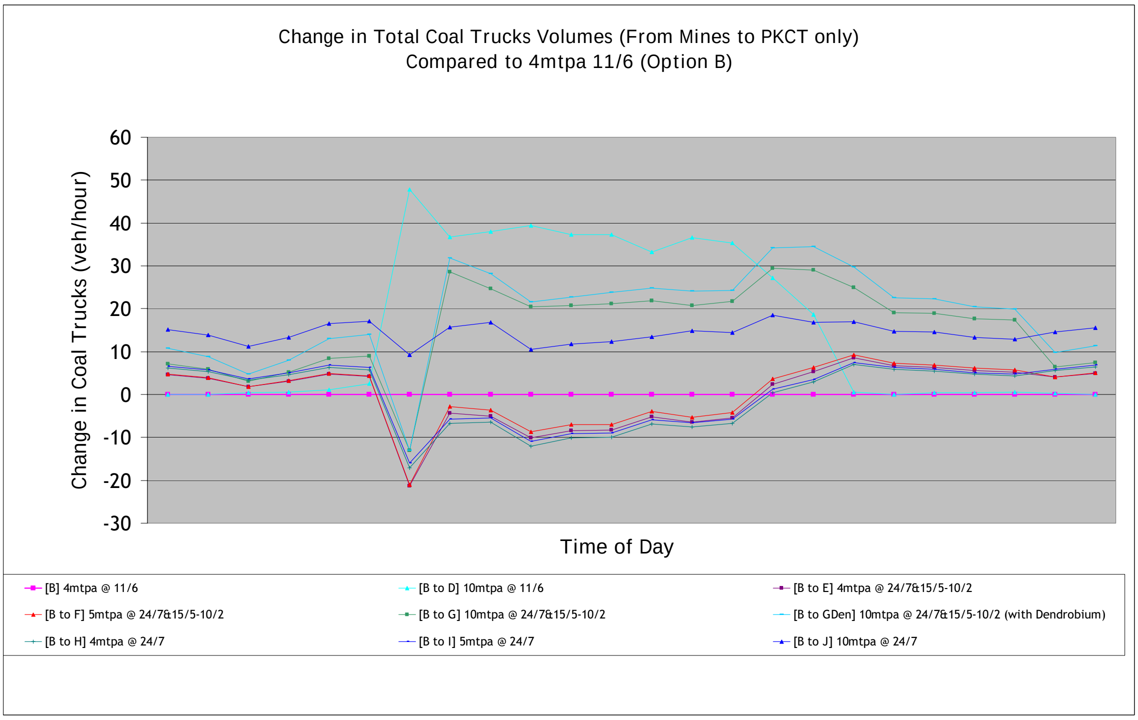


Figure 7.2 Changes in Coal Truck Departure Volume compared to '4mtpa' 11/6



7.1.3 Future Coal Trucks at Count Locations

The future coal truck traffic on public roads at the following count locations was estimated for each option:

- Appin Road, North of Princes Highway;
- Mount Ousley Road, Mount Ousley between Princess Highway and New Mount Pleasant Road, north of F6 Freeway;
- Southern Freeway F6, West Wollongong north of Princes Hwy interchange (N) and under Reserve Rd bridge (S);
- Southern Freeway F6, West Wollongong south of Princes Hwy near footbridge;
- Masters Road, Mt St. Thomas between The Avenue and Springhill Rd;
- Springhill Road, Coniston between Masters Rd and Corrimal St;
- Bellambi Lane, Bellambi between Princes Highway and Gladstone Street; and
- Northern Distributor, Wollongong between Railway Street and Bellambi Lane.

The future coal truck movements were estimated at each count location (8 locations) by time of day for each direction between each origin location (West Cliff CPP and GNRE No. 1 Mine) and PKCT under each option. This was estimated utilising the estimated travel times between the mines and PKCT, determined in Section 3.3.3.

7.1.4 Future Traffic at Count Locations

The estimated coal truck numbers at each count location for each option were added to the relevant background traffic volumes, determined in Section 5.4. This gives the total traffic volumes including coal trucks to/from PKCT at each of the 8 locations for each of the 25 scenarios.

The full estimated traffic volumes by hour for each location/scenario are provided in:

- Appendix W – 2008 traffic volume scenarios;
- Appendix X - 2009 traffic volume scenarios;
- Appendix Y – 2013 traffic volume scenarios; and
- Appendix Z - 2018 traffic volume scenarios

7.1.5 2008 Future Traffic Scenarios

The average traffic volumes, as well as the percentage of heavy vehicles and coal trucks, for each location/scenario in 2008 are summarised in Table 7.1 to Table 7.4 for the weekday and weekend daily and night time traffic volumes.

Table 7.1 Scenario Average Weekday Daily Traffic Volumes - 2008

Road Name		0mtpa @ No CT	4mtpa @ Current	4mtpa @ 11/6	4mtpa @ 24/7 &15/5-10/2	4mtpa @ 24/7
		A	B_x	B	E	H
Appin Road	All vehs	9,444	9,868	9,868	9,866	9,866
	CT	-	424	424	422	422
	%HV	12.7%	16.5%	16.5%	16.5%	16.5%
	%CT	0.0%	4.3%	4.3%	4.3%	4.3%
	%CT of HV	0.0%	26.1%	26.1%	26.0%	26.0%
Mount Ousley Road	All vehs	43,694	44,118	44,118	44,116	44,116
	CT	-	424	424	422	422
	%HV	13.3%	14.1%	14.1%	14.1%	14.1%
	%CT	0.0%	1.0%	1.0%	1.0%	1.0%
	%CT of HV	0.0%	6.8%	6.8%	6.8%	6.8%
Southern Freeway (nth)	All vehs	77,182	77,806	77,742	77,726	77,720
	CT	-	624	560	544	538
	%HV	10.3%	11.0%	10.9%	10.9%	10.9%
	%CT	0.0%	0.8%	0.7%	0.7%	0.7%
	%CT of HV	0.0%	7.3%	6.6%	6.4%	6.3%
Southern Freeway (sth)	All vehs	75,364	75,988	75,924	75,908	75,902
	CT	-	624	560	544	538
	%HV	9.9%	10.6%	10.5%	10.5%	10.5%
	%CT	0.0%	0.8%	0.7%	0.7%	0.7%
	%CT of HV	0.0%	7.7%	7.0%	6.8%	6.7%
Masters Road	All vehs	26,479	27,103	27,039	27,023	27,017
	CT	-	624	560	544	538
	%HV	12.6%	14.6%	14.4%	14.4%	14.3%
	%CT	0.0%	2.3%	2.1%	2.0%	2.0%
	%CT of HV	0.0%	15.8%	14.4%	14.0%	13.9%
Springhill Road	All vehs	15,731	16,284	16,226	16,275	16,269
	CT	-	553	495	544	538
	%HV	4.9%	8.2%	7.8%	8.1%	8.1%
	%CT	0.0%	3.4%	3.1%	3.3%	3.3%
	%CT of HV	0.0%	41.5%	38.9%	41.1%	40.9%
Bellambi Lane	All vehs	12,774	12,974	12,910	12,896	12,890
	CT	-	200	136	122	116
	%HV	7.7%	9.2%	8.7%	8.6%	8.6%
	%CT	0.0%	1.5%	1.1%	0.9%	0.9%
	%CT of HV	0.0%	16.8%	12.1%	11.0%	10.5%
Northern Distributor	All vehs	22,756	22,956	22,892	22,878	22,872
	CT	-	200	136	122	116
	%HV	7.5%	8.3%	8.0%	8.0%	7.9%
	%CT	0.0%	0.9%	0.6%	0.5%	0.5%
	%CT of HV	0.0%	10.5%	7.4%	6.7%	6.4%

Table 7.2 Scenario Average Weekday Night Time Traffic Volumes – 2008

Road Name		0mtpa @ No CT	4mtpa @ Current	4mtpa @ 11/6	4mtpa @ 24/7 &15/5-10/2	4mtpa @ 24/7
		A	B_x	B	E	H
Appin Road	All vehs	1,634	1,684	1,684	1,737	1,737
	CT	-	50	50	103	103
	%HV	23.3%	25.5%	25.5%	27.8%	27.8%
	%CT	0.0%	3.0%	3.0%	5.9%	5.9%
	%CT of HV	0.0%	11.6%	11.6%	21.3%	21.3%
Mount Ousley Road	All vehs	6,551	6,595	6,595	6,652	6,652
	CT	-	44	44	101	101
	%HV	20.3%	20.8%	20.8%	21.5%	21.5%
	%CT	0.0%	0.7%	0.7%	1.5%	1.5%
	%CT of HV	0.0%	3.2%	3.2%	7.1%	7.1%
Southern Freeway (nth)	All vehs	9,281	9,342	9,337	9,382	9,413
	CT	-	61	56	101	132
	%HV	15.8%	16.3%	16.3%	16.7%	17.0%
	%CT	0.0%	0.7%	0.6%	1.1%	1.4%
	%CT of HV	0.0%	4.0%	3.7%	6.4%	8.3%
Southern Freeway (sth)	All vehs	8,732	8,793	8,788	8,833	8,864
	CT	-	61	56	101	132
	%HV	16.2%	16.8%	16.8%	17.2%	17.5%
	%CT	0.0%	0.7%	0.6%	1.1%	1.5%
	%CT of HV	0.0%	4.1%	3.8%	6.7%	8.5%
Masters Road	All vehs	3,141	3,205	3,199	3,242	3,273
	CT	-	64	58	101	132
	%HV	21.6%	23.1%	23.0%	24.0%	24.7%
	%CT	0.0%	2.0%	1.8%	3.1%	4.0%
	%CT of HV	0.0%	8.6%	7.9%	13.0%	16.3%
Springhill Road	All vehs	1,421	1,421	1,421	1,522	1,553
	CT	-	-	-	101	132
	%HV	4.7%	4.7%	4.7%	11.0%	12.8%
	%CT	0.0%	0.0%	0.0%	6.6%	8.5%
	%CT of HV	0.0%	0.0%	0.0%	60.1%	66.3%
Bellambi Lane	All vehs	1,291	1,308	1,303	1,291	1,322
	CT	-	17	12	-	31
	%HV	8.4%	9.6%	9.2%	8.4%	10.5%
	%CT	0.0%	1.3%	0.9%	0.0%	2.3%
	%CT of HV	0.0%	13.6%	10.0%	0.0%	22.3%
Northern Distributor	All vehs	2,238	2,255	2,250	2,238	2,269
	CT	-	17	12	-	31
	%HV	8.3%	9.0%	8.8%	8.3%	9.6%
	%CT	0.0%	0.8%	0.5%	0.0%	1.4%
	%CT of HV	0.0%	8.4%	6.1%	0.0%	14.3%

2008 Weekday Existing Operations

2008 Option A represents the background traffic volumes with no coal truck movements between WCCPP/GNRE and PKCT. This is provided for reference only.

2008 Option B_x represents the current delivery patterns (with GNRE operating 11/4), whilst 2008 Option B represents what is permissible under current restrictions (GNRE operating full 11/6). In comparing 2008 Option B_x to Option B, both have the same annual coal output to PKCT from WCCPP and GNRE. However, there are minor differences in coal truck volumes, with Option B_x slightly higher than Option B. This is representative of the assumption that under Option B_x GNRE does not deliver 6 days per week but 4, and hence the delivery amounts per day under Option B_x are slightly larger than under Option B due to fewer delivery days in a year.

Under Option B and B_x the PKCT coal trucks represent the greatest proportion of total heavy vehicles along Appin Road (26%) and Springhill Road (39-42%). Along most other routes the coal trucks represent less than 17% of heavy vehicle volumes.

2008 Weekday 24/7 Operations

Changing to 24/7 operations at current outputs (2008 Option H) will generally have minimal changes to daily traffic volumes. The exception to this is Springhill Road which will see the total weekday percentage of heavy vehicles rise from 7.8% to 8.1%. This will also result in an increase in the proportion of total heavy vehicles represented by coal trucks from 38.9% to 40.9%.

When considering the day time (7am-6pm) volumes, a slight decreases in traffic volumes under 24/7 operations is observed. This is most pronounced along Springhill Road and Bellambi Lane where the coal trucks as a proportion of total heavy vehicles decreases from 41.0% to 36.3% and 12.3% to 8.8% respectively.

Most notable are the increases in night time traffic (6pm to 7am) volumes along the routes. The following changes in percentage of heavy vehicles and coal trucks during night time when comparing Option B to Option H were observed:

- Appin Road:
  - Proportion of HV increases from 25.5% to 27.8%;
  - Proportion of HV represented by CT increases from 11.6% to 21.3%;
- Masters Road:
  - Proportion of HV increases from 23.0% to 24.7%;
  - Proportion of HV represented by CT increases from 7.9% to 16.3%;
- Springhill Road:
  - Proportion of HV increases from 4.7% to 12.8%;
  - Proportion of HV represented by CT increases from 0.0% to 66.3%;
- Bellambi Lane:
  - Proportion of HV increases from 9.2% to 10.5%;
  - Proportion of HV represented by CT increases from 10.0% to 22.3%;
- Northern Distributor:
  - Proportion of HV increases from 8.8% to 9.6%;
  - Proportion of HV represented by CT increases from 6.1% to 14.3%.

Table 7.3 Scenario Average Weekend Daily Traffic Volumes - 2008

Road Name		0mtpa @ No CT	4mtpa @ Current	4mtpa @ 11/6	4mtpa @ 24/7 &15/5-10/2	4mtpa @ 24/7
		A	B_x	B	E	H
Appin Road	All vehs	8,890	9,316	9,316	9,310	9,310
	CT	-	426	426	420	420
	%HV	4.5%	8.8%	8.8%	8.8%	8.8%
	%CT	0.0%	4.6%	4.6%	4.5%	4.5%
	%CT of HV	0.0%	51.7%	51.7%	51.3%	51.3%
Mount Ousley Road	All vehs	41,866	42,292	42,292	42,286	42,286
	CT	-	426	426	420	420
	%HV	5.5%	6.4%	6.4%	6.4%	6.4%
	%CT	0.0%	1.0%	1.0%	1.0%	1.0%
	%CT of HV	0.0%	15.7%	15.7%	15.5%	15.5%
Southern Freeway (nth)	All vehs	63,867	64,493	64,427	64,375	64,401
	CT	-	626	560	508	534
	%HV	4.4%	5.3%	5.2%	5.2%	5.2%
	%CT	0.0%	1.0%	0.9%	0.8%	0.8%
	%CT of HV	0.0%	18.2%	16.6%	15.3%	16.0%
Southern Freeway (sth)	All vehs	59,889	60,515	60,449	60,397	60,423
	CT	-	626	560	508	534
	%HV	4.1%	5.1%	5.0%	4.9%	4.9%
	%CT	0.0%	1.0%	0.9%	0.8%	0.9%
	%CT of HV	0.0%	20.3%	18.6%	17.1%	17.9%
Masters Road	All vehs	17,115	17,741	17,675	17,623	17,649
	CT	-	626	560	508	534
	%HV	7.5%	10.8%	10.4%	10.2%	10.3%
	%CT	0.0%	3.5%	3.2%	2.9%	3.0%
	%CT of HV	0.0%	32.7%	30.3%	28.3%	29.3%
Springhill Road	All vehs	13,377	13,931	13,876	13,885	13,911
	CT	-	554	499	508	534
	%HV	2.5%	6.4%	6.0%	6.1%	6.3%
	%CT	0.0%	4.0%	3.6%	3.7%	3.8%
	%CT of HV	0.0%	62.2%	59.7%	60.2%	61.4%
Bellambi Lane	All vehs	10,196	10,396	10,330	10,284	10,310
	CT	-	200	134	88	114
	%HV	3.7%	5.6%	5.0%	4.6%	4.8%
	%CT	0.0%	1.9%	1.3%	0.9%	1.1%
	%CT of HV	0.0%	34.4%	26.0%	18.7%	23.0%
Northern Distributor	All vehs	18,400	18,600	18,534	18,488	18,514
	CT	-	426	426	420	420
	%HV	2.2%	4.4%	4.4%	4.4%	4.4%
	%CT	0.0%	2.3%	2.3%	2.3%	2.3%
	%CT of HV	0.0%	51.7%	51.7%	51.3%	51.3%

Table 7.4 Scenario Average Weekend Night Time Traffic Volumes - 2008

Road Name		0mtpa @ No CT	4mtpa @ Current	4mtpa @ 11/6	4mtpa @ 24/7 &15/5-10/2	4mtpa @ 24/7
		A	B_x	B	E	H
Appin Road	All vehs	1,567	1,605	1,605	1,652	1,652
	CT	-	38	38	85	85
	%HV	11.6%	13.7%	13.7%	16.2%	16.2%
	%CT	0.0%	2.4%	2.4%	5.1%	5.1%
	%CT of HV	0.0%	17.3%	17.3%	31.8%	31.8%
Mount Ousley Road	All vehs	4,767	4,801	4,801	4,850	4,850
	CT	-	34	34	83	83
	%HV	13.2%	13.8%	13.8%	14.7%	14.7%
	%CT	0.0%	0.7%	0.7%	1.7%	1.7%
	%CT of HV	0.0%	5.1%	5.1%	11.6%	11.6%
Southern Freeway (nth)	All vehs	6,404	6,465	6,455	6,487	6,521
	CT	-	61	51	83	117
	%HV	9.3%	10.2%	10.1%	10.5%	11.0%
	%CT	0.0%	0.9%	0.8%	1.3%	1.8%
	%CT of HV	0.0%	9.3%	7.9%	12.2%	16.4%
Southern Freeway (sth)	All vehs	6,116	6,177	6,167	6,199	6,233
	CT	-	61	51	83	117
	%HV	9.5%	10.3%	10.2%	10.7%	11.2%
	%CT	0.0%	1.0%	0.8%	1.3%	1.9%
	%CT of HV	0.0%	9.5%	8.1%	12.6%	16.8%
Masters Road	All vehs	2,583	2,648	2,637	2,666	2,701
	CT	-	65	54	83	118
	%HV	13.5%	15.6%	15.3%	16.2%	17.3%
	%CT	0.0%	2.5%	2.0%	3.1%	4.4%
	%CT of HV	0.0%	15.7%	13.4%	19.2%	25.3%
Springhill Road	All vehs	1,981	1,981	1,981	2,064	2,099
	CT	-	-	-	83	118
	%HV	3.1%	3.1%	3.1%	7.0%	8.6%
	%CT	0.0%	0.0%	0.0%	4.0%	5.6%
	%CT of HV	0.0%	0.0%	0.0%	57.2%	65.5%
Bellambi Lane	All vehs	923	950	940	923	957
	CT	-	27	17	-	34
	%HV	5.9%	8.5%	7.6%	5.9%	9.2%
	%CT	0.0%	2.8%	1.8%	0.0%	3.6%
	%CT of HV	0.0%	33.3%	23.9%	0.0%	38.6%
Northern Distributor	All vehs	1,679	1,706	1,696	1,679	1,713
	CT	-	38	38	85	85
	%HV	10.8%	12.9%	13.0%	15.9%	15.6%
	%CT	0.0%	2.2%	2.2%	5.1%	5.0%
	%CT of HV	0.0%	17.3%	17.3%	31.8%	31.8%

2008 Weekend 24/7 Operations

Similarly to the average weekday traffic, minimal changes are noted on daily traffic volumes when changing to 24/7 operations at current outputs (2008 Option H). Springhill Road total weekend daily percentage of heavy vehicles will increase very slightly from 6.0% to 6.3%. This will also result in minor increases in the proportion of total heavy vehicles represented by coal trucks from 59.7% to 61.4%. Slight decreases in total weekend daily volumes are observed along all other roads.

The day time volumes along all routes decrease slightly under 24/7 operations. The following changes in average weekend percentage of heavy vehicles and coal trucks during night time (6pm to 7am) when comparing Option B to Option H were observed:

- Appin Road:
  - Proportion of HV increases from 13.7% to 16.2%;
  - Proportion of HV that are CT increases from 17.3% to 31.8%;
- Masters Road:
  - Proportion of HV increases from 15.3% to 17.3%;
  - Proportion of HV that are CT increases from 13.4% to 25.3%;
- Springhill Road:
  - Proportion of HV increases from 3.1% to 8.6%;
  - Proportion of HV that are CT increases from 0.0% to 65.5%;
- Bellambi Lane:
  - Proportion of HV increases from 7.6% to 9.2%;
  - Proportion of HV that are CT increases from 23.9% to 38.6%;
- Northern Distributor:
  - Proportion of HV increases from 13.0% to 15.6%;
  - Proportion of HV that are CT increases from 17.3% to 31.8%.

7.1.6 2009 Future Traffic Scenarios

The average traffic volumes, as well as the percentage of heavy vehicles and coal trucks, for each location/scenario in 2009 are summarised in Table 7.5 to Table 7.8 for the weekday and weekend daily and night time traffic volumes.

Table 7.5 Scenario Average Weekday Daily Traffic Volumes – 2009

Road Name		0mtpa @ No CT	4mtpa @ Current	4mtpa @ 11/6	5mtpa @ 11/6	5mtpa @ 24/7 &15/5-10/2	5mtpa @ 24/7
		A	B_x	B	C	F	I
Bellambi Lane	All vehs	5,447	5,647	5,583	5,609	5,599	5,589
	CT	-	200	136	162	152	142
	%HV	7.7%	11.0%	10.0%	10.4%	10.2%	10.1%
	%CT	0.0%	3.5%	2.4%	2.9%	2.7%	2.5%
	%CT of HV	0.0%	32.3%	24.5%	27.8%	26.6%	25.3%
Northern Distributor	All vehs	23,880	24,080	24,016	24,042	24,032	24,022
	CT	-	200	136	162	152	142
	%HV	7.4%	8.2%	7.9%	8.0%	8.0%	8.0%
	%CT	0.0%	0.8%	0.6%	0.7%	0.6%	0.6%
	%CT of HV	0.0%	10.1%	7.1%	8.4%	7.9%	7.4%

Table 7.6 Scenario Average Weekday Night Time Traffic Volumes - 2009

Road Name		0mtpa @ No CT	4mtpa @ Current	4mtpa @ 11/6	5mtpa @ 11/6	5mtpa @ 24/7 &15/5-10/2	5mtpa @ 24/7
		A	B_x	B	C	F	I
Bellambi Lane	All vehs	547	564	559	560	547	587
	CT	-	17	12	13	-	40
	%HV	7.9%	10.6%	9.8%	10.0%	7.9%	14.1%
	%CT	0.0%	3.0%	2.1%	2.3%	0.0%	6.8%
	%CT of HV	0.0%	28.3%	21.8%	23.2%	0.0%	48.2%
Northern Distributor	All vehs	2,346	2,363	2,358	2,359	2,346	2,386
	CT	-	17	12	13	-	40
	%HV	8.2%	8.8%	8.7%	8.7%	8.2%	9.7%
	%CT	0.0%	0.7%	0.5%	0.6%	0.0%	1.7%
	%CT of HV	0.0%	8.1%	5.9%	6.3%	0.0%	17.2%

Table 7.7 Scenario Average Weekend Daily Traffic Volumes – 2009

Road Name		0mtpa @ No CT	4mtpa @ Current	4mtpa @ 11/6	5mtpa @ 11/6	5mtpa @ 24/7 &15/5-10/2	5mtpa @ 24/7
		A	B_x	B	C	F	I
Bellambi Lane	All vehs	4,349	4,549	4,483	4,507	4,453	4,493
	CT	-	200	134	158	104	144
	%HV	3.7%	7.9%	6.5%	7.0%	5.9%	6.7%
	%CT	0.0%	4.4%	3.0%	3.5%	2.3%	3.2%
	%CT of HV	0.0%	55.7%	45.7%	49.8%	39.5%	47.5%
Northern Distributor	All vehs	19,309	19,509	19,443	19,467	19,413	19,453
	CT	-	200	134	158	104	144
	%HV	4.9%	5.9%	5.5%	5.7%	5.4%	5.6%
	%CT	0.0%	1.0%	0.7%	0.8%	0.5%	0.7%
	%CT of HV	0.0%	17.5%	12.5%	14.4%	9.9%	13.3%

Table 7.8 Scenario Average Weekend Night Time Traffic Volumes – 2009

Road Name		0mtpa @ No CT	4mtpa @ Current	4mtpa @ 11/6	5mtpa @ 11/6	5mtpa @ 24/7 &15/5-10/2	5mtpa @ 24/7
		A	B_x	B	C	F	I
Bellambi Lane	All vehs	396	423	413	417	396	438
	CT	-	27	17	21	-	42
	%HV	5.6%	11.6%	9.4%	10.3%	5.6%	14.6%
	%CT	0.0%	6.4%	4.1%	5.0%	0.0%	9.6%
	%CT of HV	0.0%	55.1%	43.6%	48.8%	0.0%	65.6%
Northern Distributor	All vehs	1,758	1,785	1,775	1,779	1,758	1,800
	CT	-	27	17	21	-	42
	%HV	5.7%	7.1%	6.6%	6.8%	5.7%	7.9%
	%CT	0.0%	1.5%	1.0%	1.2%	0.0%	2.3%
	%CT of HV	0.0%	21.3%	14.5%	17.4%	0.0%	29.6%

2009 Weekday 24/7 Operations

Only minor variations are noted on the weekday daily traffic volumes in 2009 when comparing the various options. There are the slight increases in night time (6pm to 7am) traffic volumes along Bellambi Lane and Northern Distributor when comparing Option I to Option B.

The following notable changes in percentage of heavy vehicles and coal trucks during weekday night-time when comparing Option I to Option B were observed:

- Bellambi Lane:
  - Proportion of HV increases from 9.8% to 14.1%;
  - Proportion of HV that are CT increases from 21.8% to 48.2%;
- Northern Distributor:
  - Proportion of HV increases from 8.7% to 9.7%;
  - Proportion of HV that are CT increases from 5.9% to 17.2%.

2009 Weekday 24/7&15/5-10/2 Operations

Only minor variations are noted on the weekday daily traffic volumes in 2009 when comparing the various options. There are the slight decreases in night time (6pm to 7am) traffic volumes along Bellambi Lane and Northern Distributor when comparing Option F to Option B.

The following changes in percentage of heavy vehicles and coal trucks during weekday night-time when comparing Option F to Option B were observed:

- Bellambi Lane:
  - Proportion of HV decreases from 9.8% to 7.9%;
  - Proportion of HV that are CT decreases from 21.8% to 0.0%;
- Northern Distributor:
  - Proportion of HV decreases from 8.7% to 8.2%;
  - Proportion of HV that are CT decreases from 5.9% to 0.0%.

2009 Weekend 24/7 Operations

Minimal changes are noted on the weekend daily traffic volumes in 2009 when comparing the various options. The following notable changes in percentage of heavy vehicles and coal trucks during weekend night time, when comparing Option I to Option B, were observed:

- Bellambi Lane:
  - Proportion of HV increases from 9.4% to 14.6%;
  - Proportion of HV that are CT increases from 43.6% to 65.6%;
- Northern Distributor:
  - Proportion of HV increases from 6.6% to 7.9%;
  - Proportion of HV that are CT increases from 14.5% to 29.6%.

2009 Weekend 24/7&15/5-10/2 Operations

Minimal changes are noted on the weekend daily traffic volumes in 2009 when comparing the various options. The following notable changes in percentage of heavy vehicles and coal trucks during weekend night time, when comparing Option F to Option B, were observed:

- Bellambi Lane:
  - Proportion of HV increases from 9.4% to 5.6%;
  - Proportion of HV that are CT increases from 43.6% to 0.0%;
- Northern Distributor:
  - Proportion of HV increases from 6.6% to 5.7%;
  - Proportion of HV that are CT increases from 14.5% to 0.0%.

7.1.7 2013 Future Traffic Scenarios

The average traffic volumes, as well as the percentage of heavy vehicles and coal trucks, for each location/scenario in 2013 are summarised in Table 7.9 to Table 7.12 for the weekday and weekend daily and night time traffic volumes.

2013 Weekday Existing Operations

Option A represents the 2013 background traffic volumes with no coal truck movements between WCCPP/GNRE and PKCT. Option B represents the current permissible delivery patterns with 2013 background traffic volumes.

In 2013 under Option B the PKCT coal trucks represent the greatest proportion of total heavy vehicles along Appin Road (23.6%), Springhill Road (38.9%), and Bellambi Lane (23.8%). Along most other routes the coal trucks represent less than 14% of heavy vehicle volumes.

Table 7.9 Scenario Average Weekday Daily Traffic Volumes - 2013

Road Name		0mtpa @ No CT	4mtpa @ 11/6	10mtpa @ 11/6	4mtpa @ 24/7 &15/5-10/2	10mtpa @ 24/7 &15/5-10/2	4mtpa @ 24/7	10mtpa @ 24/7
		A	B	D	E	G	H	J
Appin Road	All vehs	10,477	10,901	11,117	10,899	11,115	10,899	11,115
	CT	-	424	640	422	638	422	638
	%HV	13.1%	16.5%	18.1%	16.5%	18.1%	16.5%	18.1%
	%CT	0.0%	3.9%	5.8%	3.9%	5.7%	3.9%	5.7%
	%CT of HV	0.0%	23.6%	31.8%	23.5%	31.7%	23.5%	31.7%
Mount Ousley Road	All vehs	48,302	48,726	48,942	48,724	48,940	48,724	48,940
	CT	-	424	640	422	638	422	638
	%HV	13.7%	14.5%	14.8%	14.5%	14.8%	14.5%	14.8%
	%CT	0.0%	0.9%	1.3%	0.9%	1.3%	0.9%	1.3%
	%CT of HV	0.0%	6.0%	8.8%	6.0%	8.8%	6.0%	8.8%
Southern Freeway (nth)	All vehs	85,212	85,772	86,556	85,756	86,512	85,750	86,450
	CT	-	560	1,344	544	1,300	538	1,238
	%HV	10.6%	11.2%	12.0%	11.2%	12.0%	11.2%	11.9%
	%CT	0.0%	0.7%	1.6%	0.6%	1.5%	0.6%	1.4%
	%CT of HV	0.0%	5.8%	12.9%	5.7%	12.6%	5.6%	12.0%
Southern Freeway (sth)	All vehs	86,635	87,195	87,979	87,179	87,935	87,173	87,873
	CT	-	560	1,344	544	1,300	538	1,238
	%HV	10.3%	10.9%	11.7%	10.8%	11.6%	10.8%	11.6%
	%CT	0.0%	0.6%	1.5%	0.6%	1.5%	0.6%	1.4%
	%CT of HV	0.0%	5.9%	13.1%	5.8%	12.7%	5.7%	12.2%
Masters Road	All vehs	26,588	27,148	27,932	27,132	27,888	27,126	27,826
	CT	-	560	1,344	544	1,300	538	1,238
	%HV	12.9%	14.7%	17.1%	14.6%	17.0%	14.6%	16.8%
	%CT	0.0%	2.1%	4.8%	2.0%	4.7%	2.0%	4.4%
	%CT of HV	0.0%	14.0%	28.2%	13.7%	27.5%	13.6%	26.5%
Springhill Road	All vehs	15,731	16,226	16,932	16,275	17,031	16,269	16,969
	CT	-	495	1,201	544	1,300	538	1,238
	%HV	4.9%	7.8%	11.7%	8.1%	12.2%	8.1%	11.9%
	%CT	0.0%	3.1%	7.1%	3.3%	7.6%	3.3%	7.3%
	%CT of HV	0.0%	38.9%	60.7%	41.1%	62.6%	40.9%	61.4%
Bellambi Lane	All vehs	5,663	5,799	6,367	5,785	6,325	5,779	6,263
	CT	-	136	704	122	662	116	600
	%HV	7.7%	9.9%	17.9%	9.6%	17.4%	9.6%	16.5%
	%CT	0.0%	2.3%	11.1%	2.1%	10.5%	2.0%	9.6%
	%CT of HV	0.0%	23.8%	61.8%	21.9%	60.3%	21.0%	57.9%
Northern Distributor	All vehs	28,415	28,551	29,119	28,537	29,077	28,531	29,015
	CT	-	136	704	122	662	116	600
	%HV	7.4%	7.8%	9.6%	7.8%	9.5%	7.8%	9.3%
	%CT	0.0%	0.5%	2.4%	0.4%	2.3%	0.4%	2.1%
	%CT of HV	0.0%	6.1%	25.1%	5.5%	23.9%	5.2%	22.2%

Table 7.10 Scenario Average Weekday Night Time Traffic Volumes - 2013

Road Name		0mtpa @ No CT	4mtpa @ 11/6	10mtpa @ 11/6	4mtpa @ 24/7 &15/5-10/2	10mtpa @ 24/7 &15/5-10/2	4mtpa @ 24/7	10mtpa @ 24/7
		A	B	D	E	G	H	J
Appin Road	All vehs	1,820	1,870	1,894	1,923	1,972	1,923	1,972
	CT	-	50	74	103	152	103	152
	%HV	23.8%	25.9%	26.8%	27.9%	29.7%	27.9%	29.7%
	%CT	0.0%	2.7%	3.9%	5.4%	7.7%	5.4%	7.7%
	%CT of HV	0.0%	10.3%	14.6%	19.2%	25.9%	19.2%	25.9%
Mount Ousley Road	All vehs	7,261	7,305	7,325	7,362	7,410	7,362	7,410
	CT	-	44	64	101	149	101	149
	%HV	20.9%	21.4%	21.6%	22.0%	22.5%	22.0%	22.5%
	%CT	0.0%	0.6%	0.9%	1.4%	2.0%	1.4%	2.0%
	%CT of HV	0.0%	2.8%	4.0%	6.2%	8.9%	6.2%	8.9%
Southern Freeway (nth)	All vehs	10,269	10,325	10,393	10,370	10,418	10,401	10,583
	CT	-	56	124	101	149	132	314
	%HV	16.3%	16.7%	17.3%	17.1%	17.5%	17.3%	18.8%
	%CT	0.0%	0.5%	1.2%	1.0%	1.4%	1.3%	3.0%
	%CT of HV	0.0%	3.2%	6.9%	5.7%	8.2%	7.3%	15.8%
Southern Freeway (sth)	All vehs	10,062	10,118	10,186	10,163	10,211	10,194	10,376
	CT	-	56	124	101	149	132	314
	%HV	16.8%	17.3%	17.9%	17.7%	18.1%	17.9%	19.4%
	%CT	0.0%	0.6%	1.2%	1.0%	1.5%	1.3%	3.0%
	%CT of HV	0.0%	3.2%	6.8%	5.6%	8.1%	7.2%	15.6%
Masters Road	All vehs	3,176	3,234	3,310	3,277	3,325	3,308	3,494
	CT	-	58	134	101	149	132	318
	%HV	22.2%	23.6%	25.3%	24.6%	25.7%	25.3%	29.3%
	%CT	0.0%	1.8%	4.0%	3.1%	4.5%	4.0%	9.1%
	%CT of HV	0.0%	7.6%	16.0%	12.5%	17.5%	15.8%	31.1%
Springhill Road	All vehs	1,421	1,421	1,421	1,522	1,570	1,553	1,739
	CT	-	-	-	101	149	132	318
	%HV	4.7%	4.7%	4.7%	11.0%	13.8%	12.8%	22.1%
	%CT	0.0%	0.0%	0.0%	6.6%	9.5%	8.5%	18.3%
	%CT of HV	0.0%	0.0%	0.0%	60.1%	69.0%	66.3%	82.6%
Bellambi Lane	All vehs	567	579	627	567	567	598	732
	CT	-	12	60	-	-	31	165
	%HV	7.8%	9.7%	16.6%	7.8%	7.8%	12.5%	28.6%
	%CT	0.0%	2.1%	9.6%	0.0%	0.0%	5.2%	22.5%
	%CT of HV	0.0%	21.4%	57.7%	0.0%	0.0%	41.3%	78.9%
Northern Distributor	All vehs	2,792	2,804	2,852	2,792	2,792	2,823	2,957
	CT	-	12	60	-	-	31	165
	%HV	8.2%	8.6%	10.1%	8.2%	8.2%	9.2%	13.3%
	%CT	0.0%	0.4%	2.1%	0.0%	0.0%	1.1%	5.6%
	%CT of HV	0.0%	5.0%	20.8%	0.0%	0.0%	11.9%	41.9%

2013 Weekday Increased Output

Option D represents an increased output in 2013 under existing operating conditions. Comparison of Option D with Option B in 2013 shows the changes that will result from the change in total output with no change to the operating hours.

In this comparison changes to daily traffic volumes along the routes do not exceed 9.8%. The change in percentage of heavy vehicles ranges from 0.4% along Mount Ousley Road to 8.0% along Bellambi Lane, where the corresponding coal trucks as a proportion of total heavy vehicles are 2.8% and 38.0% respectively.

Day-time traffic volumes were generally noted to decrease by between 0.5% and 10.0% along the routes. The following notable changes during weekday night time when comparing Option D to Option B were observed:

- Bellambi Lane:
  - 8.3% increase in total night volumes;
  - with a 6.9% increase in HV; and
  - 36.3% increase in the proportion of HV that are coal trucks;
- Northern Distributor:
  - 1.7% increase in total night volumes;
  - with a 1.5% increase in HV; and
  - 15.8% increase in the proportion of HV that are coal trucks.

2013 Weekday 24/7 Operations

Option H represents maintaining current output in 2013 under 24/7 operations. Comparing Option H with Option B in 2013 shows the changes that will result from the proposal in only changing operating hours.

In this case daily traffic along most routes stays the same or decreases, with the exception of Springhill Road which increases total daily volumes by 0.3%, which represents an increase in heavy vehicles of 0.2%.

Day-time traffic volumes were generally noted to decrease by between 0.1% and 0.7% along the routes. Night-time traffic volumes were generally noted to increase by between 0.7% and 9.3% along the routes. The following notable changes during weekday night time when comparing Option H to Option B were observed:

- Springhill Road:
  - 9.3% increase in total night volumes;
  - with an 8.1% increase in HV; and
  - 66.3% increase in the proportion of HV that are coal trucks;
- Masters Road:
  - 2.3% increase in total night volumes;
  - with a 1.7% increase in HV; and
  - 8.2% increase in the proportion of HV that are coal trucks.
- Bellambi Lane:
  - 3.3% increase in total night volumes;
  - with a 2.9% increase in HV; and
  - 19.9% increase in the proportion of HV that are coal trucks.

2013 Weekday 24/7 Operations with Increased Output

Option J represents both an increase in output in 2013 and a change to 24/7 operations. Comparing Option J with Option B in 2013 shows the changes that will result from the proposal. In this comparison changes to daily traffic volumes along the routes does not exceed 8.0%. The change in percentage of heavy vehicles ranges from 0.4% along Mount Ousley Road to 6.7% along Bellambi Lane, where the corresponding coal trucks as a proportion of total heavy vehicles are 2.5% and 34.1% respectively.

Day-time traffic volumes were generally noted to increase by between 0.3% and 6.0% along the routes. Night-time traffic volumes were generally noted to increase by between 1.4% and 26.4% along the routes. The following notable changes during weekday night time when comparing Option J to Option B were observed:

- Appin Road:
  - 5.5% increase in total night volumes;
  - with a 3.8% increase in HV; and
  - 15.6% increase in the proportion of HV that are coal trucks.
- Masters Road:
  - 8.0% increase in total night volumes;
  - with a 5.7% increase in HV; and
  - 23.5% increase in the proportion of HV that are coal trucks.
- Springhill Road:
  - 22.4% increase in total night volumes;
  - with a 17.4% increase in HV; and
  - 82.6% increase in the proportion of HV that are coal trucks;
- Bellambi Lane
  - 26.4% increase in total night volumes;
  - with a 18.9% increase in HV; and
  - 57.5% increase in the proportion of HV that are coal trucks;
- Northern Distributor
  - 5.5% increase in total night volumes;
  - with a 4.7% increase in HV; and
  - 36.9% increase in the proportion of HV that are coal trucks.

Table 7.11 Scenario Average Weekend Daily Traffic Volumes - 2013

Road Name		0mtpa @ No CT	4mtpa @ 11/6	10mtpa @ 11/6	4mtpa @ 24/7 &15/5-10/2	10mtpa @ 24/7 &15/5-10/2	4mtpa @ 24/7	10mtpa @ 24/7
		A	B	D	E	G	H	J
Appin Road	All vehs	9,835	10,261	10,475	10,255	10,473	10,255	10,473
	CT	-	426	640	420	638	420	638
	%HV	4.6%	8.5%	10.4%	8.5%	10.4%	8.5%	10.4%
	%CT	0.0%	4.2%	6.1%	4.1%	6.1%	4.1%	6.1%
	%CT of HV	0.0%	48.6%	58.7%	48.2%	58.6%	48.2%	58.6%
Mount Ousley Road	All vehs	46,166	46,592	46,806	46,586	46,804	46,586	46,804
	CT	-	426	640	420	638	420	638
	%HV	5.7%	6.5%	7.0%	6.5%	7.0%	6.5%	7.0%
	%CT	0.0%	0.9%	1.4%	0.9%	1.4%	0.9%	1.4%
	%CT of HV	0.0%	14.0%	19.6%	13.8%	19.6%	13.8%	19.6%
Southern Freeway (nth)	All vehs	70,392	70,952	71,736	70,900	71,476	70,926	71,634
	CT	-	560	1,344	508	1,084	534	1,242
	%HV	4.6%	5.3%	6.4%	5.3%	6.0%	5.3%	6.2%
	%CT	0.0%	0.8%	1.9%	0.7%	1.5%	0.8%	1.7%
	%CT of HV	0.0%	14.8%	29.4%	13.6%	25.1%	14.2%	27.8%
Southern Freeway (sth)	All vehs	68,669	69,229	70,013	69,177	69,753	69,203	69,911
	CT	-	560	1,344	508	1,084	534	1,242
	%HV	4.3%	5.1%	6.1%	5.0%	5.8%	5.0%	6.0%
	%CT	0.0%	0.8%	1.9%	0.7%	1.6%	0.8%	1.8%
	%CT of HV	0.0%	16.0%	31.3%	14.7%	26.9%	15.4%	29.7%
Masters Road	All vehs	17,224	17,784	18,568	17,732	18,308	17,758	18,466
	CT	-	560	1,344	508	1,084	534	1,242
	%HV	8.0%	10.9%	14.7%	10.6%	13.5%	10.8%	14.2%
	%CT	0.0%	3.1%	7.2%	2.9%	5.9%	3.0%	6.7%
	%CT of HV	0.0%	28.9%	49.3%	26.9%	44.0%	27.9%	47.4%
Springhill Road	All vehs	13,377	13,876	14,558	13,885	14,461	13,911	14,619
	CT	-	499	1,181	508	1,084	534	1,242
	%HV	2.5%	6.0%	10.4%	6.1%	9.8%	6.3%	10.8%
	%CT	0.0%	3.6%	8.1%	3.7%	7.5%	3.8%	8.5%
	%CT of HV	0.0%	59.7%	77.8%	60.2%	76.3%	61.4%	78.7%
Bellambi Lane	All vehs	4,518	4,652	5,222	4,606	4,964	4,632	5,122
	CT	-	134	704	88	446	114	604
	%HV	3.5%	6.3%	16.5%	5.4%	12.2%	5.9%	14.9%
	%CT	0.0%	2.9%	13.5%	1.9%	9.0%	2.5%	11.8%
	%CT of HV	0.0%	45.7%	81.6%	35.6%	73.7%	41.8%	79.2%
Northern Distributor	All vehs	22,981	23,115	23,685	23,069	23,427	23,095	23,585
	CT	-	134	704	88	446	114	604
	%HV	4.9%	5.4%	7.7%	5.2%	6.7%	5.3%	7.3%
	%CT	0.0%	0.6%	3.0%	0.4%	1.9%	0.5%	2.6%
	%CT of HV	0.0%	10.7%	38.6%	7.3%	28.5%	9.2%	35.1%

Table 7.12 Scenario Average Weekend Night Time Traffic Volumes - 2013

Road Name		0mtpa @ No CT	4mtpa @ 11/6	10mtpa @ 11/6	4mtpa @ 24/7 &15/5-10/2	10mtpa @ 24/7 &15/5-10/2	4mtpa @ 24/7	10mtpa @ 24/7
		A	B	D	E	G	H	J
Appin Road	All vehs	1,736	1,774	1,792	1,821	1,866	1,821	1,866
	CT	-	38	56	85	130	85	130
	%HV	11.9%	13.8%	14.6%	16.0%	18.0%	16.0%	18.0%
	%CT	0.0%	2.1%	3.1%	4.7%	7.0%	4.7%	7.0%
	%CT of HV	0.0%	15.6%	21.4%	29.2%	38.7%	29.2%	38.7%
Mount Ousley Road	All vehs	5,278	5,312	5,327	5,361	5,404	5,361	5,404
	CT	-	34	49	83	126	83	126
	%HV	13.7%	14.3%	14.5%	15.1%	15.8%	15.1%	15.8%
	%CT	0.0%	0.6%	0.9%	1.5%	2.3%	1.5%	2.3%
	%CT of HV	0.0%	4.5%	6.3%	10.3%	14.8%	10.3%	14.8%
Southern Freeway (nth)	All vehs	7,076	7,127	7,219	7,159	7,202	7,193	7,358
	CT	-	51	143	83	126	117	282
	%HV	9.7%	10.4%	11.5%	10.8%	11.3%	11.2%	13.2%
	%CT	0.0%	0.7%	2.0%	1.2%	1.7%	1.6%	3.8%
	%CT of HV	0.0%	6.9%	17.2%	10.7%	15.5%	14.5%	29.0%
Southern Freeway (sth)	All vehs	7,027	7,078	7,170	7,110	7,153	7,144	7,309
	CT	-	51	143	83	126	117	282
	%HV	9.9%	10.5%	11.7%	10.9%	11.5%	11.3%	13.3%
	%CT	0.0%	0.7%	2.0%	1.2%	1.8%	1.6%	3.9%
	%CT of HV	0.0%	6.9%	17.1%	10.7%	15.4%	14.4%	28.9%
Masters Road	All vehs	2,618	2,672	2,773	2,701	2,744	2,736	2,906
	CT	-	54	155	83	126	118	288
	%HV	14.4%	16.1%	19.1%	17.0%	18.3%	18.0%	22.8%
	%CT	0.0%	2.0%	5.6%	3.1%	4.6%	4.3%	9.9%
	%CT of HV	0.0%	12.6%	29.2%	18.1%	25.1%	23.9%	43.4%
Springhill Road	All vehs	1,981	1,981	1,981	2,064	2,107	2,099	2,269
	CT	-	-	-	83	126	118	288
	%HV	3.1%	3.1%	3.1%	7.0%	8.9%	8.6%	15.4%
	%CT	0.0%	0.0%	0.0%	4.0%	6.0%	5.6%	12.7%
	%CT of HV	0.0%	0.0%	0.0%	57.2%	67.0%	65.5%	82.3%
Bellambi Lane	All vehs	411	428	505	411	411	445	567
	CT	-	17	94	-	-	34	156
	%HV	5.4%	9.1%	23.0%	5.4%	5.4%	12.6%	31.4%
	%CT	0.0%	4.0%	18.6%	0.0%	0.0%	7.6%	27.5%
	%CT of HV	0.0%	43.6%	81.0%	0.0%	0.0%	60.7%	87.6%
Northern Distributor	All vehs	2,093	2,110	2,187	2,093	2,093	2,127	2,249
	CT	-	17	94	-	-	34	156
	%HV	5.7%	6.4%	9.7%	5.7%	5.7%	7.2%	12.2%
	%CT	0.0%	0.8%	4.3%	0.0%	0.0%	1.6%	6.9%
	%CT of HV	0.0%	12.5%	44.1%	0.0%	0.0%	22.2%	56.7%

2013 Weekend Existing Operations

In 2013 under Option B the PKCT coal trucks represent the greatest proportion of total weekend heavy vehicles along Appin Road (48.6%), Masters Road (28.9%), Springhill Road (59.7%) and Bellambi Lane (45.7%). Along most other routes the coal trucks represent less than 16% of heavy vehicle volumes.

2013 Weekend 24/7 Operations with Increased Output

The changes to 2013 weekend traffic are similar to that of 2013 weekday traffic. When comparing Scenario J with Scenario B, changes in daily traffic along most routes do not exceed 8.0%.

Day-time traffic volumes were generally noted to increase by between 0.3% and 7.8% along the routes. Night-time traffic volumes were generally noted to increase by between 1.7% and 32.5% along the routes. The following notable changes during weekend night time when comparing Option J to Option B were observed:

- Appin Road:
  - 5.2% increase in total night volumes;
  - with a 4.3% increase in HV; and
  - 23.1% increase in the proportion of HV that are coal trucks.
- Masters Road:
  - 8.8% increase in total night volumes;
  - with a 6.8% increase in HV; and
  - 30.8% increase in the proportion of HV that are coal trucks.
- Springhill Road:
  - 14.5% increase in total night volumes;
  - with a 12.3% increase in HV; and
  - 82.3% increase in the proportion of HV that are coal trucks;
- Bellambi Lane
  - 32.5% increase in total night volumes;
  - with a 22.3% increase in HV; and
  - 44.1% increase in the proportion of HV that are coal trucks;
- Northern Distributor
  - 6.6% increase in total night volumes;
  - with a 5.8% increase in HV; and
  - 44.2% increase in the proportion of HV that are coal trucks.

7.1.8 2018 Future Traffic Scenarios

The average traffic volumes, as well as the percentage of heavy vehicles and coal trucks, for each location/scenario in 2018 are summarised in Table 7.13 to Table 7.16 for the weekday and weekend daily and night time traffic volumes.

Table 7.13 Scenario Average Weekday Daily Traffic Volumes - 2018

Road Name		0mtpa @ No CT	4mtpa @ 11/6	10mtpa @ 11/6	4mtpa @ 24/7 &15/5-10/2	10mtpa @ 24/7 &15/5-10/2	4mtpa @ 24/7	10mtpa @ 24/7
		A	B	D	E	G	H	J
Appin Road	All vehs	11,515	11,939	12,155	11,937	12,153	11,937	12,153
	CT	-	424	640	422	638	422	638
	%HV	13.4%	16.5%	18.0%	16.5%	18.0%	16.5%	18.0%
	%CT	0.0%	3.6%	5.3%	3.5%	5.2%	3.5%	5.2%
	%CT of HV	0.0%	21.5%	29.3%	21.5%	29.2%	21.5%	29.2%
Mount Ousley Road	All vehs	52,857	53,281	53,497	53,279	53,495	53,279	53,495
	CT	-	424	640	422	638	422	638
	%HV	14.0%	14.7%	15.0%	14.7%	15.0%	14.7%	15.0%
	%CT	0.0%	0.8%	1.2%	0.8%	1.2%	0.8%	1.2%
	%CT of HV	0.0%	5.4%	8.0%	5.4%	7.9%	5.4%	7.9%
Southern Freeway (nth)	All vehs	93,191	93,751	94,535	93,735	94,491	93,729	94,429
	CT	-	560	1,344	544	1,300	538	1,238
	%HV	10.9%	11.4%	12.1%	11.4%	12.1%	11.4%	12.0%
	%CT	0.0%	0.6%	1.4%	0.6%	1.4%	0.6%	1.3%
	%CT of HV	0.0%	5.2%	11.7%	5.1%	11.4%	5.0%	10.9%
Southern Freeway (sth)	All vehs	97,849	98,409	99,193	98,393	99,149	98,387	99,087
	CT	-	560	1,344	544	1,300	538	1,238
	%HV	10.6%	11.1%	11.8%	11.1%	11.7%	11.0%	11.7%
	%CT	0.0%	0.6%	1.4%	0.6%	1.3%	0.5%	1.2%
	%CT of HV	0.0%	5.1%	11.5%	5.0%	11.2%	5.0%	10.7%
Masters Road	All vehs	26,653	27,213	27,997	27,197	27,953	27,191	27,891
	CT	-	560	1,344	544	1,300	538	1,238
	%HV	13.1%	14.9%	17.2%	14.8%	17.1%	14.8%	16.9%
	%CT	0.0%	2.1%	4.8%	2.0%	4.7%	2.0%	4.4%
	%CT of HV	0.0%	13.8%	27.8%	13.5%	27.2%	13.4%	26.2%
Springhill Road	All vehs	15,731	16,226	16,932	16,275	17,031	16,269	16,969
	CT	-	495	1,201	544	1,300	538	1,238
	%HV	4.9%	7.8%	11.7%	8.1%	12.2%	8.1%	11.9%
	%CT	0.0%	3.1%	7.1%	3.3%	7.6%	3.3%	7.3%
	%CT of HV	0.0%	38.9%	60.7%	41.1%	62.6%	40.9%	61.4%
Bellambi Lane	All vehs	5,933	6,069	6,637	6,055	6,595	6,049	6,533
	CT	-	136	704	122	662	116	600
	%HV	7.6%	9.7%	17.4%	9.5%	16.9%	9.4%	16.1%
	%CT	0.0%	2.2%	10.6%	2.0%	10.0%	1.9%	9.2%
	%CT of HV	0.0%	23.1%	60.8%	21.2%	59.4%	20.4%	57.0%
Northern Distributor	All vehs	34,081	34,217	34,785	34,203	34,743	34,197	34,681
	CT	-	136	704	122	662	116	600
	%HV	7.4%	7.8%	9.3%	7.7%	9.2%	7.7%	9.0%
	%CT	0.0%	0.4%	2.0%	0.4%	1.9%	0.3%	1.7%
	%CT of HV	0.0%	5.1%	21.8%	4.6%	20.8%	4.4%	19.2%

Table 7.14 Scenario Average Weekday Night Time Traffic Volumes - 2018

Road Name		0mtpa @ No CT	4mtpa @ 11/6	10mtpa @ 11/6	4mtpa @ 24/7 &15/5-10/2	10mtpa @ 24/7 &15/5-10/2	4mtpa @ 24/7	10mtpa @ 24/7
		A	B	D	E	G	H	J
Appin Road	All vehs	2,005	2,055	2,079	2,108	2,157	2,108	2,157
	CT	-	50	74	103	152	103	152
	%HV	24.3%	26.1%	27.0%	28.0%	29.6%	28.0%	29.6%
	%CT	0.0%	2.4%	3.6%	4.9%	7.0%	4.9%	7.0%
	%CT of HV	0.0%	9.3%	13.2%	17.5%	23.8%	17.5%	23.8%
Mount Ousley Road	All vehs	7,958	8,002	8,022	8,059	8,107	8,059	8,107
	CT	-	44	64	101	149	101	149
	%HV	21.3%	21.7%	21.9%	22.3%	22.8%	22.3%	22.8%
	%CT	0.0%	0.5%	0.8%	1.3%	1.8%	1.3%	1.8%
	%CT of HV	0.0%	2.5%	3.6%	5.6%	8.1%	5.6%	8.1%
Southern Freeway (nth)	All vehs	11,242	11,298	11,366	11,343	11,391	11,374	11,556
	CT	-	56	124	101	149	132	314
	%HV	16.6%	17.0%	17.5%	17.4%	17.7%	17.6%	18.9%
	%CT	0.0%	0.5%	1.1%	0.9%	1.3%	1.2%	2.7%
	%CT of HV	0.0%	2.9%	6.2%	5.1%	7.4%	6.6%	14.4%
Southern Freeway (sth)	All vehs	11,380	11,436	11,504	11,481	11,529	11,512	11,694
	CT	-	56	124	101	149	132	314
	%HV	17.2%	17.7%	18.1%	18.0%	18.3%	18.2%	19.5%
	%CT	0.0%	0.5%	1.1%	0.9%	1.3%	1.1%	2.7%
	%CT of HV	0.0%	2.8%	5.9%	4.9%	7.1%	6.3%	13.8%
Masters Road	All vehs	3,197	3,255	3,331	3,298	3,346	3,329	3,515
	CT	-	58	134	101	149	132	318
	%HV	22.6%	23.9%	25.7%	24.9%	26.0%	25.6%	29.6%
	%CT	0.0%	1.8%	4.0%	3.1%	4.5%	4.0%	9.0%
	%CT of HV	0.0%	7.4%	15.7%	12.3%	17.1%	15.5%	30.6%
Springhill Road	All vehs	1,421	1,421	1,421	1,522	1,570	1,553	1,739
	CT	-	-	-	101	149	132	318
	%HV	4.7%	4.7%	4.7%	11.0%	13.8%	12.8%	22.1%
	%CT	0.0%	0.0%	0.0%	6.6%	9.5%	8.5%	18.3%
	%CT of HV	0.0%	0.0%	0.0%	60.1%	69.0%	66.3%	82.6%
Bellambi Lane	All vehs	595	607	655	595	595	626	760
	CT	-	12	60	-	-	31	165
	%HV	7.7%	9.6%	16.2%	7.7%	7.7%	12.3%	27.8%
	%CT	0.0%	2.0%	9.2%	0.0%	0.0%	5.0%	21.7%
	%CT of HV	0.0%	20.7%	56.6%	0.0%	0.0%	40.3%	78.2%
Northern Distributor	All vehs	3,342	3,354	3,402	3,342	3,342	3,373	3,507
	CT	-	12	60	-	-	31	165
	%HV	8.1%	8.4%	9.7%	8.1%	8.1%	8.9%	12.4%
	%CT	0.0%	0.4%	1.8%	0.0%	0.0%	0.9%	4.7%
	%CT of HV	0.0%	4.3%	18.2%	0.0%	0.0%	10.3%	37.9%

2018 Weekday Existing Operations

Option A represents the 2018 background traffic volumes with no coal truck movements between WCCPP/GNRE and PKCT. Option B represents the current permissible delivery patterns with 2018 background traffic volumes.

The scenarios in 2018 are primarily the same as in 2013, only the background traffic changes. In 2018 under Option B the PKCT coal trucks represent the greatest proportion of total heavy vehicles along Appin Road (21.5%), Springhill Road (38.9%) and Bellambi Lane (23.1%). Along most other routes the coal trucks represent less than 14% of heavy vehicle volumes.

2018 Weekday Increased Output

Option D represents an increased output in 2018 under existing operating conditions. Comparing Option D with Option B in 2018 shows the changes that will result from the proposal to change the total output with no change in the operating hours.

In this comparison changes to daily traffic volumes along the routes does not exceed 9.4%. The change in percentage of heavy vehicles ranges from 0.3% along Mount Ousley Road to 7.7% along Bellambi Lane, where the corresponding coal trucks as a proportion of total heavy vehicles are 2.5% and 37.8% respectively.

The following notable changes during weekday night time when comparing Option D to Option B were observed:

- Masters Road:
  - 2.3% increase in total night volumes;
  - with a 1.7% increase in HV; and
  - 8.2% increase in the proportion of HV that are coal trucks;
- Bellambi Lane:
  - 7.9% increase in total night volumes;
  - with a 6.6% increase in HV; and
  - 35.9% increase in the proportion of HV that are coal trucks;
- Northern Distributor:
  - 1.4% increase in total night volumes;
  - with a 1.3% increase in HV; and
  - 13.9% increase in the proportion of HV that are coal trucks.

2018 Weekday 24/7 Operations

Option H represents maintaining current output in 2018 under 24/7 operations. Comparing Option H with Option B in 2018 shows that the differences that will result from the change in operating hours.

In this case daily traffic along most routes stays the same or decreases, with the exception of Springhill Road which increases total daily volumes by 0.3%, which represents an increase in heavy vehicles of 0.3%.

Day-time traffic volumes were generally noted to decrease by between 0.1% and 0.7% along the routes.

Night-time traffic volumes were generally noted to increase by between 0.6 and 9.3% along the routes. The following notable changes during weekday night time when comparing Option H to Option B were observed:

- Masters Road:
  - 2.3% increase in total night volumes;
  - with a 1.7% increase in HV; and
  - 8.0% increase in the proportion of HV that are coal trucks.
- Springhill Road:
  - 9.3% increase in total night volumes;
  - with an 8.1% increase in HV; and
  - 66.3% increase in the proportion of HV that are coal trucks;
- Bellambi Lane;
  - 3.1% increase in total night volumes;
  - with a 2.7% increase in HV; and
  - 19.6% increase in the proportion of HV that are coal trucks.

2018 Weekday 24/7 Operations with Increased Output

Option J represents both an increase in output in 2018 and a change to 24/7 operations. Comparison of Option J with Option B in 2018 shows the changes that will result from the increase in output and a change to 24/7 operations.

In this comparison changes to daily traffic volumes along the routes does not exceed 7.6%. The change in percentage of heavy vehicles ranges from 0.3% along Mount Ousley Road to 6.4% along Bellambi Lane, where the corresponding coal trucks as a proportion of total heavy vehicles are 2.5% and 33.9% respectively.

Day-time traffic volumes were generally noted to increase by between 0.2% and 5.7% along the routes.

Night-time traffic volumes were generally noted to increase by between 1.3% and 25.2% along the routes. The following notable changes during weekday night time when comparing Option J to Option B were observed:

- Appin Road:
  - 5.0% increase in total night volumes;
  - with a 3.5% increase in HV; and
  - 14.5% increase in the proportion of HV that are coal trucks.
- Masters Road:
  - 8.0% increase in total night volumes;
  - with a 5.6% increase in HV; and
  - 23.2% increase in the proportion of HV that are coal trucks.
- Springhill Road;
  - 22.4% increase in total night volumes;
  - with a 17.4% increase in HV; and
  - 82.6% increase in the proportion of HV that are coal trucks;
- Bellambi Lane:
  - 25.2% increase in total night volumes;
  - with a 18.2% increase in HV; and
  - 57.5% increase in the proportion of HV that are coal trucks;
- Northern Distributor:
  - 4.6% increase in total night volumes;
  - with a 4.0% increase in HV; and
  - 33.7% increase in the proportion of HV that are coal trucks.

Table 7.15 Scenario Average Weekend Daily Traffic Volumes - 2018

Road Name		0mtpa @ No CT	4mtpa @ 11/6	10mtpa @ 11/6	4mtpa @ 24/7 &15/5-10/2	10mtpa @ 24/7 &15/5-10/2	4mtpa @ 24/7	10mtpa @ 24/7
		A	B	D	E	G	H	J
Appin Road	All vehs	10,780	11,206	11,420	11,200	11,418	11,200	11,418
	CT	-	426	640	420	638	420	638
	%HV	4.7%	8.4%	10.1%	8.3%	10.1%	8.3%	10.1%
	%CT	0.0%	3.8%	5.6%	3.8%	5.6%	3.8%	5.6%
	%CT of HV	0.0%	45.5%	55.7%	45.2%	55.6%	45.2%	55.6%
Mount Ousley Road	All vehs	50,425	50,851	51,065	50,845	51,063	50,845	51,063
	CT	-	426	640	420	638	420	638
	%HV	5.8%	6.6%	7.0%	6.6%	7.0%	6.6%	7.0%
	%CT	0.0%	0.8%	1.3%	0.8%	1.2%	0.8%	1.2%
	%CT of HV	0.0%	12.7%	17.9%	12.5%	17.9%	12.5%	17.9%
Southern Freeway (nth)	All vehs	76,857	77,417	78,201	77,365	77,941	77,391	78,099
	CT	-	560	1,344	508	1,084	534	1,242
	%HV	4.7%	5.4%	6.3%	5.3%	6.0%	5.3%	6.2%
	%CT	0.0%	0.7%	1.7%	0.7%	1.4%	0.7%	1.6%
	%CT of HV	0.0%	13.5%	27.2%	12.4%	23.1%	12.9%	25.6%
Southern Freeway (sth)	All vehs	77,407	77,967	78,751	77,915	78,491	77,941	78,649
	CT	-	560	1,344	508	1,084	534	1,242
	%HV	4.4%	5.1%	6.0%	5.0%	5.7%	5.0%	5.9%
	%CT	0.0%	0.7%	1.7%	0.7%	1.4%	0.7%	1.6%
	%CT of HV	0.0%	14.2%	28.4%	13.0%	24.2%	13.6%	26.8%
Masters Road	All vehs	17,289	17,849	18,633	17,797	18,373	17,823	18,531
	CT	-	560	1,344	508	1,084	534	1,242
	%HV	8.3%	11.2%	14.9%	10.9%	13.7%	11.1%	14.5%
	%CT	0.0%	3.1%	7.2%	2.9%	5.9%	3.0%	6.7%
	%CT of HV	0.0%	28.1%	48.3%	26.1%	43.0%	27.1%	46.4%
Springhill Road	All vehs	13,377	13,876	14,558	13,885	14,461	13,911	14,619
	CT	-	499	1,181	508	1,084	534	1,242
	%HV	2.5%	6.0%	10.4%	6.1%	9.8%	6.3%	10.8%
	%CT	0.0%	3.6%	8.1%	3.7%	7.5%	3.8%	8.5%
	%CT of HV	0.0%	59.7%	77.8%	60.2%	76.3%	61.4%	78.7%
Bellambi Lane	All vehs	4,740	4,874	5,444	4,828	5,186	4,854	5,344
	CT	-	134	704	88	446	114	604
	%HV	3.6%	6.2%	16.1%	5.3%	11.9%	5.9%	14.5%
	%CT	0.0%	2.7%	12.9%	1.8%	8.6%	2.3%	11.3%
	%CT of HV	0.0%	44.1%	80.5%	34.1%	72.4%	40.1%	78.0%
Northern Distributor	All vehs	27,549	27,683	28,253	27,637	27,995	27,663	28,153
	CT	-	134	704	88	446	114	604
	%HV	4.8%	5.3%	7.2%	5.1%	6.4%	5.2%	6.9%
	%CT	0.0%	0.5%	2.5%	0.3%	1.6%	0.4%	2.1%
	%CT of HV	0.0%	9.1%	34.6%	6.2%	25.1%	7.9%	31.2%

Table 7.16 Scenario Average Weekend Night Time Traffic Volumes - 2018

Road Name		0mtpa @ No CT	4mtpa @ 11/6	10mtpa @ 11/6	4mtpa @ 24/7 &15/5-10/2	10mtpa @ 24/7 &15/5-10/2	4mtpa @ 24/7	10mtpa @ 24/7
		A	B	D	E	G	H	J
Appin Road	All vehs	1,910	1,948	1,966	1,995	2,040	1,995	2,040
	CT	-	38	56	85	130	85	130
	%HV	12.3%	14.0%	14.8%	16.0%	17.9%	16.0%	17.9%
	%CT	0.0%	2.0%	2.8%	4.3%	6.4%	4.3%	6.4%
	%CT of HV	0.0%	13.9%	19.2%	26.6%	35.6%	26.6%	35.6%
Mount Ousley Road	All vehs	5,772	5,806	5,821	5,855	5,898	5,855	5,898
	CT	-	34	49	83	126	83	126
	%HV	14.1%	14.6%	14.8%	15.3%	15.9%	15.3%	15.9%
	%CT	0.0%	0.6%	0.8%	1.4%	2.1%	1.4%	2.1%
	%CT of HV	0.0%	4.0%	5.7%	9.3%	13.4%	9.3%	13.4%
Southern Freeway (nth)	All vehs	7,732	7,783	7,875	7,815	7,858	7,849	8,014
	CT	-	51	143	83	126	117	282
	%HV	10.0%	10.5%	11.6%	10.9%	11.4%	11.3%	13.1%
	%CT	0.0%	0.7%	1.8%	1.1%	1.6%	1.5%	3.5%
	%CT of HV	0.0%	6.2%	15.7%	9.7%	14.1%	13.2%	26.8%
Southern Freeway (sth)	All vehs	7,928	7,979	8,071	8,011	8,054	8,045	8,210
	CT	-	51	143	83	126	117	282
	%HV	10.1%	10.7%	11.7%	11.0%	11.5%	11.4%	13.2%
	%CT	0.0%	0.6%	1.8%	1.0%	1.6%	1.5%	3.4%
	%CT of HV	0.0%	6.0%	15.1%	9.4%	13.6%	12.7%	26.0%
Masters Road	All vehs	2,639	2,693	2,794	2,722	2,765	2,757	2,927
	CT	-	54	155	83	126	118	288
	%HV	14.9%	16.6%	19.6%	17.5%	18.7%	18.5%	23.2%
	%CT	0.0%	2.0%	5.5%	3.0%	4.6%	4.3%	9.8%
	%CT of HV	0.0%	12.1%	28.3%	17.5%	24.3%	23.1%	42.3%
Springhill Road	All vehs	1,981	1,981	1,981	2,064	2,107	2,099	2,269
	CT	-	-	-	83	126	118	288
	%HV	3.1%	3.1%	3.1%	7.0%	8.9%	8.6%	15.4%
	%CT	0.0%	0.0%	0.0%	4.0%	6.0%	5.6%	12.7%
	%CT of HV	0.0%	0.0%	0.0%	57.2%	67.0%	65.5%	82.3%
Bellambi Lane	All vehs	433	450	527	433	433	467	589
	CT	-	17	94	-	-	34	156
	%HV	5.1%	8.7%	22.0%	5.1%	5.1%	12.0%	30.2%
	%CT	0.0%	3.8%	17.8%	0.0%	0.0%	7.3%	26.5%
	%CT of HV	0.0%	43.6%	81.0%	0.0%	0.0%	60.7%	87.6%
Northern Distributor	All vehs	2,507	2,524	2,601	2,507	2,507	2,541	2,663
	CT	-	17	94	-	-	34	156
	%HV	5.6%	6.3%	9.0%	5.6%	5.6%	6.9%	11.2%
	%CT	0.0%	0.7%	3.6%	0.0%	0.0%	1.3%	5.9%
	%CT of HV	0.0%	10.8%	40.0%	0.0%	0.0%	19.4%	52.5%

2018 Weekend Existing Operations

In 2018 under Option B the PKCT coal trucks represent the greatest proportion of total weekend heavy vehicles along Appin Road (45.5%), Masters Road (28.1%), Springhill Road (59.7%) and Bellambi Lane (44.1%). Along most other routes the coal trucks represent less than 15% of heavy vehicle volumes.

2018 Weekend 24/7 Operations with Increased Output

The changes to 2018 weekend traffic are similar to that of 2018 weekday traffic. Comparing Scenario J with Scenario B, changes in daily traffic along most routes does not exceed 9.6%.

Day-time traffic volumes were generally noted to increase by between 0.3% and 7.5% along the routes.

The following notable changes during weekend night time when comparing Option J to Option B were observed:

- Appin Road:
  - 4.7% increase in total night volumes;
  - with a 3.9% increase in HV; and
  - 21.7% increase in the proportion of HV that are coal trucks.
- Masters Road:
  - 8.7% increase in total night volumes;
  - with a 6.7% increase in HV; and
  - 30.2% increase in the proportion of HV that are coal trucks.
- Springhill Road:
  - 14.5% increase in total night volumes;
  - with a 12.3% increase in HV; and
  - 82.3% increase in the proportion of HV that are coal trucks; and
- Bellambi Lane:
  - 30.9% increase in total night volumes;
  - with a 21.6% increase in HV; and
  - 44.1% increase in the proportion of HV that are coal trucks.
- Northern Distributor
  - 5.5% increase in total night volumes;
  - with a 4.9% increase in HV; and
  - 41.8% increase in the proportion of HV that are coal trucks.

7.1.9 Dendrobium CPP 2013 Future Traffic Scenarios

The average traffic volumes along Springhill Road with the Dendrobium Coal Truck Traffic travelling on public roads has been estimated for scenario 16 in 2013. The resulting volumes as well as the percentage of heavy vehicles and coal truck numbers, are summarised in Table 7.17 for the weekday and weekend daily and night time traffic volumes.

Table 7.17 Scenario Traffic Volumes – 2013 Springhill Road

Road Name		4mtpa @ 11/6	10mtpa @ 24/7 &15/5-10/2	10mtpa @ 24/7 &15/5-10/2
		B	G	G (Dendrobium)
Average Weekday Daily Traffic Volumes	All vehs	16,226	17,031	17,367
	CT	495	1,300	1,636
	%HV	7.8%	12.2%	13.9%
	%CT	3.1%	7.6%	9.4%
	%CT of HV	38.9%	62.6%	67.8%
Average Weekday Night Traffic Volumes	All vehs	1,421	1,570	1,659
	CT	-	149	238
	%HV	4.7%	13.8%	18.4%
	%CT	0.0%	9.5%	14.3%
	%CT of HV	0.0%	69.0%	78.0%
Average Weekend Daily Traffic Volumes	All vehs	13,876	14,461	14,795
	CT	499	1,084	1,418
	%HV	6.0%	9.8%	11.9%
	%CT	3.6%	7.5%	9.6%
	%CT of HV	59.7%	76.3%	80.8%
Average Weekend Night Time Traffic Volumes	All vehs	1,981	2,107	2,183
	CT	-	126	202
	%HV	3.1%	8.9%	12.1%
	%CT	0.0%	6.0%	9.3%
	%CT of HV	0.0%	67.0%	76.5%

Option B represents the current permissible delivery patterns with 2013 background traffic volumes along Springhill Road with coal truck movements between WCCPP/GNRE and PKCT.

Option G represents both an increase in output in 2013 and a change to 24/7 operations. Option G Dendrobium represents the increase in output in 2013 with the addition of Dendrobium CPP coal truck movements on public roads with 24/7 operations.

The additional coal truck traffic from Dendrobium CPP will only affect Springhill Road within the study area. Comparing Option G with Option G Dendrobium in 2013 shows the changes that will result from the addition of Dendrobium CPP coal truck traffic.

2013 Weekday Operations

When comparing Option G and Option G Dendrobium, the following changes were noted in daily weekday traffic volumes on Springhill Road:

- 2.0% increase in total daily traffic volumes;
- 1.7% increase in percentage of heavy vehicles;
- 5.2% increase in percentage of coal trucks as a proportion of total heavy vehicles.

The following notable changes during weekday night time when comparing Option G to Option G Dendrobium were observed on Springhill Road:

- 5.7% increase in total night time traffic volumes;
- 4.6% increase in percentage of heavy vehicles; and
- 9.0% increase in percentage of coal trucks as a proportion of total heavy vehicles.

2013 Weekend Operations

When comparing Option G and Option G Dendrobium, the following changes were noted in daily weekend traffic volumes on Springhill Road:

- 2.3% increase in total daily traffic volumes;
- 2.1% increase in percentage of heavy vehicles;
- 4.5% increase in percentage of coal trucks as a proportion of total heavy vehicles.

The following notable changes during weekend night time when comparing Option G to Option G Dendrobium were observed on Springhill Road:

- 3.6% increase in total night time traffic volumes;
- 3.3% increase in percentage of heavy vehicles; and
- 9.5% increase in percentage of coal trucks as a proportion of total heavy vehicles.

7.1.10 Future Traffic Scenario Overview

Graphical representations of the changes in traffic volumes under each scenario make the picture clearer as to the impact of changing coal truck volumes. However, there are too many options to consider. These graphs are presented in Appendix W, Appendix X, Appendix Y and Appendix Z. Samples of the graphs are presented in Figure 7.3 and Figure 7.4.

Figure 7.3 2018 Average Weekday Traffic Volumes - Mount Ousley Road

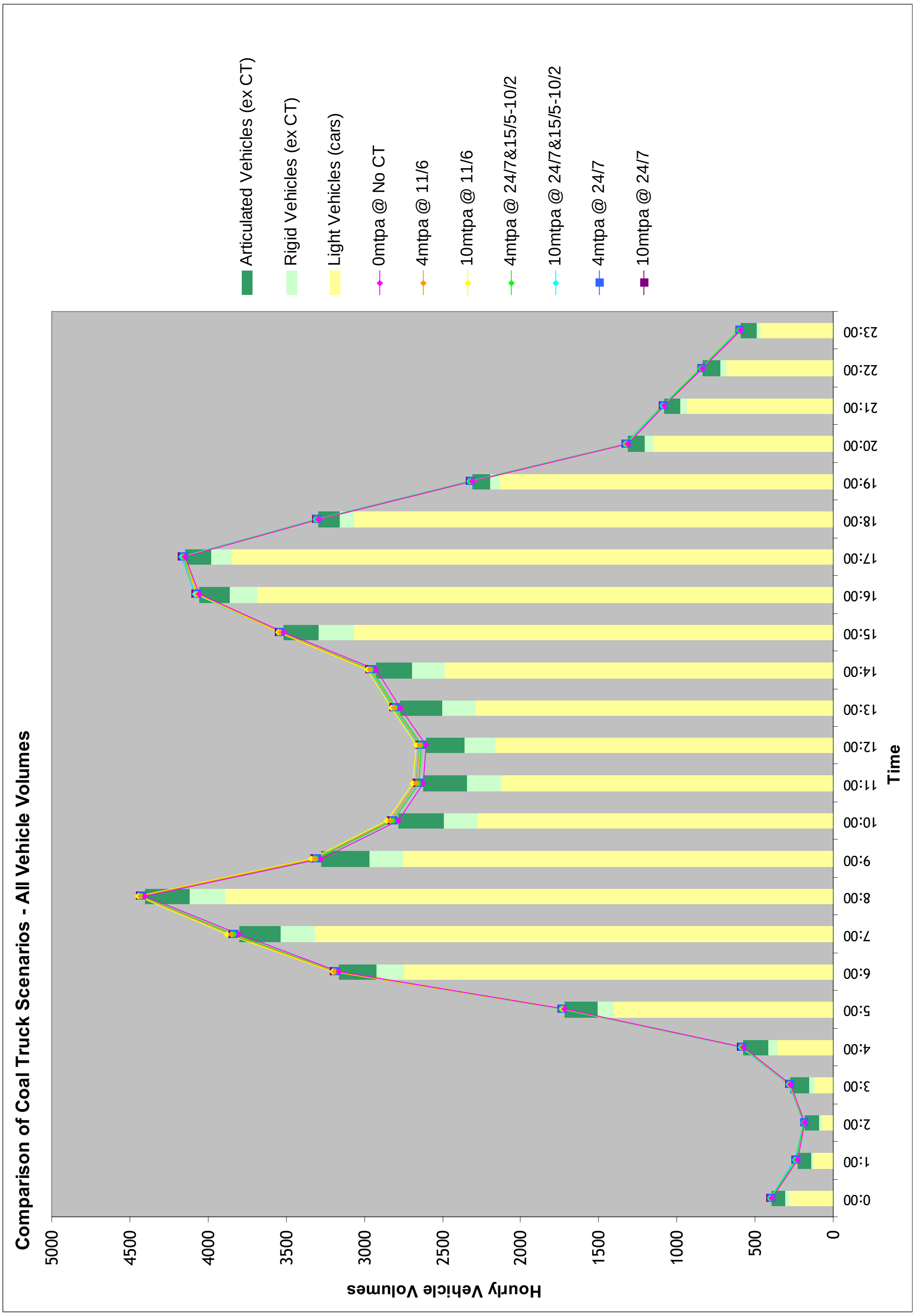
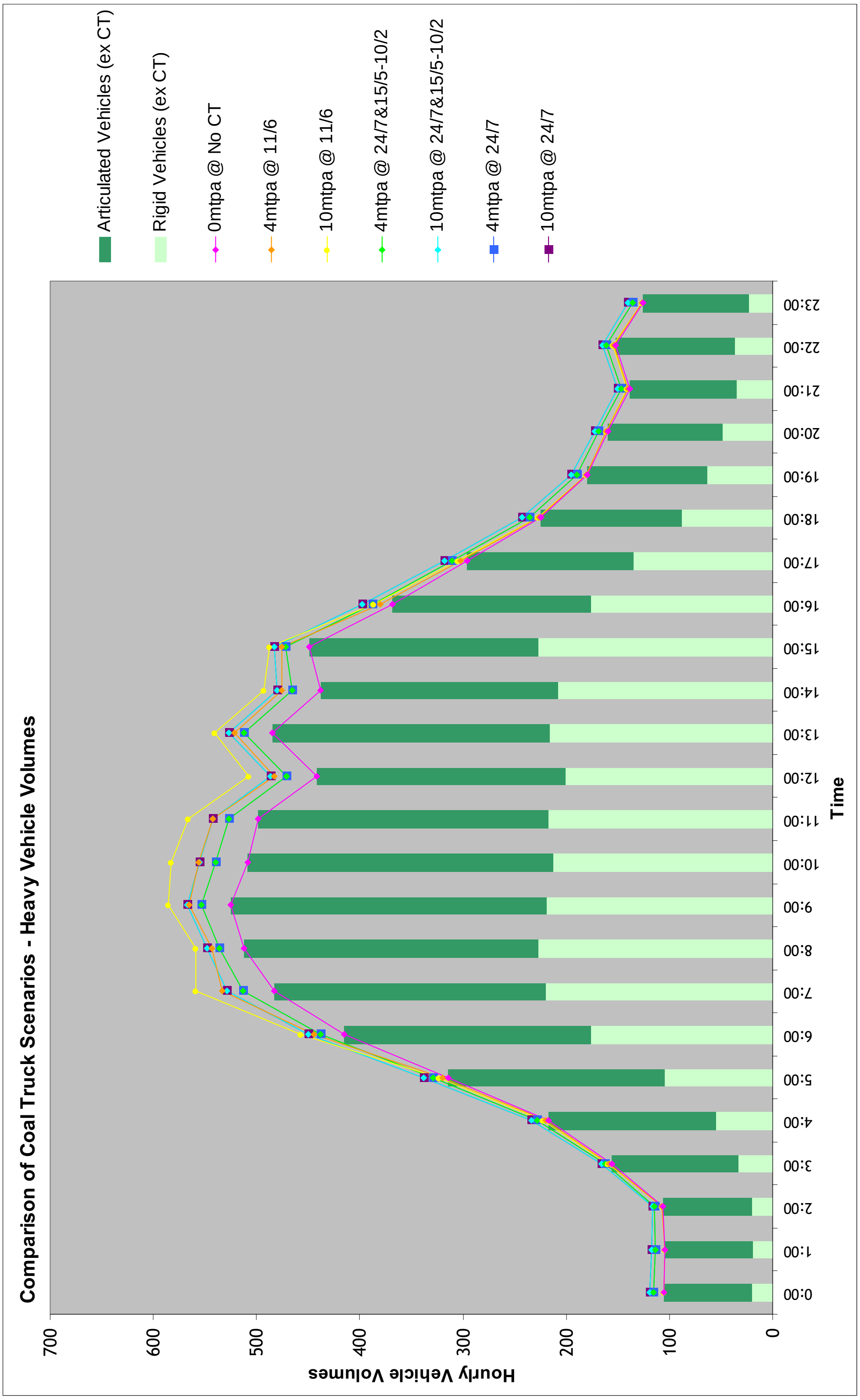


Figure 7.4 2018 Average Weekday Heavy Vehicle Volumes - Mount Ousley Road



7.2 2018 MID-BLOCK CARRIAGEWAY LEVEL OF SERVICE

The peak hour projected carriageway traffic volumes and the corresponding carriageway performance along the road haulage routes is provided in Appendix AA and Appendix BB. A summary of the average weekday mid-block carriageway Level of Service (LoS) in 2018 is presented in Table 7.18 and Table 7.19 for the average weekday AM and PM peak periods. The 2008 peak hour mid-block Level of Service is presented for comparison.

From these tables it is noted that there is very little change in the mid-block level of service along the haulage routes during the weekday AM peak hour and PM peak hour under the various scenarios when compared with the 2018 traffic volumes with no change in PKCT output or operating hours. There are more notable changes as a result of background growth,

2018 Background Traffic Growth

If coal truck movements remain as they are today, the peak hour mid-block level of services along some road sections will change as a result of background traffic growth. This was noted along the following road sections:

- AM Peak Hour – southbound:
  - Mount Ousley Road between Appin Road and the Southern Freeway - LoS ‘D’ to ‘E’;
  - Southern Freeway, South of Princes Hwy - LoS ‘D’ to ‘F’;
  - Northern Distributor between Bellambi Lane and Southern Freeway - LoS ‘B’ to ‘C’.
- AM Peak Hour – northbound:
  - Appin Road between Appin Mine and Dharawal Conservation Area Entrance - LoS ‘C’ to ‘D’
  - Mount Ousley Road between Appin Road and the Southern Freeway - LoS ‘C’ to ‘D’;
  - Southern Freeway between Northern Distributor and Princes Hwy - LoS ‘D’ to ‘E’
- PM Peak Hour – southbound:
  - Appin Road between Appin Mine and Dharawal Conservation Area Entrance - LoS ‘C’ to ‘D’
  - Appin Road between No.10A Fire Road and Appin Road - LoS ‘D’ to ‘E’
  - Mount Ousley Road between Appin Road and the Southern Freeway - LoS ‘C’ to ‘D’;
  - Southern Freeway between Northern Distributor and Princes Hwy - LoS ‘C’ to ‘D’
  - Southern Freeway, South of Princes Hwy will deteriorate from LoS ‘E’ to ‘F’;
  - Northern Distributor between Bellambi Lane and Southern Freeway - LoS ‘A’ to ‘B’.
- PM Peak Hour – northbound:
  - Mount Ousley Road between Picton Road and the Southern Freeway - LoS ‘B’ to ‘C’;
  - Southern Freeway between Mount Ousley Road and Northern Distributor - LoS ‘E’ to ‘F’
  - Southern Freeway, South of Princes Hwy - LoS ‘D’ to ‘F’;
  - Northern Distributor between Bellambi Lane and Southern Freeway - LoS ‘B’ to ‘C’.

Further changes to the future (2018) peak-hour mid-block Levels of Service as a result of changes to PKCT output or operating hours are discussed in the following sections.

Table 7.18 Carriageway Level of Service by Scenario – 2018 AM Peak

Location	2008 11/6 @ 4mtpa Existing Base Case (for comparison)	No CT	11/6		24/7& 15/5-10/2		24/7	
		0mtpa	4mtpa	10mtpa	4mtpa	10mtpa	4mtpa	10mtpa
To PKCT (south/eastbound)								
Appin Rd, South of Appin Mine	B	B	B	B	B	B	B	B
Appin Rd, South of West Cliff Mine	B	B	B	B	B	B	B	B
Appin Rd, South of Dharawal CE	C	C	C	C	C	C	C	C
Appin Rd, South of No. 10A Fire Rd	C	C	C	C	C	C	C	C
Mount Ousley Rd, South of Appin Rd	D	E	E	E	E	E	E	E
Mount Ousley Rd, South of Picton Rd	D	E	E	E	E	E	E	E
Southern Fwy, South of Mount Ousley Rd	F	F	F	F	F	F	F	F
Southern Fwy, South of Northern Dist.	C	C	C	C	C	C	C	C
Southern Fwy, South of Princes Hwy	D	F	F	F	F	F	F	F
Bellambi Lane, South of Princes Hwy	A	A	A	A	A	A	A	A
Northern Dist., South of Bellambi Ln	B	C	C	C	C	C	C	C
Northern Dist., South of Railway St	B	C	C	C	C	C	C	C
Masters Rd, East of Southern Fwy	A	A	A	A	A	A	A	A
Springhill Rd, East Masters Rd	A	A	A	A	A	A	A	A
Springhill Rd, South of Masters Rd	A	A	A	A	A	A	A	A
From PKCT (north/westbound)								
Appin Rd, South of Appin Mine	C	C	D	D	C	D	C	D
Appin Rd, South of West Cliff Mine	C	C	D	D	C	D	C	D
Appin Rd, South of Dharawal CE	D	D	D	D	D	D	D	D
Appin Rd, South of No. 10A Fire Rd	D	D	D	E	D	D	D	D
Mount Ousley Rd, South of Appin Rd	C	D	D	D	D	D	D	D
Mount Ousley Rd, South of Picton Rd	C	D	D	D	D	D	D	D
Southern Fwy, South of Mount Ousley Rd	F	F	F	F	F	F	F	F
Southern Fwy, South of Northern Dist.	D	E	E	E	E	E	E	E
Southern Fwy, South of Princes Hwy	F	F	F	F	F	F	F	F
Bellambi Lane, South of Princes Hwy	A	A	A	A	A	A	A	A
Northern Dist., South of Bellambi Ln	B	B	B	B	B	B	B	B
Northern Dist., South of Railway St	B	B	B	B	B	B	B	B
Masters Rd, East of Southern Fwy	A	A	A	A	A	A	A	A
Springhill Rd, East Masters Rd	A	A	A	A	A	A	A	A
Springhill Rd, South of Masters Rd	A	A	A	A	A	A	A	A

Table 7.19 Carriageway Level of Service by Scenario – 2018 PM Peak (to PKCT)

Location	2008 11/6 @ 4mtpa Existing Base Case (for comparison)	No CT	11/6		24/7& 15/5-10/2		24/7	
		0mtpa	4mtpa	10mtpa	4mtpa	10mtpa	4mtpa	10mtpa
To PKCT (south/eastbound)								
Appin Rd, South of Appin Mine	C	D	D	D	D	D	D	D
Appin Rd, South of West Cliff Mine	C	D	D	D	D	D	D	D
Appin Rd, South of Dharawal CE	D	D	D	D	D	D	D	D
Appin Rd, South of No. 10A Fire Rd	D	D	E	E	E	E	E	E
Mount Ousley Rd, South of Appin Rd	C	D	D	D	D	D	D	D
Mount Ousley Rd, South of Picton Rd	C	D	D	D	D	D	D	D
Southern Fwy, South of Mount Ousley Rd	F	F	F	F	F	F	F	F
Southern Fwy, South of Northern Dist.	C	D	D	D	D	D	D	D
Southern Fwy, South of Princes Hwy	E	F	F	F	F	F	F	F
Bellambi Lane, South of Princes Hwy	A	A	A	A	A	A	A	A
Northern Dist., South of Bellambi Ln	A	B	B	B	B	B	B	B
Northern Dist., South of Railway St	A	B	B	B	B	B	B	B
Masters Rd, East of Southern Fwy	A	A	A	A	A	A	A	A
Springhill Rd, East Masters Rd	A	A	A	A	A	A	A	A
Springhill Rd, South of Masters Rd	A	A	A	A	A	A	A	A
From PKCT (north/westbound)								
Appin Rd, South of Appin Mine	B	B	B	B	B	B	B	B
Appin Rd, South of West Cliff Mine	B	B	B	B	B	B	B	B
Appin Rd, South of Dharawal CE	C	C	C	C	C	C	C	C
Appin Rd, South of No. 10A Fire Rd	C	C	C	C	C	C	C	C
Mount Ousley Rd, South of Appin Rd	C	C	C	C	C	C	C	C
Mount Ousley Rd, South of Picton Rd	B	C	C	C	C	C	C	C
Southern Fwy, South of Mount Ousley Rd	E	F	F	F	F	F	F	F
Southern Fwy, South of Northern Dist.	C	C	C	C	C	C	C	C
Southern Fwy, South of Princes Hwy	D	F	F	F	F	F	F	F
Bellambi Lane, South of Princes Hwy	A	A	A	A	A	A	A	A
Northern Dist., South of Bellambi Ln	B	C	C	C	C	C	C	C
Northern Dist., South of Railway St	B	C	C	C	C	C	C	C
Masters Rd, East of Southern Fwy	A	A	A	A	A	A	A	A
Springhill Rd, East Masters Rd	A	A	A	A	A	A	A	A
Springhill Rd, South of Masters Rd	A	A	A	A	A	A	A	A

2018 Increased Output to '10mtpa' with 11/6 Operations (current)

An increase in the output with no change to the operating hours increases average weekday mid-block traffic volumes along all road sections both in the AM and PM peak hours. This is most notable in percentage terms at the following locations:

- AM Peak Hour:
  - Bellambi Lane – 10.3% increase;
  - Masters Road - 3.6% increase; and
  - Springhill Road - 4.7% increase.
- PM Peak Hour:
  - Bellambi Lane - 9.1% increase;

The following changes in mid-block level of service are observed with the increase in output and no change to operating hours:

- AM Peak Hour - Appin Road northbound, north of Mount Ousley Road - LoS 'D' to 'E'.

It is important to note that under the 4mtpa 11/6 scenario (Scenario 20) the volumes were at the highest end of the level of Service 'D' range and were in fact borderline LoS 'E'. The changes to AM peak hour traffic volumes along Appin Road are relatively low (less than 2%) when comparing the 4mtpa scenarios to the 10mtpa scenario under 11/6 operations. These minor changes were enough to technically change the predicted LoS, however this small change in volumes will be barely perceptible to the average driver.

2018 Maintain Output and change in Operation Hours

With no increase in the output and a change in operating hours, mid-block traffic volumes decrease along all road sections in the AM peak hour. The PM peak hours vary up and down with changes less than +/-1.1%.

Under the 24/7 operations, this is most notable in percentage terms at the following locations:

- AM Peak Hour:
  - Appin Road – 1.4% decrease;
  - Bellambi Lane – 1.1% decrease;
  - Springhill Road – 0.9% decrease.
- PM Peak Hour:
  - Bellambi Lane - 0.9% decrease;
  - Springhill Road – 0.8% increase.

Under the 24/7&15/5-10/2 operations, this is most notable at the following locations:

- AM Peak Hour:
  - Appin Road – 1.4% decrease;
  - Bellambi Lane - 0.7% decrease;
  - Springhill Road – 0.8% decrease.
- PM Peak Hour:
  - Springhill Road – 1.1% increase.

The following changes in mid-block LoS are expected with the change in operating hours to 24/7 or 24/7&15/5-10/2 and no increase in output:

- AM Peak Hour - Appin Road northbound, north of Dharawal Entrance - LoS 'D' to 'C'.

2018 Increased Output to '10mtpa' and change in Operation Hours

An increase in the output and a change in operating hours will lead to increases in average weekday mid-block traffic volumes along some road sections both in the AM and PM peak hours.

Under the 24/7 operations, this is most notable in percentage terms at the following locations:

- AM Peak Hour:
  - Bellambi Lane – 4.5% increase;
  - Masters Road – 1.5% increase; and
  - Springhill Road - 1.8% increase.
- PM Peak Hour:
  - Appin Road – 0.8% increase;
  - Bellambi Lane – 4.0% increase;
  - Masters Road – 1.3% increase; and
  - Springhill Road – 2.3% increase.

Under the 24/7&15/5-10/2 operations, this is most notable in percentage terms at the following locations:

- AM Peak Hour:
  - Bellambi Lane – 7.9% increase;
  - Masters Road – 2.4% increase; and
  - Springhill Road – 3.1% increase.
- PM Peak Hour:
  - Appin Road – 0.8% increase;
  - Bellambi Lane – 7.9% increase;
  - Masters Road – 2.0% increase; and
  - Springhill Road – 3.6% increase.

No changes in mid-block LoS are observed with the increase in output and change to operating hours to 24/7 or 24/7&15/5-10/2.

Overview

During both peak hours traffic volume changes are most notable under the 10mtpa 11/6 scenario. The greatest increases are noted along Springhill Road, Masters Road and Bellambi Lane:

- Springhill Road:
  - heading to PKCT:
    - total volumes increase by up to 7.8% (AM Peak);
    - corresponding increases in heavy vehicles of 6.3% (AM Peak).
  - heading away from PKCT:
    - total volumes increase by up to 3.4% (AM Peak)
    - corresponding increases in heavy vehicles of 3.1% (AM Peak).
- Bellambi Lane:
  - heading to PKCT:
    - total volumes increase by up to 9.0%/10% (AM Peak/PM peak);
    - corresponding increases in heavy vehicles of 7.7%/8.1% (AM Peak/PM peak).
  - heading away from PKCT:
    - total volumes increase by up to 11.9%/8.3% (AM Peak/PM peak)
    - corresponding increases in heavy vehicles of 9.3%/7.0% (AM Peak/PM peak).

During both peak hour periods under the 10mtpa 24/7 scenario traffic volume changes are less notable. The increase in coal truck traffic under each 10mtpa scenario (11/6 or 24/7) does not result in any significant changes to the mid-block operating performance of key route sections. The peak hour volume changes are less notable under 24/7 operations than 11/6.

7.2.1 Springhill Road with Dendrobium CPP

If Dendrobium CPP coal truck movements are undertaken on public roads this will only affect Springhill Road. The percentage increase in hourly traffic volumes on Springhill Road due to Dendrobium CPP potential coal truck traffic increases in 2013 is negligible.

The percentage traffic increase on Springhill Road in 2013 under 24/7&15/5-10/2 operations as a result of Dendrobium CPP coal truck travelling on public roads is summarised in Table 7.20.

Table 7.20 Changes in Springhill Road Volumes with Dendrobium CPP - 2013 Scenario 24/7&15/5-10/2

Period		To PKCT (Eastbound)		From PKCT (Westbound)	
		Total Hourly Volumes	% Heavy Vehicles	Total Hourly Volumes	% Heavy Vehicles
Weekday	AM Peak	↑ 2.2%	↑ 1.8%	↑ 1.0%	↑ 0.9%
	PM Peak	↑ 0.6%	↑ 0.6%	↑ 0.8%	↑ 0.7%
Weekend	AM Peak	↑ 3.0%	↑ 2.4%	↑ 2.4%	↑ 2.0%
	PM Peak	↑ 1.9%	↑ 1.6%	↑ 2.0%	↑ 1.7%

Potential changes to the future (2013) peak-hour mid-block Level of Service as a result of the additional Dendrobium CPP coal trucks on Springhill Road was assessed. No changes in level of service was observed. Springhill Road currently operates at LoS A in both the AM and PM peaks and will continue to do so under this scenario (as with all others).

8 SUMMARY & CONCLUSIONS

8.1 Summary

8.1.1 Existing Operations

Existing operations of PKCT, BHPBIC, GNRE No.1 Mine, ICC, BSL and ASMS have been reviewed. The following collieries deliver coal to PKCT via public roads:

- BHPBIC Appin Colliery;
- BHPBIC West Cliff Colliery; and
- GNRE No.1 Mine.

West Cliff CPP operates and delivers coal to PKCT by road 24/7. During the permitted hours, all coal deliveries are made via Springhill Rd and Port Kembla Rd. Outside the restricted hours, coal is delivered to PKCT via BlueScope Steel Limited. Coal is transported from West Cliff CPP to PKCT by a range of coal trucks supplied by Bulktrans and its sub-contractors.

GNRE No.1 Mine is permitted to carry out mining activities 24 hours a day, 7 days a week (24/7). GNRE currently do not operate on Sundays. Coal is delivered to PKCT during the day time, typically departing the mine between 6:00am and 5:00pm.

PKCT operates 24/7 and staff rosters are organised to ensure 24 hour operation to meet customer requirements. Road haulage of coal to the Port Kembla Coal Terminal is regulated under State Environmental Planning Policy (Infrastructure) 2007, which normally restricts the hours of transportation along Springhill Road, east of Masters Road, to between 7.00am and 6.00pm, Sundays and public holidays excepted.

8.1.2 Coal Truck Movements

Five sets of data have been recorded for West Cliff CPP and three sets of data for GNRE. Movement patterns were analysed from all data sets. Much of the data was collected during a-typical periods when output was high or when operating hours were temporarily changed.

On average from all available data 36% of all truck movements from West Cliff CPP occur at night. After reviewing the more typical data it was shown that generally only 20% of all truck movements from West Cliff CPP occur at night.

GNRE No.1 Mine did not deliver coal outside of the restricted hours.

8.1.3 Haulage Routes

The following routes were considered in detail:

- Specific Routes from Gujarat NRE No.1 Mine to PKCT:
  - Bellambi Lane; and
  - Northern Distributor.
- Specific Routes from West Cliff & Appin Colliery to PKCT:
  - Appin Road;
  - Mount Ousley Road; and
  - Southern Freeway (Northern).
- Common Routes to PKCT:
  - Southern Freeway (Southern);
  - Masters Road; and
  - Springhill Road.

Appin Road and Mount Ousley Road pass through mostly non-urban land which is part of the Sydney's water catchment. Bellambi Lane, Northern Distributor, and Southern Freeway pass through residential areas, however direct property access is restricted.

Masters Road and Springhill Road are purpose-built accesses to the industrial area and port. Significant amount of buffer parklands are provided separating the industrial area from the residential area of Coniston and Wollongong.

8.1.4 Mid-block Carriageway Capacity

The current mid-block carriageway capacity performance is generally satisfactory along the haulage routes except for parts of the Southern Freeway, Mount Ousley Road and Appin Road, where sections are approaching or exceeding capacity.

During AM peak periods, the Level of Service (LoS) along Southern Freeway between Mount Ousley Road and Northern Distributor is 'F' in both directions. On the same section, during PM peak periods, LoS 'F' for southbound and LoS 'E' for northbound is noted. The section along Southern Freeway between the Northern Distributor and the Princes Highway is approaching capacity with LoS 'D' in the northbound direction during AM peak periods. The section along Southern Freeway between Princes Highway and Masters Road shows LoS 'D' for southbound and LoS 'F' for northbound in the AM peak. On the same section during PM peak periods LoS 'E' for southbound and LoS 'D' for northbound are estimated.

During the AM peak Mount Ousley Road is approaching capacity, and experiences LoS 'D' for southbound traffic.

Parts of Appin Road, along the southern half of the route, are also approaching capacity, at LoS 'D' northbound during the AM peak period and southbound during the PM peak

It should be noted that in those areas where capacity is of most concern the coal trucks represent only a small proportion of the peak hour directional traffic volumes:

- Appin Road: 0.6-2.1%
- Mount Ousley Road: 1.1% ; and
- Southern Freeway: 0.3-1.0%.

8.1.5 Intersection Operation

The following key intersections were analysed to assess their performance under existing conditions, all were shown to operate satisfactorily:

- Masters Rd/ Springhill Rd
- Springhill Rd/Port Kembla Rd
- Springhill Rd/Tom Thumb Rd

Other intersections not considered as part of this study that may be reviewed separately as part of the individual mine operations review include:

- Bellambi Lane/Princes Highway;
- Bellambi Lane/Northern Distributor;
- Appin Road/West Cliff CPP Entry.

8.1.6 Crash Data

A review of the RTA road crash data for the 5 year period between 2002 and 2007 was undertaken. There was a significant number of crashes involving articulated vehicles (AV) along Mount Ousley Road. The Auslink Sydney-Wollongong Corridor Study identified this issue and noted that:

"The section of road from Bulli Pass to the top of Mount Ousley exhibits a relatively higher crash history than other sections of the corridor, with a crash rate four times the regional average. This can be largely explained by the convergence of vehicles from Picton Road onto Mount Ousley Road heading to and from Wollongong, coupled with the topographical nature of the link and its undulating terrain."

Out of the 1,197 recorded crashes 96 involved articulated vehicles (8%). Articulated vehicles had a higher injury rate (1 injury per 2.1 crashes) than the average of all vehicles (1 injury per 2.7 crashes). Articulated vehicles had a slightly lower fatality rate (1 fatality per 96 crashes) than the average (1 fatality per 86 crashes).

In general articulated vehicles were observed to be involved in a greater proportion of crashes than they represented volumes of traffic on the road sections. This was particularly evident along Appin Road, Mount Ousley Road, Masters Road and Springhill Road. It is important to note that coal trucks represent only a small proportion of the total traffic volumes along these routes, between 0.9% (Springhill Road) and 4.7% (Appin Road).

8.1.7 Road Safety Audit

In general the road safety audit revealed that the road sections were in good condition with no significant safety issues. However the following issues on various sections of the haulage routes were noted:

- Appin Rd from West Cliff Colliery to Wedderburn Road:
  - Some linemarking is in poor condition or obliterated;
  - The guardrail safety barrier on the right hand side at the mine entrance is too low and unsafe; and
  - The pavement is badly rutted on the left hand side near Appin Road turnoff causing some trucks to veer onto centreline.
- Appin Rd between West Cliff Colliery and Mount Ousley Road:
  - Major bridge over Lodden River does not meet the required safety standards for the volume of heavy vehicles now using the road.
- Mount Ousley Road between Appin Road and Southern Freeway:
  - Number of pit lids on the outer lane northbound, approx 2.5km south of Picton Road, which have settled causing unsafe conditions for traffic.

8.1.8 Sydney to Wollongong Corridor

The Ausllink Sydney-Wollongong Corridor Study (SWCS) was reviewed to provide an overview of the broader issues along the corridor. Particular issues identified included:

- The capacity of most of the road corridor is sufficient to meet current needs;
- Congestion in the morning peak through Wollongong and Mount Ousley Road occurs and has led to peak spreading and slower travel times;
- The increase in coal mining in the region and the relocation of a number of import activities from Sydney to Port Kembla will inevitably lead to more trucks on the roads around Wollongong;
- There is limited scope to increase freight capacity on Illawarra rail corridor
- *"The transport of coal to Port Kembla also creates a number of safety issues. As rail paths are limited and a number of coal mines operate at a distance from rail facilities, there is significant trucking of coal into the port during daylight hours which can create conflicts with passenger vehicles. Despite this, technology has progressed to the point where the safety and operability of B-Double vehicles has improved substantially. Existing weight limits on heavy vehicles also leads to more trucks utilising Mount Ousley Road than is arguably necessary, especially when it is considered that the road is designed to cater especially for this heavy vehicle task, with a separate truck lane on both north and south lanes."*

8.1.9 24/7 Trial

PKCT were given approval to undertake a Trial of 24 hours per day, 7 days per week (24/7) transportation of coal by public road to the Port Kembla Coal Terminal. During the trial road transported coal was delivered 24 hours per day 7 days per week from two mines, namely the West Cliff Colliery and Appin Colliery, however, road transported coal was also received 11 hours per day 6 days per week from Gujurat NRE No. 1 Mine.

The aim of the 24/7 Trial was to replicate the proposed spread of hours, days of the week and tonnage throughput forecasts, as far as possible within the current operating environment.

Deliveries were only increased on Wednesday the 19th to replicate a 10mtpa day. BHPBIC delivered on 30 days of the 42 day trial. GNRE did not alter its existing delivery times and patterns. GNRE only delivered on 15 days of the 42 day trial, with no deliveries made on Mondays, Wednesdays, Sundays and night time (6pm-7am).

8.1.10 Existing Background Traffic Volumes

Total traffic volume was determined at eight key locations along the haulage routes of West Cliff CPP and GNRE no.1 Mine to PKCT. Departure times of coal trucks from West Cliff CPP and GNRE No.1 Mine were collected for traffic count periods. By estimating the travel times required for each truck to reach the count locations, the number of trucks at each count location by time of day and direction is determined. Background traffic volumes were established by subtracting the PKCT coal truck traffic from the heavy vehicles volumes at each count location.

8.1.11 Background Traffic Growth

Several sources were utilised to determine reasonable growth rates for the key route sections:

- The Sydney-Wollongong Corridor Strategy was reviewed to determine the likely future growth along Mount Ousley Road and the Southern Freeway;
- Northern Distributor Extension modelling data was used to determine the likely future growth of Bellambi Lane and the Northern Distributor;
- Historical AADT data was used to determine growth rates at other locations; and
- The Environmental Assessment Report for the Expansion of Port Kembla Port Corporation (PKPC) General Cargo Handling Facility (GCHF) was used to determine growth as a result of this development.

8.1.12 Future Scenarios

A total of 25 scenarios were developed for calculating truck movements to be assessed. These scenarios included various combinations of:

- 4 road receival output options:
  - '0mtpa' - Background traffic only;
  - '4mtpa' - Existing deliveries to PKCT;
  - '5mtpa' - Estimated deliveries in 2009; and
  - '10mtpa' - Estimated maximum deliveries of this study.
- 4 options for operational hours:
  - Current:
    - GNRE delivers 11/4; and
    - BHPBIC delivers 24/7 (via BSL outside permitted hours).
  - 11/6:
    - GNRE delivers 11/6; and
    - BHPBIC delivers 24/7 (via BSL outside permitted hours).
  - 24/7&15/5-10/2:
    - GNRE delivers 15/5 Monday to Friday with 10/2 Saturday and Sunday; and
    - BHPBIC delivers 24/7.
  - 24/7:
    - GNRE delivers 24/7; and
    - BHPBIC deliver 24/7.
- 4 different years of background traffic:
  - 2008 - existing traffic conditions;
  - 2009 - forecast traffic year to consider opening of the NDE;
  - 2013 - 5 year forecast; and
  - 2018 - 10 year forecast.

Following is a summary of the 25 scenarios considered in the assessment:

	Options										
Year	0mtpa @ No CT	4mtpa @ Current	4mtpa @ 11/6	5mtpa @ 11/6	10mtpa @ 11/6	4mtpa @ 24/7&15/5-10/2	5mtpa @ 24/7&15/5-10/2	10mtpa @ 24/7&15/5-10/2	4mtpa @ 24/7	5mtpa @ 24/7	10mtpa @ 24/7
2008	1	2	3			4			5		
2009	6	7	8	9			10			11	
2013	12		13		14	15		16	17		18
2018	19		20		21	22		23	24		25

8.1.13 Traffic Impact

The future background and coal truck traffic on public roads at eight (8) count locations was estimated for each of the 25 scenarios. Typical profiles were developed for average weekday and weekend traffic at each location by hour of day. These profiles provided background traffic volumes for light, rigid and articulated vehicles per hour at each location. The coal truck scenarios were then added to each profile to demonstrate the impact of the change in coal truck volumes by time of day.

Springhill Road, Bellambi Lane and Mount Ousley Road were identified as key locations that were subjected to significant changes. Figure 8.1, Figure 8.2 and Figure 8.3 represent the hourly profiles for average weekday heavy vehicle traffic in 2018 for Springhill Road and Bellambi Lane respectively.

The ‘green columns’ represent the hourly rigid and articulated truck volumes as background traffic. The ‘orange line’ represents the heavy vehicle volumes with coal truck traffic under existing conditions (‘4mtpa’ output with 11/6 restrictions). The ‘orange line’ represents the baseline heavy vehicle volumes under current arrangements.

Figure 8.1 2018 Average Weekday Heavy Vehicle Volumes – Springhill Road

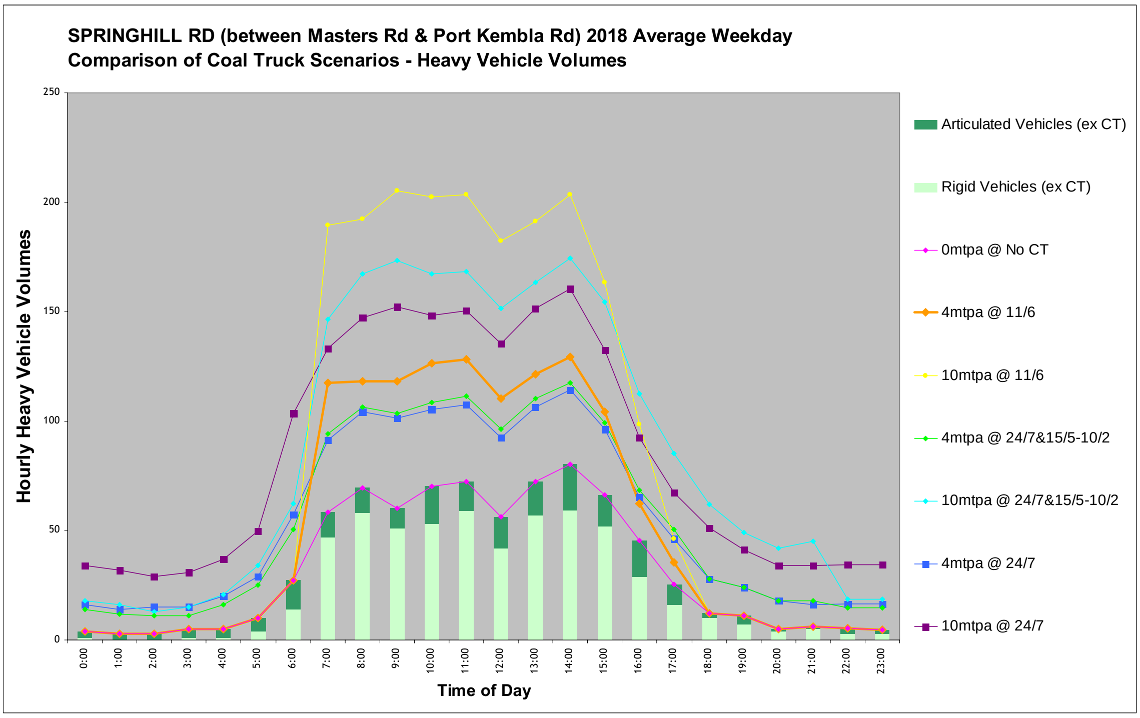


Figure 8.2 2018 Average Weekday Heavy Vehicle Volumes –Bellambi Lane

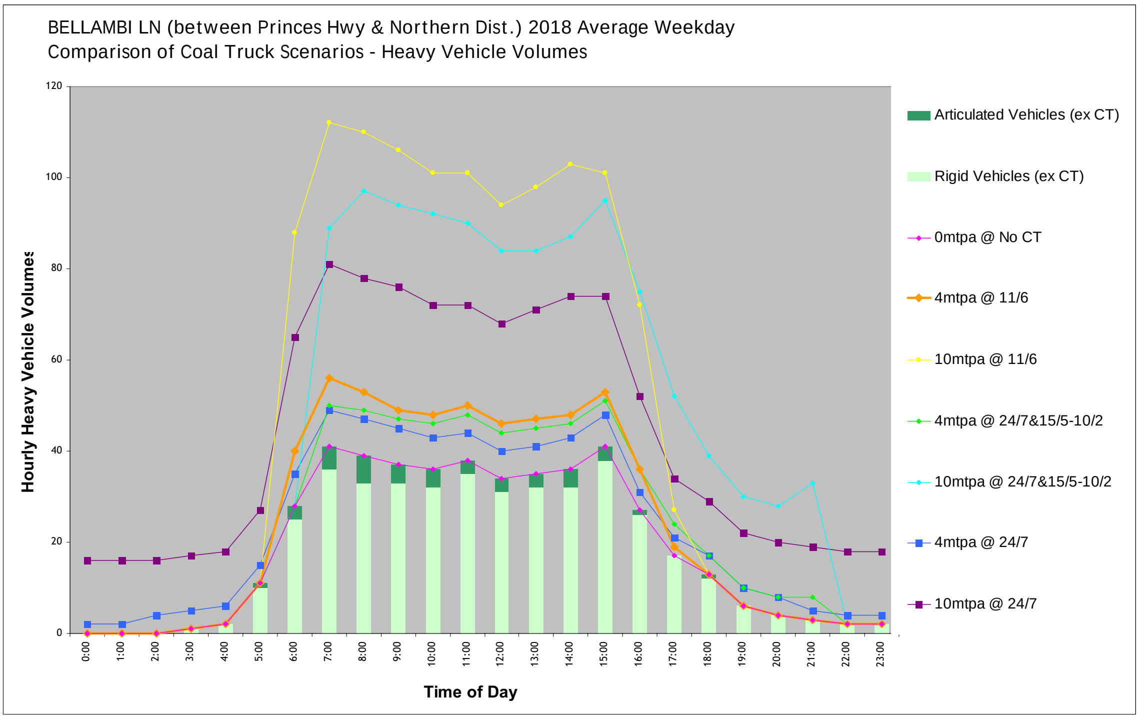
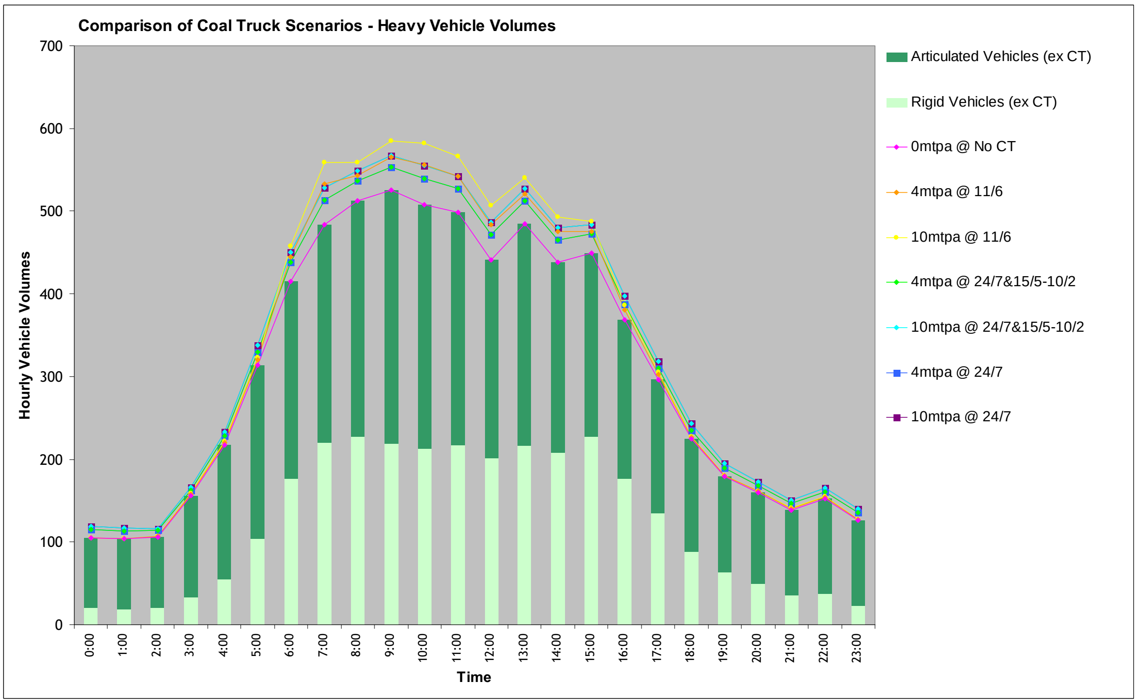


Figure 8.3 2018 Average Weekday Heavy Vehicle Volumes – Mount Ousley Road



From these graphs the heavy vehicle volume changes in 2018 at different times of the day under each of the key scenarios is highlighted:

- The ‘darker blue line’ represents the heavy vehicle volumes with coal truck traffic under current output (‘4mtpa’) with 24/7 operations. Comparing this to the ‘orange line’, the following observations are noted:
  - there is a slight decrease in day time hourly heavy vehicle volumes;
  - there is a slight increase in night time hourly heavy vehicle volumes;
  - overall there is a smoothing of the hourly profile when compared to the existing situation;
- The ‘yellow line’ represents the heavy vehicle volumes with coal truck traffic under increased output (‘10mtpa’) with existing 11/6 restrictions. Comparing this to the ‘orange line’, the following observations are noted:
  - there is a marked increased in day time hourly heavy vehicle volumes;
  - there is very little change in night time hourly heavy vehicle volumes;
  - overall there is an increasing disparity between night time and day time hourly volumes, with a higher peaks and lower troughs observed in the graph shape.
- The ‘dark purple line’ represents the heavy vehicle volumes with coal truck traffic under increased output (‘10mtpa’) with 24/7 operations. Comparing this to the ‘orange line’, the following observations are noted:
  - There is an increase in both the day time and night time hourly heavy vehicle volumes; and
  - overall there is a smoothing of the hourly profile compared to the existing situation

The total volumes and proportion of heavy vehicles and coal trucks for Bellambi Lane, Springhill Road and Mount Ousley are summarised for key scenarios in Table 8.1, Table 8.2 and Table 8.3.

Table 8.1 Average Daily Traffic Comparison

Name		4mtpa @ 11/6	5mtpa @ 24/7&15/5-10/2*	10mtpa @ 24/7&15/5-10/2*	
		2008	2009	2013	2018
Average Weekday					
Mount Ousley Road	All vehs	44,118		48,940	53,495
	CT	424		638	638
	%HV	14.1%		14.8%	15.0%
	%CT	1.0%		1.3%	1.2%
	%CT of HV	6.8%		8.8%	7.9%
Springhill Road	All vehs	16,226		17,031	17,031
	CT	495		1,300	1,300
	%HV	7.8%		12.2%	12.2%
	%CT	3.1%		7.6%	7.6%
	%CT of HV	38.9%		62.6%	62.6%
Bellambi Lane	All vehs	12,910	5,599	6,325	6,595
	CT	136	152	662	662
	%HV	8.7%	10.2%	17.4%	16.9%
	%CT	1.1%	2.7%	10.5%	10.0%
	%CT of HV	12.1%	26.6%	60.3%	59.4%
Average Weekend					
Mount Ousley Road	All vehs	42,292		46,804	51,063
	CT	426		638	638
	%HV	6.4%		7.0%	7.0%
	%CT	1.0%		1.4%	1.2%
	%CT of HV	15.7%		19.6%	17.9%
Springhill Road	All vehs	13,876		14,461	14,461
	CT	499		1,084	1,084
	%HV	6.0%		9.8%	9.8%
	%CT	3.6%		7.5%	7.5%
	%CT of HV	59.7%		76.3%	76.3%
Bellambi Lane	All vehs	10,330	4,453	4,964	5,186
	CT	134	104	446	446
	%HV	5.0%	5.9%	12.2%	11.9%
	%CT	1.3%	2.3%	9.0%	8.6%
	%CT of HV	26.0%	39.5%	73.7%	72.4%

* BHPBIC operates at 24/7 & GNRE operates at 15/5-10/2

Table 8.2 Average Day Time (7am to 10pm) Traffic Comparison

Name		11/6	24/7&15/5-10/2*		
		4mtpa	5mtpa	10mtpa	
		2008	2009	2013	2018
Average Weekday					
Mount Ousley Road	All vehs	37,523		41,530	45,388
	CT	380		489	489
	%HV	12.9%		13.5%	13.6%
	%CT	1.0%		1.2%	1.1%
	%CT of HV	7.8%		8.7%	7.9%
Springhill Road	All vehs	14,805		15,461	15,461
	CT	495		1,151	1,151
	%HV	8.1%		12.0%	12.0%
	%CT	3.3%		7.4%	7.4%
	%CT of HV	41.0%		61.8%	61.8%
Bellambi Lane	All vehs	11,607	5,052	5,758	6,000
	CT	124	152	662	662
	%HV	8.7%	10.5%	18.3%	17.8%
	%CT	1.1%	3.0%	11.5%	11.0%
	%CT of HV	12.3%	28.7%	62.8%	61.9%
Average Weekend					
Mount Ousley Road	All vehs	37,491		41,400	45,165
	CT	392		512	512
	%HV	5.5%		5.8%	5.8%
	%CT	1.0%		1.2%	1.1%
	%CT of HV	19.2%		21.3%	19.4%
Springhill Road	All vehs	11,895		12,354	12,354
	CT	499		958	958
	%HV	6.5%		10.0%	10.0%
	%CT	4.2%		7.8%	7.8%
	%CT of HV	64.5%		77.8%	77.8%
Bellambi Lane	All vehs	9,390	4,057	4,553	4,753
	CT	117	104	446	446
	%HV	4.7%	5.9%	12.8%	12.5%
	%CT	1.2%	2.6%	9.8%	9.4%
	%CT of HV	26.3%	43.2%	76.5%	75.1%

* BHPBIC operates at 24/7 & GNRE operates at 15/5-10/2

Table 8.3 Average Night Time (10pm to 7am) Traffic Comparison

Name		11/6	24/7&15/5-10/2*		
		4mtpa	5mtpa	10mtpa	
		2008	2009	2013	2018
Average Weekday					
Mount Ousley Road	All vehs	6,595		7,410	8,107
	CT	44		149	149
	%HV	20.8%		22.5%	22.8%
	%CT	0.7%		2.0%	1.8%
	%CT of HV	3.2%		8.9%	8.1%
Springhill Road	All vehs	1,421		1,570	1,570
	CT	-		149	149
	%HV	4.7%		13.8%	13.8%
	%CT	0.0%		9.5%	9.5%
	%CT of HV	0.0%		69.0%	69.0%
Bellambi Lane	All vehs	1,303	547	567	595
	CT	12	-	-	-
	%HV	9.2%	7.9%	7.8%	7.7%
	%CT	0.9%	0.0%	0.0%	0.0%
	%CT of HV	10.0%	0.0%	0.0%	0.0%
Average Weekend					
Mount Ousley Road	All vehs	4,801		5,404	5,898
	CT	34		126	126
	%HV	13.8%		15.8%	15.9%
	%CT	0.7%		2.3%	2.1%
	%CT of HV	5.1%		14.8%	13.4%
Springhill Road	All vehs	1,981		2,107	2,107
	CT	-		126	126
	%HV	3.1%		8.9%	8.9%
	%CT	0.0%		6.0%	6.0%
	%CT of HV	0.0%		67.0%	67.0%
Bellambi Lane	All vehs	940	396	411	433
	CT	17	-	-	-
	%HV	7.6%	5.6%	5.4%	5.1%
	%CT	1.8%	0.0%	0.0%	0.0%
	%CT of HV	23.9%	0.0%	0.0%	0.0%

* BHPBIC operates at 24/7 & GNRE operates at 15/5-10/2

8.1.14 Future Mid-block Carriageway Level of Service

A comparison of future peak hourly traffic volumes with the mid-block road capacity was undertaken for each option to determine the changes in traffic volumes and the changes (if any) to mid-block carriageway level of service.

As a result in background traffic growth with no changes to coal truck volumes or operating hours changes in mid-block LoS are to be expected. This was particularly evident on:

- Appin Road – many sections will operate at LoS 'D' and one at LoS 'E';
- Mount Ousley Road - will predominantly operate at LoS 'D' or 'E'; and
- Southern Freeway – 4 lane sections will operate at LoS 'F' and 6 lane section at LoS 'C', 'D' or 'E'.

Changes to the coal truck volumes and hours of delivery were shown to have minor changes to peak hour traffic volumes (some increases and some decreases). During the AM and PM peak hours traffic volume changes are most notable under the 10mtpa 11/6 scenario. The greatest increases are noted along Springhill Road, Masters Road and Bellambi Lane. During the both peak hour periods under the 10mtpa 24/7 scenario peak hour traffic volume changes are less notable.

The increase in coal truck traffic under each 10mtpa scenario (11/6, 24/7 or 24/7&15/5-10/2) does not result in any significant changes to the mid-block operating performance of key route sections. The peak hour volume changes are less notable under 24/7 or 24/7&15/5-10/2 operations than 11/6.

With increased output under the '10mtpa' scenario the maximum weekday hourly increase in coal trucks is expected to be 48 trucks per hour - this occurs under the 11/6 operation. Under 24/7&15/5-10/2 or 24/7 operation this is reduced to 29 and 19 trucks per hour respectively. There are some existing capacity issues, many of which are worsened as a result of increases in background traffic. These are not exacerbated by the increases in coal trucks as a result of increased output and changes to operational hours. These changes have little or no impact on peak hour mid-block level of service along the key routes.

8.1.15 Dendrobium CPP Coal Trucks on Public Roads

If coal trucks from the Dendrobium CPP were no longer able to travel internally through the BlueScope Steel private roads they would be required to travel along Springhill Road to enter PKCT. An assessment of the impact Dendrobium CPP coal truck movements may have on Springhill Road was undertaken if these coal trucks were to travel on public roads.

The assessment of Dendrobium CPP delivering 24/7 to PKCT at a maximum output capacity based on the '10mtpa' scenario by the year 2013 was considered for the 24/7&15/5-10/2 option. Increasing overall PKCT road receival output from '4mtpa' to '10mtpa' will increase daily coal truck movements departing Dendrobium CPP by 76 coal trucks per day to 167 coal trucks per day.

In 2013 it has been estimated that average daily traffic volumes with 24/7&15/5-10/2 operations will increase along Springhill Road by around 2.0%. Total night time traffic volumes will increase by around 5.7%. Weekend daily traffic will increase by approximately 2.3% with weekend night time traffic increasing by 3.6%.

The percentage increase in hourly traffic volumes on Springhill Road due to Dendrobium CPP potential coal truck traffic increases in 2013 is negligible, ranging from 0.6% to 3.0%. Resulting potential changes to the future (2013) peak-hour mid-block Level of Service as a result of the additional Dendrobium CPP coal trucks on Springhill Road was then assessed. No change in level of service was observed. Springhill Road currently operates at LoS A in both the AM and PM peaks and will continue to do so under this scenario (as with all others).

8.1.16 Key Assumptions

It is important to highlight the key assumptions that were made in modelling and analysing the future potential coal truck movements. Key assumptions in relation to coal truck deliveries from WCCPP and GNRE No. 1 Mine to PKCT by public road are summarised in Table 8.4.

Significant sustained variations to these assumptions may have effects on the predicted impact on the overall road network. The effect may be positive or negative and in some cases two-fold, examples of each follow:

- Two-fold effect - increasing the percentage of night-time deliveries. This will increase hourly coal truck volumes at night but will reduce the hourly truck volumes during the day. This may have a positive effect on day time network congestion but may have a negative impact on night time noise;
- Negative effect - reducing deliveries to 40 weeks per year. If the total annual output remains the same, with less delivery weeks the daily and hourly coal truck volumes would increase across the board; and
- Positive effect - increase the capacity of trucks. This would reduce the volume of trucks required to move the same amount of coal.

It will be important to manage and understand the effects likely to be caused by significant sustained variations.

Table 8.4 Coal Truck Delivery Assumptions

Delivery Parameters	11/6		24/7&15/5-10/2		24/7	
	GNRE	WCCPP	GNRE	WCCPP	GNRE	WCCPP
Delivery weeks per year	52	52	52	52	52	52
Delivery days per week	6 (Mon-Sat)	7	7	7	7	7
Delivery hours per weekday	11hrs (7am-6pm)	24hrs*	15hrs (7am-10pm)	24hrs	24hrs	24hrs
Delivery hours per weekend	11hrs (7am-6pm) (Sat only)	24hrs*	10hrs (8am-6pm)	24hrs	24hrs	24hrs
% Deliveries at Night - Weekdays	0%	20%	15%	35%	35%	35%
% Deliveries at Night - Weekends	0%	15%	0%	30%	30%	30%
Average Truck Capacity (tonnes)	31.8	36.5	31.8	36.5	31.8	36.5

* Deliveries outside 7am to 6pm will not occur on Springhill Road between Masters Road and Port Kembla Road (but will enter PKCT through BSL)

8.2 Conclusions

8.2.1 Overview

A thorough assessment of the impact on the road traffic environment has been undertaken with the proposed changes to existing operations at PKCT to either a 24 hour 7 day per week or a modified 24/7&15/5-10/2 delivery of coal via public road and increased delivery of coal to a maximum of '10mtpa'.

The assessment has considered the background traffic volumes in 2008, 2009 (at Bellambi Lane and Northern Distributor only), 2013 and 2018. Traffic growth was assessed using the best available information to the study and considered relevant recent studies and traffic modelling and traffic count data from the RTA.

Predicted coal truck movements were determined at eight (8) key locations based on distribution profiles established from a rigorous review of coal truck data provided by BHPBIC and NRE. Coal truck movement profiles under a range of development scenarios were developed.

Comparisons between background traffic and coal truck traffic increases for each coal truck and background growth scenario were considered in terms of changes to traffic volumes by time of day and impact on the operational performance of mid-block road sections.

These comparisons showed that under 11/6 operations there is a greater proportion of coal truck traffic experienced during the day time delivery hours. With the introduction of 24/7 operations this hourly profile smooths out with less difference observed between night-time hourly traffic and day-time hourly traffic. Although the night-time traffic will still only represent a small proportion of the total daily traffic volume (around 30-35%) it is more than under 11/6 operations (15-20%).

The increased delivery of coal to a maximum of '10mtpa' to PKCT will see an increase in coal trucks of around 129,160 coal trucks per year compared with current delivery levels.

Increasing output to '10mtpa' will see an increase of coal truck movements per day:

- 788 average coal truck movements/day (394 to PKCT and 394 returning to both mines) under 11/6 operations; and
- 688 average coal truck movements/day (344 to PKCT and 344 returning to both mines) under 24/7 operations and 24/7&15/5-10/2 operations.

The impact of increasing the PKCT road receival output to '10mtpa' is much more significant on day time hourly volumes under the 11/6 operations than under 24/7 operations. Typically day time hourly coal truck volumes will increase by:

- 19-48 coal trucks per hour (average 35) departing both mines (in total) between 6.00am and 5.00pm (two-way volumes would be double) under 11/6 operations;
- 20-29 coal trucks per hour (average 24) departing both mines (in total) between 7.00am and 5.00pm (two-way volumes would be double) under 24/7&15/6 operations; and
- 9-19 coal trucks per hour (average 14) departing both mines (in total) between 6.00am and 5.00pm (two-way volumes will be doubled) under 24/7 operations.

Although proportionally the night-time hourly traffic increases are quite significant the actual hourly volume increases are approximately:

- 0-3 coal trucks per hour (average less than 1) departing both mines (in total) between 5.00pm and 6.00am (two-way volumes would be double) under 11/6 operations;
- 3-19 coal trucks per hour (average 11) departing both mines (in total) between 5.00pm and 6.00am (two-way volumes would be double) under 24/7&11/6 operations; and
- 11-17 coal trucks per hour (average 15) departing both mines (in total) between 5.00pm and 6.00am (two-way volumes would be double) under 24/7 operations.

The assessment of carriageway level of service demonstrated that the increase in coal truck traffic under each 10mtpa scenario (11/6 or 24/7) does not result in any significant changes to the mid-block operating performance of key route sections. The peak hour volume changes are less notable under 24/7 operations than 11/6.

In conclusion the increased delivery of coal to a maximum of '10mtpa' to PKCT will see significant increases in coal truck movements over a year (129,170 one-way). The total daily coal truck volumes are slightly lower under a 24/7 scenario (344 one-way from both mines) than under the 11/6 operations (394 one-way from both mines).

Day time hourly coal truck volumes are significantly lower (on average around 25 coal trucks per hour less from both mines) with corresponding increases in night time hourly volumes (on average around 14 coal trucks per hour more from both mines) when comparing the 24/7 operation to 11/6 under '10mtpa' output.

The impact on peak hour traffic is minimised under the 24/7 operations. No significant changes to peak hour mid-block level of service are observed under either scenario at key locations, but impacts are less notable under the 24/7 operations.

8.2.2 Conclusions

Some key questions for this study (in relation to road traffic impact) were asked.

Should PKCT move to 24/7 road receival of coal?

Should the restriction on operating hours for deliveries of coal received by public road be lifted with PKCT able to receive coal 24 hour 7 day per week? This would not change the annual or weekly amount of coal delivered. On a day to day and hour by hour situation there are minor changes. With current output:

- average daily coal trucks would reduce by 10 trucks per day;
- average weekday day time hourly coal trucks would reduce by 10 trucks per hour;
- average weekend day time hourly coal trucks would reduce by 5 trucks per hour; and
- average weekday and weekend night time hourly coal trucks would increase by 4 trucks per hour.

In respect of traffic impact the answer in short is yes. Some impacts as a result of this change would be increased night time coal truck volumes particularly on Bellambi Lane and Springhill Road (restricted section). Correspondingly there would be some reductions in day time coal truck volumes. Overall there would be very minimal impact on the broader road network.

Can increased coal road receival at PKCT be accommodated?

Should PKCT increase road receivals to a maximum of 10 million tonnes per year? This represents an increase in annual coal truck volumes on public roads (from WCCPP and GNRE to PKCT) by around 125% with:

- annual coal trucks would increase by 129,170 trucks per annum;
- average weekly coal trucks would increase by 2476 trucks per week;
- average daily coal trucks would increase by 394 trucks per day;
- average weekday and weekend day time hourly coal trucks would increase by 34 trucks per hour;
- average weekday night time hourly coal trucks would increase by 2 trucks per hour;
- average weekend night time hourly coal trucks would increase by 1 truck per hour.

In respect of traffic impact the answer again is yes. Whilst it is clear that increasing output will have an across the board increase in coal trucks, the question remains will the impact be significant. In short no, although there are some capacity issues in the system these are not exacerbated by the increase in coal trucks.

Can the combined impact of increased coal road receival at PKCT and changes to operating hour be accommodated?

Several scenarios were considered with the assessment initially focussed on ‘10mtpa’ with 24/7 operations in 2013 and 2018. Outcomes of the road traffic analysis did not identify any significant issues from a road traffic performance perspective, however, issues in relation to the noise impacts at night time along Bellambi Lane were of concern. The separate acoustic assessment showed that Bellambi Lane would not to meet Environmental Criteria for Road Traffic Noise (ECRTN) based on increased road deliveries in 2013 and due to the opening of the Northern Distributor Extension (NDE) and subsequent lower background traffic volumes.

As a result it is suggested that the approval of this application contain a condition restricting road deliveries of coal from GNRE along Bellambi Lane to only 7am – 10pm Monday to Friday and 8am to 6pm on weekends and Public Holidays. This time frame is referred to as 15/5-10/2.

The increases in coal truck volumes under both scenarios will have minimal effects on road traffic performance and will not exacerbate the road network capacity issues.

TERMS & GLOSSARY

Acronym	Definition
AC	Appin Colliery
AGTEP	Austroads Guide to Traffic Engineering Practice
ASMS	Australian Steel Mill Services
BHPBIC	BHP Billiton Illawarra Coal
BSL	BlueScope Steel Limited
CPP	Coal Preparation Plant
CT	Coal Trucks
DCPP	Dendrobium Coal Preparation Plant
DoP	Department of Planning
EA	Environmental Assessment
GNRE	Gujarat Natural Resources Environment
HV	Heavy Vehicles
ICC	Illawarra Coke Company
NRE	Natural Resources Environment
PKCT	Port Kembla Coal Terminal
mtpa	million tonnes per annum
RTA	Roads and Traffic Authority of NSW
SEPP	State Environmental Planning Policy
SKM	Sinclair Knight Merz
WCC	West Cliff Colliery
WCCPP	West Cliff Coal Preparation Plant

Term	Definition
10/2	10 hours per day (8am to 6pm) for 2 days per week (Sat-Sun)
11/4	11 hours per day (7am to 6pm) for 4 days per week (Mon-Sat)
11/6	11 hours per day (7am to 6pm) for 6 days per week (Mon-Sat)
15/5	15 hours per day (7am to 10pm) for 5 days per week (Mon-Fri)
24/7	24 hours per day for 7 days per week
2006 Data Collection Period	14-20 August 2006
2007 SEPP 7 Relaxation Data Collection Period	23 Feb – 21 March 2007
2007 High Output Data Collection Period	1-14 Nov 2007
2008 TRIAL 24/7 Data Collection Period	3 March – 13 April 2008
2008 POST-TRIAL Data Collection Period	2 – 20 May 2008
Coal Truck Delivery - Day	7:00am to 6:00pm for CT deliveries
Coal Truck Delivery - Night	6:00pm to 7:00am for CT deliveries
Noise Assessment - Day	7:00am to 10:00pm for traffic volumes
Noise Assessment - Night	10:00pm to 7:00am for traffic volumes
veh	vehicles

1.0 PURPOSE

The purpose of this procedure is to provide an overview of Port Kembla Coal Terminal Limited's environment management system.

PKCT's environmental management system is integrated in PKCT's overall Business Management System and operates in compliance with the following:-

(a) ISO 9001:2000 Quality Management Systems
(b) ISO 14001:2004 Environmental Management Systems

Section 9 herein provides a matrix showing linkages between ISO 14001 System components and PKCT's system.

2.0 SCOPE

PKCT's EMS covers all activities carried out on PKCT's Site associated with PKCT's operations.

The shippers of coal and other products handled by PKCT arrange directly and manage shipping and road/rail deliveries. Some environmental aspects associated with these activities may have an adverse impact ,directly or indirectly, on PKCT's responsibility to meet its legal and other requirements.

Such aspects shall be included in the Environmental Aspects Register. PKCT shall liaise with its shippers and service providers, as appropriate, to ensure these environmental aspects are satisfactorily managed.

3.0 DEFINITIONS

PKCT refers to Port Kembla Coal Terminal Limited

DEC refers to the Department of Environment and Conservation (NSW)

Site refers to PKCT's leased premises.

EMS refers to PKCT's Environment Management System

3.0 REFERENCES

Protection of the Environment Act 1997

DEC Licence No.01625 (located in Central Filing System: file No. 3.04 (a copy may also be obtained from DEC's web site.)

WorkCover Licence No. 35/019839 (file no 2.11)

Sydney Water Trade Waste Agreement - Permission No. 20157 (file no 3.07.01)

0Q/1.2 Business Management

4.0 POLICY

4.1 General

PKCT's overall policy, vision, mission, values and quality objectives are outlined in the 0Q/1.2 Business Management.

4.2 Environmental Policy Statement

PKCT is committed to preventing pollution by operating in an environmentally responsible manner, sensitive to community and customer expectations.

In support of this commitment, we undertake to do the following:-

- To achieve the highest possible standard of dust control recognising the impact dust emissions have on the environment and our neighbours.
- To be proactive and continually improve our environmental performance through our environmental management system.
- To have a positive relationship with the community and stakeholders taking into account their needs, concerns and expectations.
- To comply with our Department of Environment and Conservation licence, all applicable legislation, associated standards and codes of practice and other requirements.
- To provide adequate resources for the implementation of this policy.
- To document and communicate policy, objectives and targets to our people and obtain their involvement in the development and implementation of improvement actions.
- To communicate our policy, objectives and achievements to the community.

4.3 Policy Statement Communication

An Environmental Policy Statement by Strategic Management Group representatives shall be kept in OQ/Business manual\Policy Statements and used for workforce communication and noticeboard display.

5.0 LEGISLATIVE REQUIREMENTS

5.1 General

5.1.1 In the early 80's, a new coal loading facility (now known as the Coal Berth or No.2 Berth) was constructed on Site to replace the previous facility (now known as Bulk Products Berth or No.1 Berth). This was a major project requiring Development Approval. This entailed two basic steps:-

(a) A Development Application and associated Environmental Impact Statement needed to be submitted by PKCT. Approval was required to enable the project to proceed and involved review, assessment of associated environmental impacts, stakeholder and community consultation and consideration of adequacy of environmental control proposed and the nature of any changes and conditions to be applied to an approval to proceed.

(b) At the completion of construction, a licence was issued by the State Pollution Control Commission (now Department of Environment and Conservation (NSW)) when the PKCT construction was complete. This enabled PKCT to commence operations. The licence specifies conditions relating to various pollution statutes

The Protection of the Environment Act 1997 is the primary piece of environment legislation applicable to PKCT's operations. In examining the environmental aspects and impacts of PKCT's operation, other legislation also apply directly and indirectly.

Environment management system documentation shall reference applicable legislation in the procedures to which they pertain and in a register of Environmental Aspects forming part of PKCT's Environmental Management Plans.

Environmental legislation applicable to PKCT's operation shall also be listed in a Legal Compliance Register (0Q/Business Manual /Legislation/Legal Compliance Register.xls. Applicable standards, codes, guides and other requirements shall also be referenced therein.

5.2 Keeping EMS Up to Date with Legislative Changes.

5.2.1 System shall be kept up to date with new legislation and legislative changes as follows:

(a) access to current legislation and monitoring changes directly or via contact with relevant authorities.
(b) Access to current Australian standards and codes
(c) Through the administrative processes associated with PKCT's environmental licences, permits and approvals.
(d) Notification by statutory authorities of changes. Often changes in legislation include a consultation process with businesses affected.
(e) Networking and liaison with PKCT contractors engaged in providing environmental services.
(f) Media releases and environmental publications
(g) Periodic external audits
(h) Industry contacts and associations
(i) Environmental training run by accredited bodies.
(j) Subscription service with a provider to inform PKCT of relevant legislative changes.

5.2.2 An external audit by an Environmental consultant shall be carried out at least on a 3 yearly basis to check PKCT's Environmental Management System and to review on site operations to assess PKCT's compliance with legal requirements and to identify any areas which may have been missed in 5.2.1.

5.2.3 As a further check, an external training course or seminar on Environmental Law shall be attended by the Manager responsible for PKCT's EMS,at least every two years, to ensure any relevant changes in environmental legislation hasn't been missed.

5.3 DEC Licence Requirements

5.3.1 As part of the administration of the licence, PKCT is required to submit to the DEC an Annual Return at the end of its reporting period which occurs on 1st April of each year (refer file no. 3.04).

5.3.2 The Annual Return together with the licence fee must be lodged within 60 days from the end of the reporting period. In accordance with Section78 of the Protection of the Environment Operations Act 1997, the DEC reviews the licence at least once every 3 years. The Annual Return consists of 5 sections as follows:-

- A- Licence Details
- B- Monitoring & Complaints Summary
- C- Statement of Compliance
- D- Statement of Compliance- Load Based fee calculation worksheets (if applicable- NB not applicable to PKCT
- E- Signature and certification)

5.3.3 PKCT's correspondence associated with licence renewal shall be forwarded by Registered Post .

5.3.4 The Protection of the Environment Operations Act (1997) provides for penalties (company and personal) for offences under the Act. The Act deems offences under the pollution statutes upon which PKCT's licence conditions are based, to be offences under the Act.

6.0 ORGANISATION STRUCTURE AND RESPONSIBILITIES

(a) 6.1 General

6.1.1 PKCT's organisational structure and responsibilities are outlined in 1Q/7.2.

6.1.2 An outline of PKCT's team system is also given in 3Q/3.12.

6.2 Specific Environmental Responsibilities

6.2.1 Overall responsibility for environmental policy, strategy and management rests with the General Manager

6.2.2 The Operations Risk Manager is responsible for the PKCT's environmental performance, monitoring and control and liaison with the DEC on all matters relating to pollution control; water, air and noise. The Operations Risk Manager is also responsible for ensuring standards are set and procedures and work instructions are in place to ensure maximum efficiency of pollution control methods.

6.2.3 The day to day maintenance, cleaning operation and control of PKCT's environmental systems is the responsibility of the teams. Team key responsibilities entail the following:

(a) Reliable and satisfactory performance of plant and equipment

(b) Diligent and competent operation, monitoring and control of PKCT's environmental systems.

However, everyone on site has a duty and responsibility to be diligent in ensuring PKCT's environmental objectives are met and its operation is in compliance with EPA licence conditions.

6.2.4 Daywork and Shift Teams are responsible for the purchase, delivery, handling storage and use of hazardous and other materials and for landscaping activities carried out on site.

6.2.5 Main Control Room Coordinator is responsible for the operational control of the stockpile spray system, water collection and treatment system and agglomeration system. These systems are controlled by PKCT's computer system.

6.2.6 The Central Planning is responsible for planning and prioritising work team activities so that PKCT's environmental responsibilities are met.

6.3 Specific responsibilities will also be specified in procedures and work instructions where appropriate.

7.0 SYSTEM COMPONENTS

7.1 Stockpile Sprays

7.1.1 *System Description*

The stockpile spray system has been installed to keep coal stockpiles in a moist condition to prevent dust lift-off and carry-over into the city. This is an EPA licence condition. The system is to have automatic control and to operate when wind speed exceeds 10 metres per second.

PKCT has an automatic stockpile spray system. System control is located in the Main Control Room (South Control Tower). For winds above 10 metres per second, the system activates a cycle compatible with the wind direction. Below 10 metres per second, a spray interval is selected manually to suit the weather conditions and the moisture content of the stockpiles.

Wind speed is measured by an anemometer located on roof of the Main Control Room..

The system covers No.1 and No.2 Berth Stockyards. Approx 130 spray guns cover No.2 Berth stockyard and 50 guns cover No.1 Berth stockyard

An early wind warning system forms part of the system. An anemometer located at Crookhaven Heads, south of Nowra provides wind speed and wind direction information. If a strong southerly is detected, an alarm will automatically activate in the Main Control Room.

Main Control Room personnel shall control the operation of the stockpile spray system in accordance with Work Instruction 3Q/12.20 .

7.1.2 *System Monitoring*

The stockpile spray system is PLC controlled. The control system monitors the system's operation on a continuous 24 hour basis checking system status every 5 minutes. Information is available as outlined in Work Instruction 3Q/12.68.

Solenoid valves control the operation of spray guns. Solenoids can be turned off or on in the control tower enabling manual control. Solenoid status is displayed on the System mimic. On occasion, it is necessary to isolate defective guns in the yard. The panel doesn't recognise this ie. solenoid may be displayed as "on" but the spray gun is not operating.

A manual system check is carried out by Shift Teams of the system periodically to identify defective guns that require maintenance.

System monitoring information is for the company's internal use and is not supplied to external bodies i.e. EPA. In case of pollution incident there may be a need to convey information to external bodies such as the EPA as part of an investigation.

7.2 Conveyor Spray System

7.2.1 *System Description*

PKCT's conveyor spray system refers to the following:-

- Receival Conveyor Sprays – conveyor sprays installed at various locations on the road and rail receival system to dampen coal received prior to stacking in the Coal Berth stock yard.

- Shiploading Conveyor Sprays- conveyor sprays installed to provide additional dust control when loading "dusty" coal types, in particular BHPB and HELEC.

The Receival Conveyor Sprays originally formed part of the Agglomeration System which enabled an agglomerating agent to be added to improve dust control once coal is stockpiled. Chemical treatment was found to be impractical and of questionable benefit particularly in view of the quick stockyard turnover. After consultation with the DEC, chemical addition is not currently carried out those it is subject to PKCT's satisfactory environmental performance.

Conveyor sprays are automatic and can be set "on" or "off" in the Main Control Room. Sprays can also be turned on manually. Conveyor sprays are situated in the following locations:

Receivals
- Rail- TS4; NC9
- Road- NC1/NC2 transfer; NC8

Shiploading- NC11/NC12 transfer; NC12/NC13 transfer; NC14

The conveyor spray system is to be operated in accordance with Work Instruction 3Q/12.15

7.2.2 *System Monitoring*

Conveyor Spray System is PLC controlled. Information is available as outlined in Work Instruction No. 3Q/12.68.

7.2.3 *Purchase of Chemical*

If required, the Daywork team is responsible for the purchase of agglomeration chemical. This is done in consultation with Operations Risk Manager to ensure technical requirements are met. Chemical shall be supplied under contract. Currently, agglomeration chemical is not added to water for conveyor sprays.

7.3 Truckwashing

7.3.1 DEC licence conditions require that PKCT keeps its roads clean and controls dust emissions.

7.3.2 PKCT has two automatic truckwashers (north and south) to assist in meeting these obligations. The truckwashers run on recirculating water. Each truckwash has two spray lanes. Waste water from the spray lanes is collected in dual primary settlement tanks, then transferred to a filter tank where it is chemically treated to accelerate settlement. Water is then transferred to a clean water tank for reuse.

7.3.3 Truckwashers need to be cleaned periodically. This is done in accordance with 3Q/12.26 and 3Q/12.25.

7.4 Road Cleaning Operation

7.4.1 DEC licence condition requires that all sealed roads shall be swept or washed to control wind blown dust emissions.

7.4.2 PKCT's site consists of roads, sealed and unsealed areas, These areas are potential sources of fugitive dust emissions.

7.4.3 Road cleaning operation shall be carried out in accordance with work instruction 3Q/12.30.

7.5 Water Collection and Treatment System

7.5.1 This system consists of the site's drainage facilities which inflow into a number of collection ponds. These ponds are connected by pump and pipeline to a settlement lagoon enabling the transfer of coal contaminated water. Purpose of the system is to collect dry weather flows and stormwater runoff up to a storm of 1 in 10 year return, 2 hour duration without discharge and then transfer to the settlement lagoon. The settlement lagoon has a chemical dosing facility to accelerate settlement ensuring that discharge from the lagoon complies with DEC licence water quality requirements.

7.5.2 The system is automatic, each pond with level controls and alarming. System control is located in the south control tower. Pumps have a facility to enable manual operation. This may be used in carrying out pond cleaning maintenance.

7.5.3 There are three collection points which are licensed but are not connected to the Water Collection and Treatment System's PLC Control System. Conveyor 7 (South) No 1 Berth pump operates by local level control and transfer water collected to the main system. Northern Intersection Pond (Road 1, 2) dewaters by infiltration. Run off in the area around the NC8 (south end) discharge point is not coal contaminated unless there is a serious plant malfunction.

7.5.4 System operational control shall be carried out in accordance with Work Instruction 3Q/12.8.

7.5.5 Water Collection System is PLC controlled. The computer system monitors the systems operation on a continuous 24 hour basis checking system status every hour. Information is available as outlined in Work Instruction 3Q/12.68.

7.5.6 Cleaning of system shall be carried out in accordance with Work Instruction 3Q/12.3 to 3Q/12.7 inclusive.

7.6 General Housekeeping/Landscaping

7.6.1 Housekeeping is an integral part of pollution control practice. All spillage, rubbish, discarded material and spills of hazardous material must be cleared away immediately it is identified or at the latest at the completion of the activity that prevents clear safe access.

7.6.2 Teams are responsible for housekeeping and spillage cleanup associated with material handling activities. Spillage cleanup shall be carried out in accordance with 3Q/12.

7.6.3 Contract coal spillage removal shall be carried out in accordance with Work Instruction 3Q/12.36.

7.6.4 Scrap metal shall be placed in scrap metal bins. Bins are emptied periodically by a scrap metal contractor.

7.6.5 Rubbish shall be placed in rubbish bins (yellow bins). Bins are emptied periodically by a rubbish removal contractor.

7.6.6 Oil to be discarded shall be removed by an oil recycle contractor. Care shall be taken to ensure oil isn't left in open drums and contaminated with water (1Q/3.7 Waste Management).

7.6.7 PKCT has landscaped areas. These are maintained under a landscape maintenance contract (1Q/3.5 Landscaping and Weed Control).

7.7 Hazardous and Other Materials (also refer 1Q/3.7)

7.7.1 Dangerous goods are stored on site in accordance with Workcover (Dangerous Goods) Licence No.35/019839. In particular, PKCT has fuel tanks located adjacent to the Store (petrol, diesel). Materials are primarily held in the store and issued as required.

7.7.2 A caustic storage tank is located adjacent to Pond No.3 (south pond). The tank forms part of a pH adjustment facility. PH adjustment is not currently required. This facility is not operational currently and doesn't hold chemical at the moment. It would require recommissioning to bring it back into service.

7.7.3 Agglomeration chemical is held in steel tanks located at the No.2 Berth Road & Rail Receival which forms part of each agglomeration station facility. If required, chemical is delivered to site by tanker and pumped into storage tanks. Storage tanks are bunded. Chemical addition is not currently required. This facility is not operational currently and doesn't hold chemical at the moment. It would require recommissioning to bring it back into service.

7.7.4 Flocculent chemical is stored in steel storage tanks at each truckwash and at the settlement lagoon forming part of chemical dosing facilities. Replacement chemical is delivered and tanks refilled. Tanks hold 6 to 12 months supply.

7.7.5 Process for the control of chemicals and their use and storage on site is outlined in 1Q/8.2.6 Hazardous Goods.

7.8 Sewerage and Trade Waste System (also refer 1Q/3.6)

7.8.1 PKCT has facilities to handle domestic sewage and trade waste generated on Site. Facilities forming part of the Workshop complex provide for the collection and disposal of waste to sewer.

7.8.2 Legal requirements pertaining to discharge of trade waste to sewer is covered by the Sydney Water Act 1994.

7.8.3 PKCT's trade waste is managed as outlined in 1Q/3.6 Trade Waste and in compliance with trade waste agreement with Sydney Water (Permission No.20157).

7.8.4 PKCT also has trade waste pits/traps that need to be emptied periodically in accordance with Sydney Water requirements.

7.9 Environmental Performance Monitoring and Reporting

7.9.1 Environment monitoring and reporting associated with PKCT's DEC licence shall be carried out in accordance with DEC licence requirements as specified in 1Q/3.3.

7.9.2 Environment monitoring and reporting associated with PKCT's Trade Waste Permission shall be carried out in accordance with Sydney Water requirements as specified in 1Q/3.6 Trade Waste

7.9.3 Other monitoring may be required from time to time to follow up on complaints, measure improvement or assist in the management of PKCT's environmental processes. Any monitoring will be done by an appropriately qualified testing company eg. NATA registered.

7.10 Breaches and Notifications

7.10.1 The Operations Risk Manager shall be notified under the following circumstances:

(a) A situation arises whether due to forecast extreme weather conditions, equipment failure, plant malfunction or other events, that PKCT is at risk of causing a pollution incident

(b) Any licence breach (actual or suspected)

(c) Pollution complaint or observation is received from a member of the community, statutory authority or stakeholder.

(d) An accident/ mishap occurs resulting in an uncontrolled discharge in air and water ways.

7.10.2 The team co-ordinator together with other relevant PKCT personnel shall investigate notifiable incidents. Operations Risk Manager shall arrange for a report of any licence breach including corrective measures taken for the General Manager and the DEC. For potential licence breaches, the Operations Risk Manager shall assess the circumstances and liaise/report to the DEC as appropriate.

7.11 Weather Forecasts

7.11.1 Weather forecasts are available from Bureau of Meteorology daily in accordance with Work Instruction 3Q/12.66.

7.12 Complaints and Suggested Improvements

7.12.1 Customer complaints and improvement suggestions shall be attended to in accordance with 1Q/11.2.

7.12.2 External customer complaints and improvement suggestions shall be registered as outlined therein. Documentation associated with a corrective action shall be placed on Central Filing System number 3.71.

7.12.3 With reference to Section 2.0, any complaints received relating to the activities associated with PKCT's shippers will be recorded and referred to them for their attention and action.

7.13 Environmental Aspects and Improvement

7.13.1 Environmental aspects of PKCT's operation which are an environmental hazard and provide a risk of causing environmental harm shall be identified, accessed and controlled in accordance with PKCT's risk management process (0Q/1.4).

7.13.2 Risk assessments shall be incorporated into a Management Plan from which improvement actions and programs can be developed and incorporated into the Business Planning process.

7.13.3 Improvement initiatives may develop as follows:-

- Top/down- strategic review/ external environment assessment (refer 1Q/9.2).
- Bottom/up- environmental issues identified at an operational level requiring attention and providing an opportunity for improvement.

7.13.4 Aspects register and associated management plan shall be reviewed at least annually as part of the business planning process. More frequent revision may be undertaken to reflect significant changes e.g. environmental risk assessments; new aspects; priorities and resourcing.

7.13.5 Where new aspects are identified or where an incident has occurred which significantly changes an associated risk, the event shall be recorded as an incident on PKCT's Incident Register. The Incident Register shall be checked to ensure any aspects aren't overlooked whenever the Environmental Aspects Register is updated.

7.14 Training

1Q/3.4 Training outlines training requirements with reference to PKCT's training system (refer 8Q/1-). The system incorporates Environmental Awareness training together with other training modules to ensure PKCT personnel have the necessary skills and competence to carry out their tasks.

8.0 DOCUMENTATION

All reports and instructions are to be kept for at least 10 years.

Documentation shall be controlled in accordance with 1Q/6.6.

9.0 Management System Matrix **Management Plan EMP Rev5 0406**

AS/NZS ISO 14001	System Document Procedure

Clause	Element Title	Title	References
4.2	**Environmental Policy**	Environmental Policy	1Q/3.2 Section 4 herein 1Q/6.8 Quality Policy 1Q/6.9 Quality System
4.3	**Planning**		1Q/9.2 Business Planning and Review
4.3.1	Environmental aspects	Procedure for Identification of Environmental Aspects	Environmental Aspects (register attached to Management Plan EMP Rev5 04046 Refer 1Q/3.2 Section 7.13 herein.
4.3.2	Legal and other requirements	Procedure for Identification of Legal and Other Requirements Legislative Requirements Register	1Q/3.2 Section 4 herein Environmental Aspects(register attached to above referenced management plan. includes references to relevant legislation LEGISLATION REGISTER
4.3.3	Objectives and targets	Environnemental Improvement Plan	HSEC Task Brief ; Business Plan 06/07. Management Plan EMP Rev5 04046
4.3.4	Environmental management programmes	Environmental Improvement Plan	Refer 4.3.3
4.4	**Implementation and operation**	Process Control Manual	1Q/3.1 Environment Management Procedures 3Q\12.1 Environment Procedures-Operational

4.4.1	Structure and responsibility	Organisation Chart Position Descriptions Process Control Manual	1Q/3.2 Section 3 herein; also referenced in specific procedures 1Q/7.2 Overview of Organisational Processes and Structure 1Q/7 Organisational Structure and Responsibilities Appendix 6 EBA 2000
4.4.2	Training, awareness and competence	Procedure for Training Staff Induction	1Q/3.4 Training
4.4.3	Communication	Procedure for Communication EPA communication file General External Communications file	1Q/11.3 Communication Processes File 3.04 DEC Environment Licence File 3.03 Environment- DEC & General File 3.07.01 Sydney Water- Trade Waste File no. 3.07.04- Water Reuse File no. 2.11 Licences Team Meeting minutes
4.4.4	Environmental management system documentation	Management System matrix	1Q/3.2 System Overview
4.4.5	Document control	Procedure for Document Control Procedure for Records Maintenance	1Q/6.2 Quality Documentation Control 1Q/6.4 Guide to Writing Procedures and Work Instructions.

4.4.6	Operational control	Process Control Manual Management of Landfill A Dust Suppression Log	1Q/3.1 Environmental procedures 3Q/12.1 Environment Procedures-Operational 3Q/12.20 Stockpile Spray system ops control 3Q/12.8 Water Collection ops control 3Q/12.15 Conveyor Spray System – MCR Control 3Q/12.3 Operational Cleaning- Planning
4.4.7	Emergency response	Procedure for Risk Management Emergency Response Plan	0Q/01.4 Risk Management 1Q/3.10 Emergency Management 1Q/2.11.1 Emergency Response
4.5	**Checking and corrective action**		1Q/11.2 Corrective and Preventative Actions
4.5.1	Monitoring and Measurement	Monitoring of Environmental Performance Inspection, measurement and Test Equipment Analysis of Incoming Liquid Waste Effluent Sampling Effluent Analysis	1Q/3.3 DEC Licence 1Q/3.6 Trade Waste also refer Environment Aspects Register in Management Plan EMP Rev5 0406.doc
4.5.2	Non-conformance and corrective and preventive action	Procedure for Corrective Action	1Q/11.2 Corrective and Preventative Actions INCIDENT REGISTER Customer Complaints Register File No. 3.71 Pollution Incidents
4.5.3	Records	Procedure for Records Maintenance	1Q/6.2 Quality Documentation Control 1Q/4.7 Storage & Retention of Records Central Filing System- refer procedures for specific file references.

4.5.4	Environmental management system audit	Procedure for Audits Audit Schedule	1Q/6.6 Internal Audit 1Q/10.02&10.04 Internal Audit Plan External Audits ex. Lloyds- refer file no.3.03.01
4.6	**Management review**	Management Review file	1Q/6.5 Management Review

NSW GOVERNMENT
Department of Planning

Major Development Assessment

Contact: Georgia Ivancevic
Phone: (02) 9228 6457
Fax: (02) 9228 6466
Email: georgia.ivancevic@planning.nsw.gov.au
Level 4 Western Gallery
23-33 Bridge Street
GPO Box 39
SYDNEY NSW 2001

Our ref: 9041530

Ms Debra Murphy
Port Kembla Port Terminal
PO Box 823
Wollongong NSW 2520

Dear Ms Murphy

Director-General's Requirements
Port Kembla Coal Terminal Project
Project Application 08_0009

The Department has received your application for the Port Kembla Coal Terminal Project in the Wollongong local government area.

I have attached a copy of the Director-General's requirements for the project. These requirements have been prepared in consultation with the relevant public authorities, and are based on the information you have provided to date. I have also attached a copy of the public authorities' comments for your information.

Please note that under section 75F(3) of the *Environmental Planning and Assessment Act 1979*, the Director-General may alter these requirements at any time.

As you are aware, the Department prefers operations like the coal terminal to operate under a single, modern planning approval; and consequently encourages you to develop the project with this express purpose in mind.

If your proposal is likely to have a significant impact on matters of National Environmental Significance, it will require an approval under the Commonwealth *Environment Protection Biodiversity Conservation Act 1999* (EPBC Act). This approval is in addition to any approvals required under NSW legislation. It is your responsibility to contact the Department of Environment, Water, Heritage and the Arts in Canberra (6274 1111 or http://www.environment.gov.au) to determine if the proposal requires an approval under the EPBC Act. The Commonwealth Government has accredited the NSW environmental assessment process for assessing any impacts on matters of National Environmental Significance. As a result, if it is determined that an approval is required under the EPBC Act, please contact the Department immediately as supplementary Director-General's requirements may need to be issued.

I would appreciate it if you would contact the Department at least two weeks before you propose to submit your Environmental Assessment for the project to determine the:

- applicable fees (see Division 1A, Part 15 of the *Environmental Planning and Assessment Regulation 2000*);
- consultation and public exhibition arrangements; and
- number of copies (hard-copy or CD-ROM) of the Environmental Assessment that will be required for exhibition purposes.

The Department will review the Environmental Assessment in consultation with the relevant authorities to determine if it adequately addresses the Director-General's requirements. If the Director-General considers the Environmental Assessment to be inadequate, you will be required to revise it prior to public exhibition.

The Director-General's requirements will be placed on the Department's website along with other relevant information which becomes available during the assessment of the project. As a result, I would appreciate it if all the documents subsequently submitted to the Department are in a suitable format for the web, and if you would arrange for an electronic version of the Environmental Assessment to be hosted on a suitable website with a link to the Department's website.

If you have any enquiries about these requirements, please contact Georgia Ivancevic on 9228 6457 or Georgia.Ivancevic@planning.nsw.gov.au

Yours sincerely

26.2.08

Chris Wilson
Executive Director
Major Project Assessment
As delegate for the Director-General

Director-General's Requirements

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

Application number	08_0009
Project	The continued use of existing and approved infrastructure at the Port Kembla Coal Terminal, allowing products to be received by road 24 hours a day, 7 days a week.
Location	Lot 100 DP 643687 / DP 647408 and PT Lot 1 DP 261720, Port Kembla Road, Port Kembla
Proponent	Port Kembla Coal Terminal
Date of Issue	26 February 2008
Date of Expiration	26 February 2010

General Requirements	The Environmental Assessment must include:
	• an executive summary;
	• a historical overview of the terminal's operations, including a detailed description of the existing and approved operations, all relevant statutory approvals, and the current regime for environmental management and monitoring on site;
	• a detailed description of the project, including the:
	  ▪ need for the project;
	  ▪ alternatives considered;
	  ▪ plans for any building works;
	  ▪ various components and stages of the project; and
	• consideration of any relevant statutory provisions, including whether the project is consistent with the objects of the *Environmental Planning & Assessment Act 1979*;
	• a general overview of the environmental impacts of the proposal, identifying the key issues for further assessment, and taking into consideration the issues raised during consultation;
	• a detailed assessment of the key issues specified below, and any other significant issues identified in the general overview of environmental impacts of the proposal (see above), which includes:
	  ▪ a description of the existing environment;
	  ▪ a description of the proposed changes to current operations and equipment (if any);
	  ▪ an assessment of the potential impacts of the proposal including any potential cumulative impacts;
	  ▪ a description of the measures that would be implemented to avoid, minimise, mitigate, offset, manage and/or monitor the impacts of the proposal;
	• a Statement of Commitments, outlining the proposed environmental management, mitigation and monitoring measures;
	• a conclusion justifying the project, taking into consideration the environmental, social and economic benefits of the project; and
	• a signed statement from the author of the Environmental Assessment certifying that the information in the report is neither false nor misleading.

Key Issues	• **Air Quality** – including dust and other emissions from the site; • **Traffic** – including the rationale for the use of road transport, details of traffic types and volumes likely to be generated; assessment of predicted impacts on road safety and the capacity of the road network, and a report on the extent and impacts of traffic during any road transport trial or during previous use of the "emergency provisions" under the repealed *State Environmental Planning Policy No 7 - Port Kembla Coal Terminal*;

	• **Noise** – including site and traffic noise; • **Water** – including site water management, stormwater management, the operational requirements of the site's environment protection licence and discharges from the project site; and • **Greenhouse Gas & Energy Efficiency** – including quantified assessment of greenhouse gases likely to be generated by the proposal, and a description of the measures that would be implemented to ensure the terminal is energy efficient.
References	The Environmental Assessment must take into account relevant State government technical and policy guidelines. While not exhaustive, guidelines which may be relevant to the project are included in the attached list.
Consultation	During the preparation of the Environmental Assessment, you should consult with the relevant local, State or Commonwealth government authorities, service providers, community groups or affected landowners. The consultation process and the issues raised must be described in the Environmental Assessment. In particular you should consult with: • Department of Environment and Climate Change; • Department of Primary Industries (Fisheries); • Roads and Traffic Authority; and • Wollongong City Council. The consultation process and the issues raised must be described in the Environmental Assessment.
Deemed refusal period	60 days

State Government Technical and Policy Guidelines - For Reference

Aspect	Policy /Methodology
Air Quality	
	Approved Methods for the Modelling and Assessment of Air Pollutants in NSW (DEC, 2005);
	Approved Methods for the Sampling and Analysis of Air Pollutants in NSW (DECC, 2007)
	Protection of the Environment Operations (Clean Air) Regulation 2002
Traffic and Transport	
	Guide to Traffic Generating Development (RTA, 2002)
	RTAs Road Design Guide (RTA)
	Illawarra and South Coast Freight Study (DoP)
Noise	
	NSW Industrial Noise Policy (DEC, 2000);
	Environmental Criteria for Road Traffic Noise (DEC, 1999);
	Environmental Noise Control Manual (DEC, 1994);
Water Quality	
	Managing Urban Stormwater: Treatment Techniques (EPA, 1997)
	Managing Urban Stormwater: Strategic Framework. Draft (EPA, 1996)
	Managing Urban Stormwater: Source Control. Draft (EPA, 1998)
Greenhouse Gas and Energy Efficiency	
	AGO Factors and Methods Workbook (AGO, 2006)
	Guidelines for Energy Savings Action Plans (DEUS, 2005)

Our reference : FIL08/332:DOC08/948:PW
Contact : Paul Wearne, (02) 4224 4100

Department of Planning
(Attention: Georgia Ivancevic)
GPO BOX 39
SYDNEY NSW 2001

Received
18 JAN 2008
Major Development Assessment
OSDAA

Dear Madam

PORT KEMBLA COAL TERMINAL
REQUEST FOR ENVIRONMENTAL ASSESSMENT REQUIREMENTS

We refer to your request for the Department of Environment and Climate Change (DECC) to identify key issues and requirements for the Environmental Assessment (EA) in regard to the above proposal. This proposal provides for the extension of public road receival capacity for 24 hours per day, seven days per week.

DECC has met with Port Kembla Coal Terminal on 1 November 2007 and discussed operational requirements under the Environment Protection Licence. Based on this meeting and information provided to date, the above proposed changes in operations do not appear to require any changes to the current licence. We will continue to seek ongoing environmental improvements, where required, through our ongoing regulation of the premises under this licence, for example by way of Pollution Reduction Programs.

On the basis of a review of the information provided to date, there are a number of environmental issues that should be assessed in the EA. These are outlined in Attachment A. These issues include:

- Noise and vibration
- Transport planning
- Air quality

These should be assessed in accordance with the relevant guidelines listed in Attachment A.

Should you require any further information please contact the officer listed above.

Yours sincerely

William Dove 15/01/2008
WILLIAM DOVE
Acting Manager Illawarra
Climate Change and Environment Protection

Att: Attachment A –EA Requirements

(N:Part 3A/EARs/DOC08/948PKCT INCREASE RECEIVAL HOURS.doc)

Attachment A

ENVIRONMENTAL ASSESSMENT REQUIREMENTS

The following environmental requirements should be addressed in the Environmental Assessment (EA) for the proposed development.

- Noise and vibration
- Transport planning; and
- Air quality

Details are required on the location of the proposed development including the affected environment to place the proposal in its local and regional environmental context including surrounding landuses, planning zonings, potential sensitive receptors, surface and sub-surface area/ features of conservation significance and environmental sensitivity. These should include areas containing natural and cultural heritage values.

Mitigation and management options that will be used to prevent, control, abate or mitigate identified environmental impacts associated with the project and to reduce risks to human health and prevent the degradation of the environment, should be described. This should include an assessment of the effectiveness and reliability of the measures and any residual impacts after these measures are implemented.

Impacts of Traffic Noise and Vibration

An assessment of impacts associated with facility operations and associated road activities should be undertaken in accordance with the recommended guidelines detailed in Attachment B.

The approach should reflect strategies to reduce the impact of traffic noise. These include, but are not necessarily limited to:

- governing maximum noise levels from individual vehicles
- best noise management practices
- developing programs to monitor and control noisy vehicles on the roads
- controlling noise from heavy vehicle exhaust and engine brakes
- implementing traffic management policies (such as the use of dedicated truck routes, enforcement of quiet zones, movement scheduling, and restricted access in residential areas during sleeping hours); and
- community consultation and complaint handling.

Transport Planning

The EA should take into account the Illawarra and South Coast Freight study prepared by the Department of Planning (DoP). The purpose of this study is to improve the detail and quality of freight related data for the Illawarra and South Coast regions and provide the foundation for the identification and development of potential options for the effective management of regional transport tasks. In addition the EA should document the model split between materials transported by truck and rail. Further information can be obtained by contacting DoP (Wollongong) on 4224 9459.

We also support the approach adopted for the Port Kembla Cargo Handling Facilty approval (MP 05-0073) which required the proponent to develop and implement all reasonable options, over time, to maximize the use of rail to transport coal to and from the coal loader.

Impacts on Air Quality

The environmental outcome for the project in relation to air quality is to ensure sensitive receptors are protected from any adverse impacts from dust. In addition, the development should ensure:

- National Environment Protection Measures (NEPM) ambient air quality goals should not be compromised
- dust emissions from material handling, storage, processing, haul roads, transport and material transfer systems are minimised; and
- vehicular kilometres travelled are minimised.

In this regard the EA should document that the proposed development would not result in any increased impacts relative to the current operations.

In relation to haulage, handling and transfer of coal, the EA will also need to document dust management and mitigation controls.

GUIDANCE MATERIAL

Noise and Vibration

- NSW Industrial Noise Policy (EPA, 1999)
- NSW Environmental Criteria for Road Traffic Noise (EPA, 1999)
- Environmental Noise Management Manual (RTA, Dec 2001)

Air Quality

- Legislative requirements under the Protection of the Environment Operations Act 1997 and its associated Regulation.
- Approved Methods and Guidance for the Modelling and Assessment of Air Pollutants in New South Wales (August 2001)
- Approved Methods for the Sampling and Analysis of Air Pollutants in New South Wales (July 2001).

NSW GOVERNMENT
Department of Planning

REQUEST FOR INPUT INTO DIRECTOR-GENERAL'S REQUIREMENTS

Development Proposal: Increased road receiving hours – Port Kembla Coal Terminal

From: Mr Neil McGaffin **Date:** 29 January 2008

Major Project Assessments - Contact Officer: Georgia Ivancevic **Name:** Georgia Ivancevic

Phone No: 9228 6457

Director-Generals Requirements or relevant information has been requested for the preparation of the following (tick applicable):

[ ] Environmental Impact Statement	[ ] Statement of Environmental Effects	[X] Review of Environmental Factors

Date Information Required By: **31 January 2008**

1. LEGISLATIVE FRAMEWORK

Please provide advice on whether the proposed development requires approval/concurrence under one or more of the following:

X	E P & A Act Part 3A Consent		Plantations & Reafforestation Act
	E P & A Act Part 4 Consent		Native Vegetation Conservation Act
	E P & A Act Part 5 Approval		Water Act
	Rivers & Foreshores Improvement Act		EPBC Act (Cwth)
	Water Management Act		Roads Act
	Coastal Protection Act		Mining Act
	Hunter Water (Special Areas) Regs		Crown Lands Act

2. PLANNING INSTRUMENTS, POLICIES & STRATEGIES

2.1. List applicable State, Regional & Local EPIs, DCPs, Policies, or Strategies (including drafts), Water Sharing Plans, Regional Vegetation Management Plans that apply and any particularly relevant provisions

- Wollongong LEP 1990
- Illawarra Regional Environmental Plan No. 1
- Illawarra Regional Strategy
- State Environmental Planning Policy (Infrastructure) 2007

2.2. Is the proposal permissible?

[X] Yes [ ] No

Provide details on the relevant zoning provisions or permissibility. Also, where a project is not clearly in one category, please provide details:

- The Port Kembla Coal Terminal is zoned 5(a) Special Uses – Port, whilst the F6 Southern Freeway and Northern Distributor Corridor along which the majority of trucks travel is zoned 5(c) Main Roads under the Wollongong LEP 1990.

2.3. List any relevant concurrence / consultation requirements? (If yes, please identify the instrument and provisions):

- Before being repealed by SEPP Infrastructure (2007), concurrence was required under SEPP 7 (Port Kembla Coal Loader) for an increase in road receiving hours.

2.4. List any relevant Planning Strategies / Studies or relevant current work items:

- N/A

3. NATURAL RESOURCE STRATEGIES & PLANS

3.1. List applicable NSW State Natural Resource Management Policies, Strategies, & Plans (eg Catchment BluePrints, Estuary Management Plans, Coastal Management Plans & Flood Prone Risk Management Plans), NSW Coastal Policy & Flood Prone Land Policy that may apply to the proposal or any relevant provisions:

- N/A

4. KEY ISSUES

4.1. What are likely to be the key issues? Prioritise – high, important, other, and list any specific information including modelling, maps, plans and data collection, that should be considered to address the issue. Information may be attached to this form.

Note: Major Project Assessments has prepared a number of EIS Guidelines for certain types of proposals, activities and issues. A list of the current EIS Guidelines is provided at the end of this Form. If this Form relates to a type of proposal, activity or issue that has an EIS Guideline, it is not necessary for your requirements to duplicate the information covered in the Guideline. However you may still provide a list of the key issues you consider as being important for the proposal or activity to address.

- Noise – High
- Air Quality – High
- Road/Motorist Safety - Important
- Limitations on the Coal Terminal - Important
- Alternatives to road haulage – Important
- Cumulative impact of other port based operations

4.2. In your opinion, is the proposal likely to be of local, regional or State interest? Please provide details.

- State Interest – The efficient export of coal from Port Kembla is important to New South Wales as the Port Kembla Coal Terminal exports all coal sourced from the Southern and Western coalfields.

4.3. For Part 5, where DoP is a determining authority, has it considered the need for an EIS

[ ] Yes [X] No

If yes, please detail:

- N/A

4.4. Does the site have a history that is of relevance to this proposal?

[X] Yes [ ] No

If yes, please detail:

- The transport of coal by road to the Port Kembla Coal Terminal has been regulated since the introduction of SEPP 7 (Port Kembla Coal Loader) in 1982.

• Local road upgrades and improvements over the past 25 years have meant that coal truck haulage routes are now largely isolated along main roads such as the F6 Southern Freeway and Northern Distributor.
• In addition to road transport, the Port Kembla Coal Terminal receives an average of eight coal trains per day, delivering approximately 57 percent of total coal to the site.

5. CONSULTATION

5.1. Please list any agencies, councils, community group, or other interested parties with whom the proponent should consult.

• Residents surrounding main haulage routes
• Wollongong City Council
• Roads and Traffic Authority
• Department of Environment and Climate Change
• Australian Trucking Association – NSW Branch
• Australian Coal Association

6. CONTACT

6.1. Please provide the name and contact details of a nominated officer for ongoing liaison with your office.

Name	Julia Kaul	Contact No.	4224 9472
Position	Environmental Planning Officer	Date	29 January 2008

EIS GUIDELINES

Section A: Chemical, Petroleum, Manufacturing and Materials Processing

- Chemical facilities
- Bitumen works
- Concrete works

Section B: Extractive Industries, Mining and Mineral Processing

- Extractive industries – Quarries
- Extractive industries – Dredging and other extraction in riparian and coastal areas
- Coal Mines and Associated Infrastructure

Section C: Livestock, Agriculture, Aquaculture and Forestry Industries

- Cattle feedlots
- Piggeries
- Poultry farms
- Large Scale Irrigation in the Murray, Murrumbidgee and Darling Basin (Draft)

Section D: Transport and Energy

- Roads and related facilities
- Marinas and related facilities
- NSW Wind Energy (Draft)
- Network Electricity Systems and Related Facilities
- Railway Facilities (Draft)

Section E: Water and Waste

- Landfilling
- Composting and related facilities
- Sewerage systems
- Irrigation of sewage effluent
- Aquatic Ecology
- Aquaculture in Natural Waterbodies
- Aquaculture in Land-based Activities

Georgia Ivancevic - Port Kembla Coal Terminal

From: "Chris Lacey" <Chris.Lacey@dpc.nsw.gov.au>
To: <georgia.ivancevic@planning.nsw.gov.au>
Date: 23/01/2008 14:21
Subject: Port Kembla Coal Terminal

Dear Ms Ivancevic

Re Port Kembla Coal Terminal

I refer to your email to Mark Roberts, Illawarra Regional Coordinator, dated 9 January, requesting details of key issues and assessment requirements associated with a proposal to increase the road receival hours at the Port Kembla Coal Terminal. Mr Roberts has requested that I respond on his behalf.

I can confirm that the Department received a copy of the Preliminary Environmental Assessment (October 2007), which outlines the key issues associated with the proposal.

As you would be aware, the NSW Government has recently committed $140M to upgrade the Port of Port Kembla as part of the NSW Ports Growth Strategy, and therefore has a strong interest in ensuring the port precinct generally is operating efficiently to maximise its productive capacity for the benefit of the Illawarra and NSW economy. It would appear the current restrictions operate to limit the productive capacity of the Port and, as such, should only remain if there are strong grounds to justify them.

On the basis of the information provided, it would also appear that the circumstances which led to the introduction of road haulage restrictions on the Port Kembla Coal Terminal have changed sufficiently to warrant a prima facie re-examination of the need for, and effects of, such restrictions.

The Preliminary Environmental Assessment provides a useful overview of the main issues associated with the proposal, and I trust the key technical landuse, transport and environmental assessment requirements will be identified in detail by the responsible agencies and addressed by the applicants.

The potential noise impacts generated by the proposal, particularly in the evenings to adjacent residents along Mt Ousley Road, would warrant deliberate efforts by the applicant to consult and inform the community about the proposal and to provide opportunities for early feedback. The assessment should also take into account any effects on the likely future community that will reside in the Horizon Seaside Links aged care complex (currently under construction) at the southern end of the Wollongong Golf Course.

I trust this information is of assistance, and if you require further information please contact me on the number below.

Sincerely,
Chris Lacey
23.1.08

Chris Lacey
Assistant Regional Coordinator, Illawarra
Strategic Projects Division
Department of Premier & Cabinet

Ph. 02 42276931
Fax. 02 42249901
M. 0409 044 487

Georgia Ivancevic

From: <judith.egan@dpi.nsw.gov.au>
To: <Georgia.Ivancevic@planning.nsw.gov.au>
Date: 30/01/2008 10:18

Georgia

Department of Primary Industries-Mineral Resources have no concerns with the proposal to extend the receiving hours for the Port Kembla Coal Terminal. The Port Kembla Coal Terminal does not operate within a Mining Lease and DPI does not have a statutory responsiblity for the site. However, an increase in the amount of coal being delivered to the terminal will be reflected in the Mining Operations Plans which are a DPI requirement for all mines.

Regards

Judith Egan
Team Leader, Environment
Environmental Sustainability Branch
Southern Region (Wollongong)
Department of Primary Industries

Phone: 02 4222 8310
Mobile: 0429 082 258

Katestone Environmental

AIR QUALITY ASSESSMENT OF INCREASED ROAD RECEIVAL HOURS AT PORT KEMBLA COAL TERMINAL

May 2008

Final

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DOCUMENT DETAILS

Job Number: *KE0712578*	***Date:*** *12/05/2008*
Title: *Air Quality Assessment of Increased Road Receival Hours at Port Kembla Coal Terminal*	
Client: *Port Kembla Coal Terminal*	
Document reference: *Aq_assess_PKCT_24_7* 1.1.docx	

Revision No.	***Prepared by:***	***Reviewed by:***	***Approved by:***	***Date***
Rev 1.0	*Natalie Leishman*	*Simon Welchman*	*Simon Welchman*	*12/05/08*

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1. Introduction

Katestone Environmental has been commissioned by Port Kembla Coal Terminal Limited (PKCT) to undertake an air quality assessment of the Port Kembla Coal Terminal located in the Inner Harbour at Port Kembla, near Wollongong, New South Wales.

PKCT currently operates under consent conditions attached to its Development Approval. State Environmental Planning Policy (SEPP) (Infrastructure) 2007, has superseded three of these consent conditions in relation to road haulage and limits the hours in which PKCT is permitted to receive coal deliveries by public road to between 7am and 6pm on Monday to Saturday.

Based on studies of maximum throughput, this time restriction constrains the maximum capacity of PKCT to receive coal by public road to 5.2 million tonne per year.

PKCT is seeking approval to increase road receival of coal from 7 am to 6 pm Monday to Saturday to 24 hours per day, 7 days a week at their facility for a maximum of 10 million tonnes per year of coal received by public road.

This report presents the results of an air quality assessment that has been undertaken in accordance with the Department of Environment and Climate Change's (DECC) air quality assessment requirements that are specified in the document: *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (DEC, 2005).

2. Site description

2.1 Site location

The PKCT is located in the Inner Harbour at Port Kembla, near Wollongong (Figure 1). PKCT is zoned (5B) Special uses (Port) under Wollongong local Environmental Plan 1990. Surrounding land is predominantly zoned 5(B) Special Uses (Port) or 4(B) Heavy Industry under the same planning instrument. Residential areas are located approximately 1 kilometre to the north, 3.5 kilometres to the west and 2 kilometres south of PKCT.

2.2 Overview of PKCT current and proposed operations

Coal is currently received at PKCT by rail (65%) and road (35%). Approximately seven trains are unloaded per day each delivering around 3300 tonnes of coal. Coal is recovered from the receival bins of both receival facilities through under-bin belt feeders at a rate of up to 4,200 tonnes per hour.

Coal is transported by conveyor from the rail and road receival bins to the stockyard. Three rail-mounted stackers distribute the coal into stockpiles. If necessary, different coal types can be blended during the stacking process. The terminal's stockyard has an east and a west pad each 50 metres wide and 1 kilometre long. The stockyard has a total capacity of 850,000 tonnes with an optimal working capacity of 600,000 tonnes.

PKCT has two track-mounted bucket-wheel reclaimers that reclaim the coal from the stockpiles. Coal is transported from the reclaimers via conveyors to the shiploader. The reclaiming machines have ten buckets on their wheels and are capable of reclaiming 6,600 tonnes per hour. On the way to the vessel, the coal passes through a sampling plant where samples are taken to measure coal quality, moisture and ash content.

PKCT has two shiploading berths. Berth 102 is the main coal berth, while Berth 101 is primarily used for loading coke, slag and other bulk products. The coal berth has two rail-mounted shiploaders capable of loading at 6,600 tonnes per hour. The No. 1 Berth has a separate stockpile area where bulk cargoes, usually coke or steelworks slag, are stored prior to loading.

Figure 2, Figure 3 and Figure 4 are aerial photographs that show the PKCT site and surrounding activities.

PKCT currently operates under consent conditions attached to its Development Approval. SEPP (Infrastructure) 2007 has superseded three of these consent conditions in relation to road haulage and limits the hours during which PKCT is permitted to receive coal deliveries by public road to between 7am and 6pm on Monday to Saturday. Based on studies of maximum throughput, this time restriction constrains the maximum capacity of PKCT to receive coal by public road to 5.2 million tonne per year.

PKCT is seeking approval to increase road receival of coal from 7 am to 6 pm Monday to Saturday to 24 hours per day, 7 days a week for a maximum of 10 million tonnes per year of coal received by public road. This proposed amendment to road receival of coal does not result in changes to the approved throughput of the facility nor does it change the size and operation of the stockpiles. There will be no changes to the on-site infrastructure that is associated with stacking, reclaiming or shiploading.

The increase in road receivals will be achieved by increases in unwashed coal from the Gujarat NRE No. 1 Mine and from the Westcliff and Appin Mines via the Westcliff Washplant.

3. Air quality standards

The Department of Environment and Climate Change (DECC) lists the impact assessment criteria for criteria pollutants in the *Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales* (2005). This provides criteria for 24-hour and annual average concentrations of PM_{10}[1], annual average concentrations of total suspended particulate (TSP) and annual average dust deposition rate.

The PM_{10} criteria are based on the standards contained in the NEPM (Ambient Air Quality). All impact assessment criteria apply at sensitive receptor locations such as dwellings, schools, hospitals, offices or public recreational areas.

Criteria are summarised in Table 1.

[1] PM_{10} are particles that are suspended in the atmosphere and that have an aerodynamic diameter of less than 10 micrometres

Table 1: Impact assessment criteria for particles

Pollutant	Standard	Units	Averaging period
Particulates as TSP	90	µg/m³	Annual
Particulates as PM_{10}	50 30	µg/m³ µg/m³	24 hour Annual
Deposited dust	2[1] 4[2]	g/m²/month	annual

Table note
[1] Maximum increase in deposited dust level above background
[2] Maximum total deposited dust level (increment plus background)

4. Existing environment

4.1 Meteorology

4.1.1 Regional Meteorology

4.1.1.1 Temperature, Relative Humidity and Rainfall

The Bureau of Meteorology (BoM) conducts meteorological monitoring by use of an automatic weather station at Wollongong Airport, which is located approximately 15 kilometres to the southwest of PKCT and at Wollongong University, which is located approximately 5 kilometres to the northwest of the PKCT.

A summary of long-term climate data is presented in Table 2 from the BoM stations. Monthly averages of mean, maximum and minimum temperatures, relative humidity, rainfall and pressure are presented.

The summer months are the hottest months with the average maximum temperature of 25.6°C. The highest temperature recorded was 44.1°C in January 2006. July is typically the coldest month with average minimum temperatures approximately 8°C. The lowest temperature recorded was 0.2°C in July 1986. Relative humidity is higher in the summer months than the winter months. Summer and autumn months tend to experience the highest average rainfalls with rainfall in March typically twice that of July and August.

Table 2: Monthly averages for various meteorological variables for the period from 1970 to February 2008 for temperature, relative humidity and rainfall and from June 1999 to December 2007 for atmospheric pressure.

Month	Temperature (^oC)		Relative Humidity (%)		Rainfall (mm)	Pressure (hPa)
	Mean Maximum	Mean Minimum	9am	3pm		
January	25.6	17.9	70	68	130.3	1012.4
February	25.6	18.2	73	69	150.6	1014.0
March	24.5	16.8	70	66	162.8	1016.0
April	22.6	14.2	65	63	130.0	1019.2
May	20	11.8	66	62	109.3	1018.0
June	17.6	9.4	64	58	113.2	1018.0
July	17	8.3	62	54	63.4	1018.5
August	18.3	8.8	57	52	83.3	1017.3
September	20.3	10.6	55	55	66.6	1015.3
October	22.1	12.6	60	61	100.5	1014.0
November	22.9	14.4	66	64	115.6	1012.0
December	25.1	16.5	66	64	94.6	1012.3

4.1.1.2 Wind Speed and Wind Direction

The wind rose for the period 1999 to 2007 is presented in Figure 5 for the Wollongong Airport. The wind rose indicates that Wollongong Airport predominantly receives moderate to strong westerly winds with less frequent light to moderate southerly and northeasterly winds.

4.1.2 Local Meteorology

The PKCT is located in an area of relatively complex terrain. Due to the complex nature of the site, a site representative meteorological file was generated using the CSIRO model, TAPM. A detailed description of model setup is provided in Appendix A. A summary of the meteorological parameters that are important for dispersion of pollutants is provided in the following sections.

The wind rose for all hours of the year 2004, as predicted by TAPM, is presented in Figure 6 for the PKCT site. Figure 7 illustrates the distribution of winds based on time of day. The wind rose indicates that very light to moderate wind speeds are commonly experienced at the site from a west to southwesterly direction in the morning, increasing to moderate winds from a northeasterly direction in the afternoon. During the evening these winds begin to weaken and return to light to moderate winds from a west to southwesterly direction.

Figure 8 illustrates the seasonal variation in winds. Summer winds are typically dominated by moderate northeasterly winds, while the light to moderate west and southwesterly winds occur during winter, light to moderate southwesterly winds occur in autumn and light northeasterly and southeasterly winds occur in spring.

4.2 Air quality

4.2.1 Existing sources

Port Kembla has a number of industrial facilities that have the potential to impact on dust levels in and around Wollongong.

Table 3 shows all industries that are within the region that emit particulate matter (as PM_{10}) and report to the National Pollutant Inventory (NPI). The most important off-site dust sources that could contribute to dust levels in the local area are located at the BlueScope Steel steelworks approximately 1.1 kilometres west of PKCT.

Motor vehicles and salt spray are also likely to be important sources of PM_{10} emissions in the region. The latter may be most evident when the wind direction is from the south-southeast through to east and through to north. Studies by Australian Nuclear Science and Technology Organisation (ANSTO) of particulate levels at Warrawong (Cohen 1999) have found that the component of sea salt in $PM_{2.5}$ dust monitoring samples to be about 11% of the total and motor vehicles to account for 27% of the total.

Table 3: Inventory of emission sources of particulate matter as PM_{10}. Total annual emission rates reported for 2006-2007 (NPI)

Facility Name	Locality	ANZSIC Class Name	Relative location to PKCT		PM_{10} (kg)
			Distance	Direction	
BlueScope Steel Port Kembla Steelworks	Port Kembla	Iron Smelting and Steel Manufacturing	1.1	W	1191357
Corrimal Coke Works	Corrimal	Other Petroleum and Coal Product Manufacturing	7	N	28401.6
Coalcliff Coke Works	Coalcliff	Other Petroleum and Coal Product Manufacturing	23.7	NNE	25572.6
Elouera Colliery	Wongawilli	Coal Mining	11.8	WSW	6923
Shinagawa Refractories Australasia, Glastonbury Avenue site	Unanderra	Other Ceramic Product Manufacturing	4	WSW	6421.2
BlueScope Illawarra Coated Products - Springhill	Port Kembla	Iron Smelting and Steel Manufacturing	2.2	W	6200
Industrial Galvanizers Port Kembla	Port Kembla	Metal Coating and Finishing	2.6	SSW	2974
BlueScope Steel CRM Service Centre	Port Kembla	Iron Smelting and Steel Manufacturing	1.3	S	1200
Boral Asphalt Port Kembla	Port Kembla	Other Petroleum and Coal Product Manufacturing	2.3	SSE	1042
Orica Port Kembla Site	Port Kembla	Basic Inorganic Chemical Manufacturing	1.7	SSE	385.16
Wollongong Sewage Treatment System	Wollongong East	Sewerage and Drainage Services	0.5	N	142.96
BOC Gases Port Kembla	Cringila	Industrial Gas Manufacturing	2.1	SW	106.3

4.2.2 Monitoring

The closest monitoring station to the PKCT that measures PM_{10} is the DECC Wollongong monitoring station located 3.2 kilometres to the northwest of PKCT. Figure 9 shows 24-hour average concentrations of PM_{10} for the period 2004 to 2006. A summary of the 24-hour and annual average concentrations for each year are presented in Table 4. The NEPM standard allows the 24-hour average standard of 50 $\mu g/m^3$ to be exceeded up to 5 days per year, therefore if the sixth highest 24-hour average concentration meets the 50 $\mu g/m^3$, compliance is achieved. Existing levels of PM_{10} meet the 24-hour NEPM standard and the annual DECC criterion.

Table 4: Measured 24-hour average and annual average concentrations of PM_{10}. (DECC Wollongong data)

Year	24-hour average ($\mu g/m^3$)			Annual average ($\mu g/m^3$)
	Maximum	5th highest	6th highest	
2004	48.1	45.3	44.1	18.5
2005	54.8	44.0	43.5	18.6
2006	62.0	51.6	47.4	20.2
Standard/criteria	**50 (exceedances allowed 5 days per year)**			**30**

BlueScope Steel monitors levels of TSP using a high volume air sampler at four locations around the local area. One of these monitoring locations is approximately 1.3 kilometre to the north of PKCT. A summary of annual TSP levels measured is provided in Table 5. The levels are above the criteria of 90 $\mu g/m^3$. This is most likely a result of the existing mix of industrial activities, motor vehicles and natural sources such as salt spray. PKCT is unlikely to contribute substantially to these levels given the results of dust deposition monitoring that is conducted closer to PKCT. The dust deposition monitoring results are discussed below.

Table 5: Measured annual average concentrations of TSP (Blue Scope Steel monitoring data)

Year	TSP ($\mu g/m^3$)
2004	101
2005	105
2006	101
Goal	**90**

Dust deposition monitoring is conducted by PKCT at 15 locations in and around the local area. Three of these gauges are located within residential areas to the north. Figure 10 presents the annual average dust deposition rate from 1990 to 2006 for the three sites. Both insoluble solids and combustible matter are presented in this figure.

Coal is mostly made up of organic material and therefore will combust. Approximately 10% of coal will be non-combustible material. A summary of annual average insoluble solids, combustible material and ash measured for the years 1990 to 2006 is provided in Table 6. If a significant proportion of the insoluble solids is made up of ash this would suggest that coal is not the main source of insoluble solids.

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Table 6 shows that under most circumstances combustible matter contributes less than 2 g/m^2/month to the level of insoluble solids at the residential areas to the north of PKCT. Averaged across each site for the last seven years, combustible matter contributed 33% to the total insoluble solids. The majority of the insoluble solids that is measured in the residential areas to the north of PKCT is made up on non-combustible material and therefore not coal dust. This indicates that current operations of PKCT do not exceed the DECC's amenity criteria for dust deposition rates in residential areas.

Table 6: Measured annual average total insoluble, combustible material and ash for three residential areas (g/m^2/month) (PKCT data)

Year	177 Corrimal Street			81 Auburn Street			157 Church Street		
	Insoluble solids	Comb-ustible	Ash	Insoluble solids	Comb-ustible	Ash	Insoluble solids	Comb-ustible	Ash
1990	4.68	1.52	3.16	3.24	1.13	2.11	4.60	2.00	2.60
1991	2.73	1.01	1.72	1.82	0.68	1.14	2.05	0.71	1.35
1992	3.31	1.57	1.74	2.18	0.85	1.33	1.78	0.63	1.14
1993	2.84	1.04	1.80	1.88	0.66	1.23	1.29	0.49	0.80
1994	3.05	1.20	1.85	2.96	0.98	1.98	2.41	0.88	1.53
1995	3.21	1.17	2.04	2.53	1.03	1.50	2.14	0.72	1.42
1996	3.25	1.40	1.85	2.39	0.88	1.51	2.26	0.89	1.37
1997	4.27	1.96	2.31	2.21	0.90	1.31	2.48	0.75	1.73
1998	3.49	1.26	2.23	2.15	0.80	1.35	2.49	0.80	1.69
1999	4.73	1.55	3.18	2.27	0.89	1.38	2.13	0.76	1.37
2000	3.95	1.27	2.68	2.23	0.73	1.51	2.57	0.86	1.71
2001	6.95	1.57	5.38	2.15	0.85	1.29	2.09	0.73	1.36
2002	9.77	1.79	7.98	3.11	0.95	2.15	3.05	0.85	2.20
2003	7.63	1.92	5.71	3.09	0.96	2.13	3.61	1.26	2.35
2004	5.38	1.59	3.79	2.49	0.85	1.65	2.72	0.84	1.88
2005	4.24	1.34	2.90	2.49	0.83	1.66	2.55	0.85	1.69
2006	5.03	1.89	3.14	3.33	1.20	2.13	2.15	1.29	0.85

5. Emission estimation

5.1 Nature of dust producing activities at PKCT

In general, dust emissions can occur at any point where coal is picked up, conveyed, discharged, crushed or open to erosion by the wind. Whilst stockpiles are the primary source of wind erosion, secondary dust emissions can also occur due to wind action on material that has been spilled or deposited on structures.

External factors also contribute to elevated emissions of dust. Meteorological conditions at the terminal and in transit from the mine to the coal terminal have an important affect on the dustiness of coals during handling and storage at the port. Hot and dry conditions can enhance the dustiness during transit from the mine and can result in elevated emissions during unloading. Windy conditions can lead to erosion during stacking and reclaiming.

Activities that are associated with the most significant dust emissions from coal terminals are:

- Fugitive dust from wind erosion of coal stockpiles;
- Fugitive dust from front end loader operations in the bulk materials area;
- Stacking and reclaiming;

- Coal conveying;
- Shiploading; and
- Receival of coal from road.

Minor amounts of wind-blown dust are also associated with vehicular activity on-site and wind erosion of dust from bare ground.

5.2 Dust suppression and mitigation

A variety of dust suppression and mitigation strategies are implemented at PKCT. They are as follows:

- Yard sprays are installed along the coal stockpiles and operate on an automatic cycle that is varied depending on wind conditions. Water sprays on stockpiles are triggered when:
    - Wind speed exceeds 10 m/s;
    - Coal moisture is reduced through drying; and
    - Early warning is received of increased wind speeds.
- Yard sprays may also be manually controlled and set to spray coal stockpiles on cycles between 30 minutes and 6 hours
- Road sweeper and water cart for minimisation of dust on site roads;
- Water sprays at road receival;
- Enclosure of rail receival within a building;
- Fully enclosed inloading conveyors;
- Wind guards on outloading conveyors;
- All transfer points are fully enclosed transfer points with the exception of TS6. TS 6 has an enclosed chute;
- Road receival facility has truck washing facilities; and
- Variable height stackers are used to load coal into stockpiles.

Whilst truck washing facilities are installed, visual observations suggest that there is some tracking-out of coal along the PKCT access road. This may be attributed to some inadequacies in the implementation or effectiveness of the truck washing facility. Works should be implemented to ensure that the truck washing facility is effective.

PKCT has also developed a dust management strategy that consists of the following:

(a) Networking with other similar terminals to ensure PKCT is up to date with best practice dust management methodologies
(b) Obtaining better information on ambient dust levels by installing two continuous dust monitors to supplement existing dust deposition gauges. This will provide real time data to enable PKCT to develop a better understanding of dust emissions and their relationship to weather conditions. This will also assist operational control.
(c) Investigating the benefits of using agglomerating chemicals to reduce the dustiness of the materials that are handled on-site and to reduce wind erosion of unsealed areas.
(d) Investigating the dust extinction moisture levels of the materials that are handled on-site to ensure that products are maintained at their optimum moisture content and are less prone to dust emission.
(e) Improving site practices and housekeeping to reduce the likelihood of fugitive dust emissions.
(f) Providing effective environmental management practices through ISO 14001 certification

(g) Increasing environmental accountability, competency and awareness via a sustainability program.

Given that part of the increase in coal throughput will be achieved by increased deliveries of unwashed coal from the Gujarat NRE No. 1 Mine, additional dust characterisation works in accordance with (c) and (d) above are recommended.

5.3 Dust Emissions Rates

Table 7 presents the average dust emission rate estimated for the PKCT. The PKCT is presented at its nominal throughput of 17 Mtpa. Dust emissions from road receival are based on 10 Mtpa being unloaded within the road receival facility. The remainder is unloaded at the rail receival facility. The largest source of dust emissions is the coal stockpiles. These represent about half of the total emissions of PM_{10} from PKCT. Dust emission rates from on-site emission sources that represent 98% of total site emissions will remain unchanged as a result of the proposal to receive coal by road 24 hours per day.

Emissions of dust from road and rail receival are equivalent per tonne of throughput because the emission controls that are implemented provide an equivalent reduction in total emissions. Shifting coal unloading between the road and rail facilities is therefore unlikely to substantially change total dust emissions.

The dust emission estimates presented in Table 7 differ from the data most recently provided by PKCT to the National Pollutant Inventory. The emission rates presented in Table 7 are based on more detailed information on throughput, dust controls and stockpile areas than that provided to the National Pollutant Inventory.

Table 7: Dust Emission Rates (kg/year) for Important Dust Producing Activities at the PKCT.

Activity	Dust emission rates (kg/year)	
	TSP	**PM_{10}**
Road	840	397
Rail	588	278
Conveyors	23254	8465
Transfer points	5893	1788
Stacking	6202	2933
Reclaiming	6202	2933
Stockpiles	38037	19018
Shiploading	1888	843
Exposed areas	6207	3103
Bulk material handling	22859	11340
Total	**111970**	**51100**

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6. Dispersion modelling

6.1 Model setup

Dispersion modelling has been undertaken to estimate ground-level concentrations of PM_{10}, TSP and dust deposition rate due to the operation of PKCT with road receival occurring 24 hours per day. The Australian regulatory dispersion model AUSPLUME (Version 6) was used for this assessment. The AUSPLUME model was originally developed in 1986 by the Victorian EPA to assist with the assessment and licensing of new developments.

The AUSPLUME model was setup with the following inputs:

- Grid size of 4 km by 5 km with a grid resolution of 50 metres;
- Flat terrain;
- Surface roughness of 0.4 m to account for surrounding land use
- Pasquill Gifford horizontal and vertical dispersion curves;
- Default temperature gradients;
- Irwin urban wind profile exponents, and
- An hourly varying emission source file for particulates.

The modelling was conducted to predict the long-term (i.e. 24-hour and annual average) concentrations of PM_{10}, annual average concentrations of total suspended particulates (TSP) and annual average dust deposition rates.

Ambient monitoring information for PM_{10} at the DECC's Wollongong site was used to characterise the background levels of PM_{10}. The recorded hourly background was added to the hourly modelled concentrations for each receptor. A contemporaneous assessment has been undertaken to determine the likelihood that this proposal could result in additional exceedances of the impact assessment criteria.

A conservative background dust deposition rate of representative of residential areas to the north was used in the assessment, to characterise the worst-case annual average.

6.2 Results

The predicted 24-hour average and annual average concentrations of PM_{10}, the annual average concentrations of TSP and annual average dust deposition rate are presented in Table 8 at nearest residences to PKCT. The ground-level concentrations are due to the PKCT operating with road receival occurring 24 hours per day. The results show that predicted ground-level concentrations due to the entire PKCT operations are well below the relevant DECC criteria.

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Table 8: Predicted ground-level concentrations of PM_{10}, TSP and dust deposition rate due to PKCT operations (not including background)

Receptor	PM_{10} (µg/m^3)		TSP (µg/m^3)	Deposition (g/m^2/month)
	24 hour	**Annual**	**Annual**	**Annual**
R1 (1.3 km/N)	4.7	0.4	0.8	0.07
R2 (1.7 km/NW)	2.3	0.2	0.4	0.04
R3 (1.65 km WNW)	1.5	0.1	0.3	0.01
R4 (2.5 km SW)	1.1	0.1	0.3	0.02
R5 (2.8 km SSW)	1.9	0.1	0.3	0.03
R6 (2.6 km S)	2.2	0.2	0.4	0.03
Criteria	**50**	**30**	**90**	**2**

The Links Seaside Development is located to the north of Receptor R1 on the corner of Ross and Corrimal Streets. Dust levels at the Links Seaside Development due to operations of PKCT are likely to be lower than those predicted at Receptor R1 and are not expected to cause adverse impacts.

Figures 11-14 present contour plots of the predicted 24-hour average and annual average concentrations of PM_{10}, the annual average ground-level concentration of TSP and annual average dust deposition rate due to the PKCT. The results show maximum concentrations are predicted to occur on site or to the immediate east.

Table 9 presents the predicted concentrations of dust due to PKCT operations with background levels included. The results show the predicted ground-level concentrations are below the criteria for PM_{10} and dust deposition rate, but exceed the criteria for TSP due to the existing background levels being above 90 μg/m^3.

Table 9: Predicted ground-level concentrations of PM_{10}, TSP and dust deposition rate (including background)

Receptor	PM_{10} (µg/m^3)		TSP (µg/m^3)	Deposition (g/m^2/month)
	24 hour	**Annual**	**Annual**	**Annual**
R1 (1.3 km N)	49.1	18.9	102	3.7
R2 (1.3 km N)	48.3	18.8	101	3.6
R3 (1.65 km WNW)	48.5	18.8	101	3.6
R4 (2.5 km SW)	48.5	18.7	101	3.6
R5 (2.8 km SSW)	48.3	18.7	101	3.6
R6 (2.6 km S)	49.1	18.7	101	3.6
Criteria	**50**	**30**	**90**	**4**

7. Conclusions

PKCT currently operates under consent conditions attached to its Development Approval. SEPP (Infrastructure) 2007 has superseded three of these conditions in relation to road haulage and limits the hours during which PKCT is permitted to receive coal deliveries by public road to between 7am and 6pm on Monday to Saturday.

Based on studies of maximum throughput, this time restriction constrains PKCT's maximum capacity to receive coal by public road to 5.2 million tonne per year.

An air quality assessment has been undertaken to assess the potential impacts PKCT may have on the local area if they receive approval to increase road receival of coal to 24 hours per day, 7 days a week.

The assessment found that:

- For the existing operations at PKCT, maximum concentrations of PM_{10} and TSP and dust deposition rates due to all activities at PKCT are expected to be well below the relevant air quality criteria for human health and amenity.

- The largest source of dust emissions is the coal stockpiles. These represent about half of the total emissions of PM_{10} from PKCT. These will be unchanged as a result of the 24-hour road receival.

- Emissions of dust from road and rail receival are equivalent per tonne of throughput because the emission controls that are implemented provide an equivalent reduction in total emissions. As a consequence, increasing road receival will not substantially affect coal dust emission rates provided that existing dust controls are diligently applied and tracking-out of coal along access roads is minimised.

- Whilst truck washing facilities are installed at PKCT, visual observations suggest that there is some tracking-out of coal along the PKCT access road. This may be attributed to some inadequacies in the implementation or effectiveness of the truck washing facility. Works should be implemented to ensure that the truck washing facility is effective.

- Part of the increase in coal throughput will be achieved by increased deliveries of unwashed coal from the Gujarat NRE No. 1 Mine. Additional dust characterisation works in accordance with the PKCT dust management strategy are recommended.

- Maximum concentrations of PM_{10}, TSP and dust deposition rates due to PKCT are predicted to occur on site or to the immediate east.

- Maximum concentrations of PM_{10}, TSP and dust deposition rates due to all activities at PKCT, including the proposed increase in road receival, are predicted to be well below the relevant air quality criteria for human health and amenity.

- Predicted 24-hour average and annual average concentrations of PM_{10} are less than 5 $\mu g/m^3$ and 0.5 $\mu g/m^3$, respectively at the closest residences due to PKCT. These are well below the 24-hour NEPM standard of 50 $\mu g/m^3$ and the annual average DECC criterion of 30 $\mu g/m^3$.

- Predicted annual average concentrations of TSP and dust deposition rates are less than 1% and 4% of the relevant criteria.

8. References

Cohen D (1999), “Seasonal and regional variations in ambient fine particle concentrations and sources in New South Wales, Australia: A seven year study”, International Conference on Urban Climatology, November 1999.

DEC (2005), “Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales”, Department of Environment and Conservation.

National Environment Protection Council (NEPM) (2003), “National Environment Protection ambient air quality Measure”.

New South Wales Department of Environment and Climate Change (NSW DECC) (2006), “Action for Air”, 2006 update

New South Wales Mineral Council (2000), “Particulate matter and mining”, a NSW Minerals Council Technical Paper.

USEPA (1995) - AP42, Fifth Edition, Volume 1: Stationary Point and Area Sources: Chapter 13.4 “Aggregate handling and storage piles” (2006).

USEPA (October 1998). Chapter 11.9.1 “Western Surface Coal Mining”, AP-42. USEPA Office of Air Quality Planning and Standards.

Figure 1: Aerial photograph of PKCT and surrounding landuses

Figure 2: Aerial photograph of PKCT

Figure 3: Aerial photograph showing the PKCT site looking towards the north

Figure 4: Aerial photograph showing the PKCT site looking towards the southeast

Figure 5: Windrose for the period 1999 – 2007, Wollongong Airport (BoM).

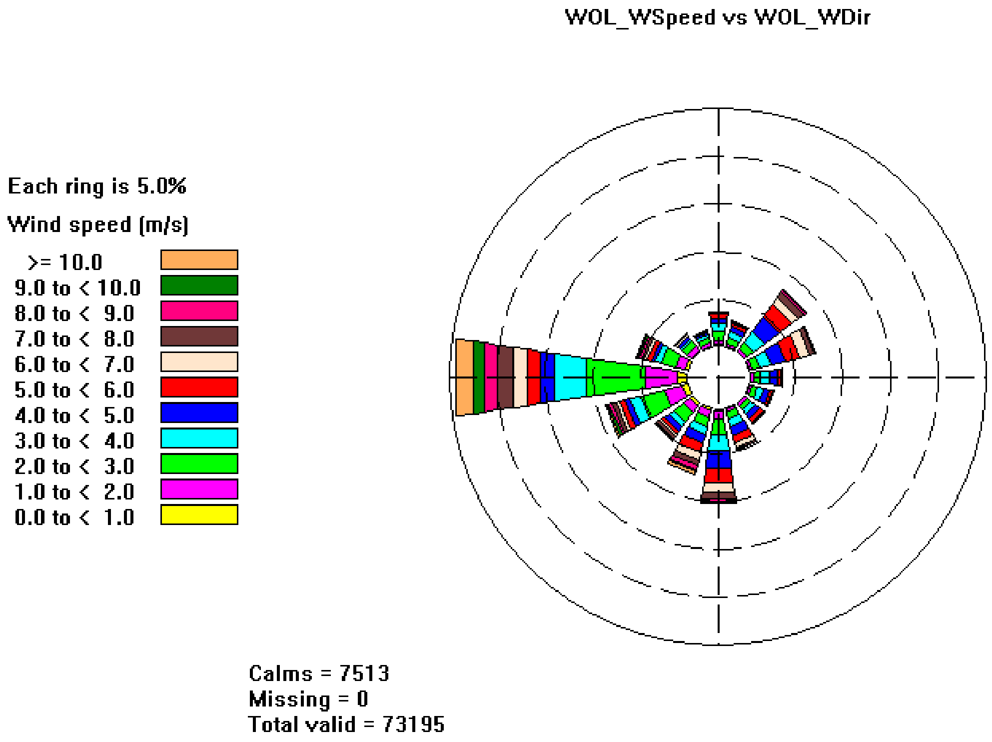

Figure 6: Windrose, all hours for the year 2004 for the PKCT site (TAPM generated).

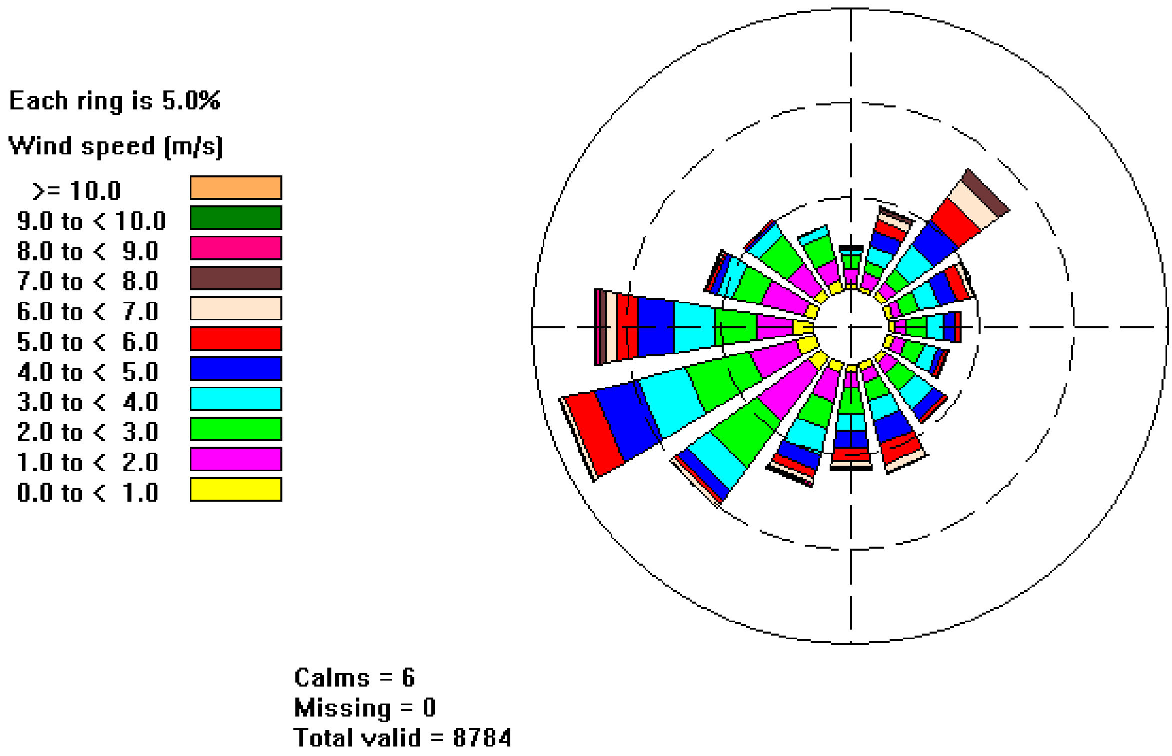

Figure 7: Windrose, based on time of day for the year 2004 for the PKCT site (TAPM generated).

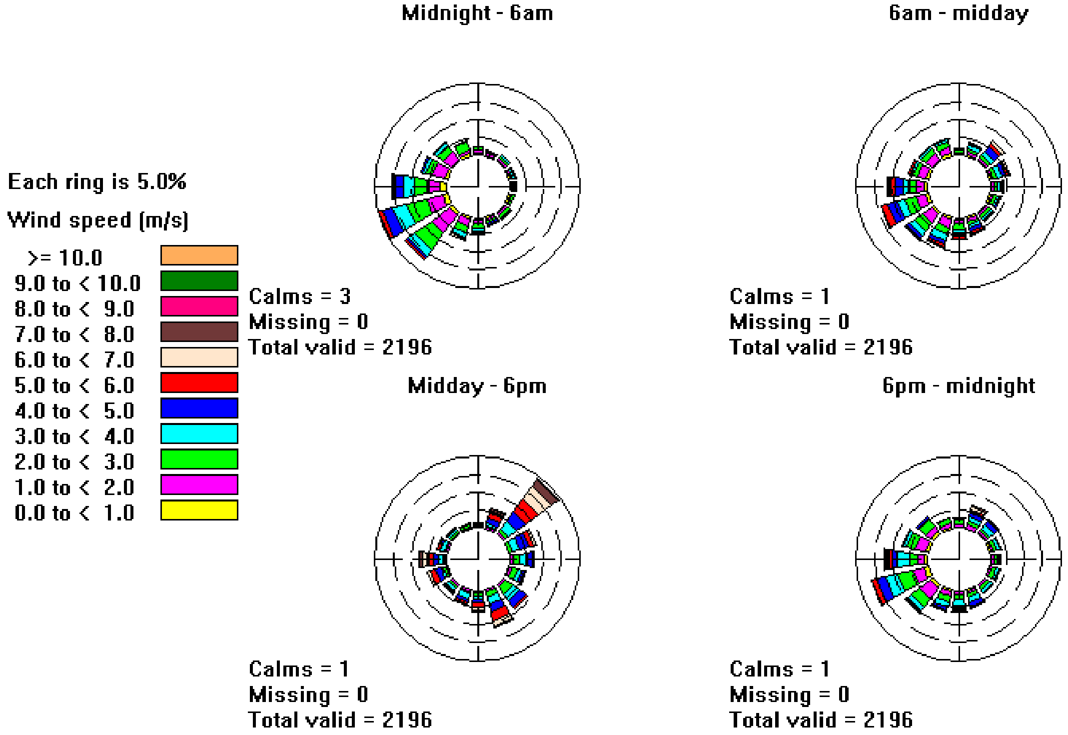

Figure 8: Windrose, based on season, for the year 2004 for the PKCT site.

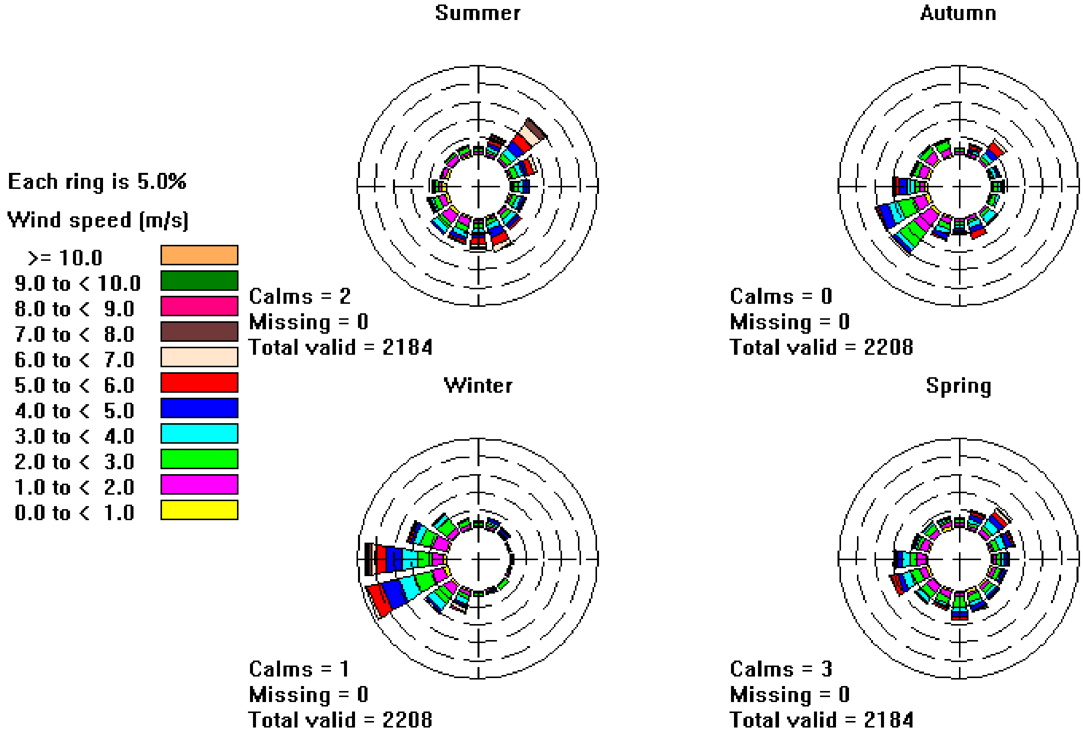

Figure 9: 24-hour concentrations of PM_{10} recorded at DECC Wollongong for the period 2004 to 2006.

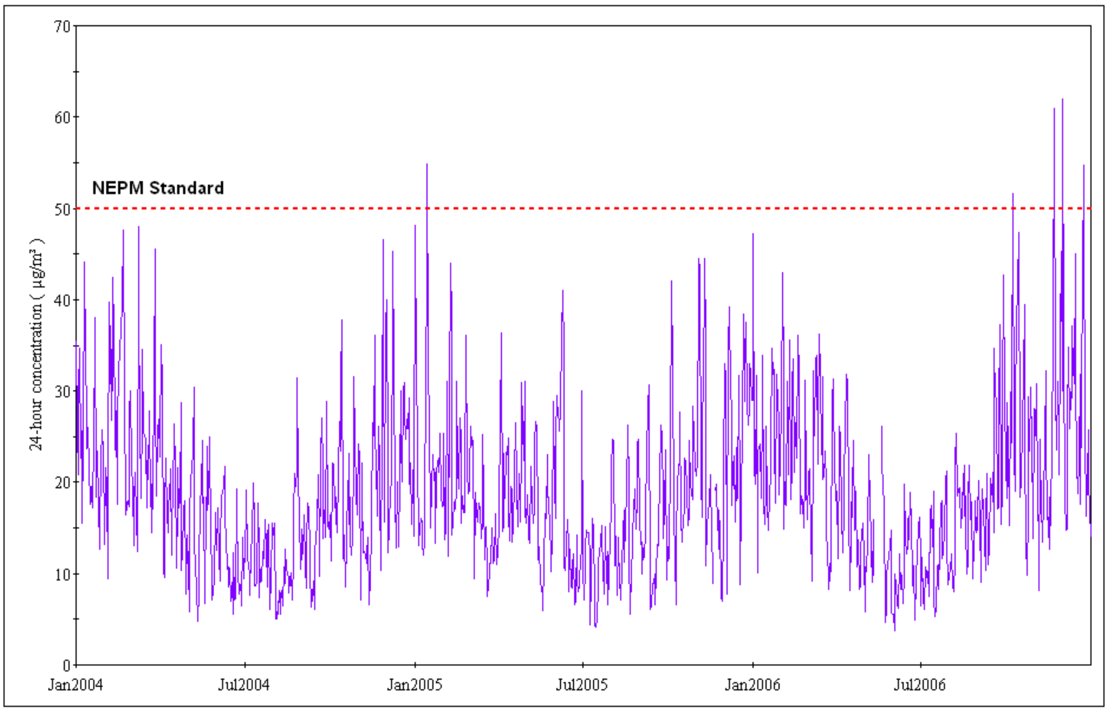

Figure 10: Annual average dust deposition rates (g/m²/month) measured by PKCT at three residential locations for the period 1990 to 2006.

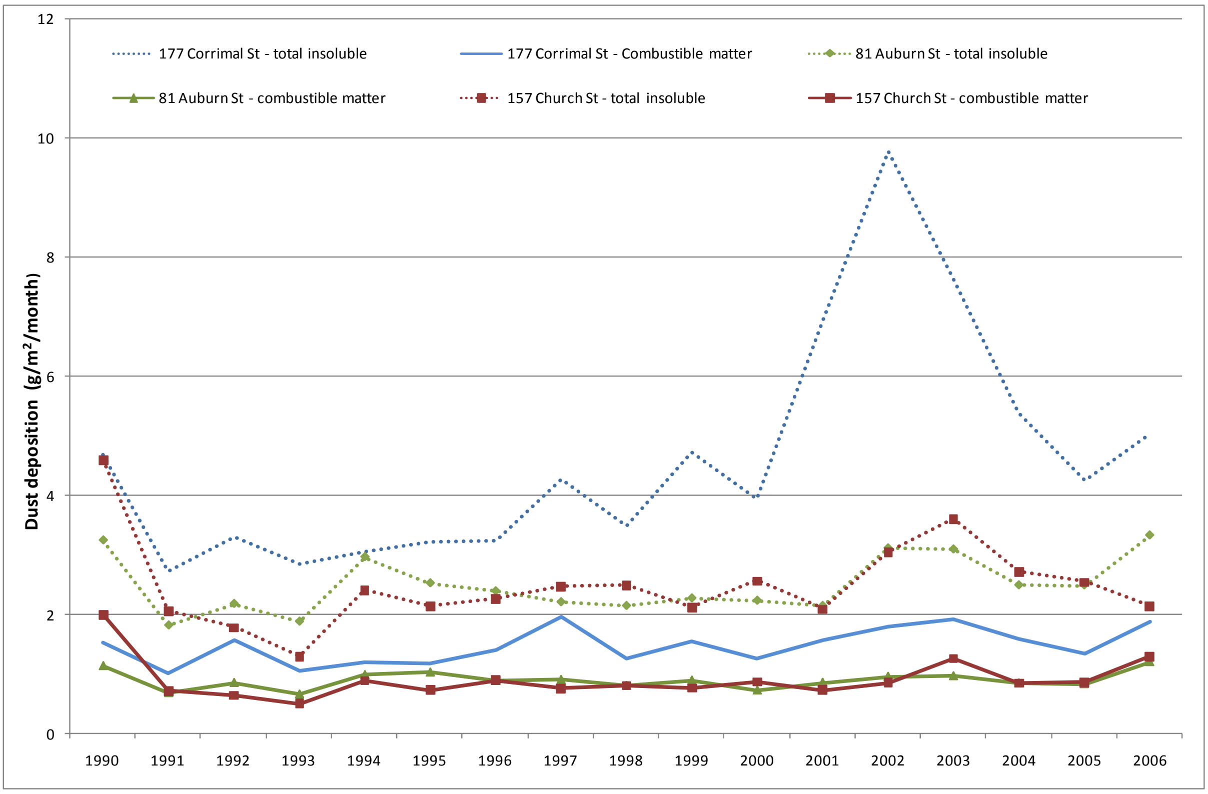

Figure 11: Predicted maximum 24-hour average ground-level concentration of PM_{10} due to the PKCT and road receival facility operating 24 hours per day. Contours in $\mu g/m^3$.

Figure 12: Predicted annual average ground-level concentration of PM_{10} due to the PKCT and road receival facility operating 24 hours per day. Contours in $\mu g/m^3$.

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Figure 13: Predicted annual average ground-level concentration of TSP due to the PKCT and road receival facility operating 24 hours per day. Contours in $\mu g/m^3$.

Figure 14: Predicted annual average dust deposition rate due to the PKCT and road receival facility operating 24 hours per day. Contours in g/m^2/month.

Appendix A – TAPM modelling methodology meteorological assessment

A1. DECC requirements

The DECC's requirements for developing meteorological data files for use in dispersion modelling are detailed in The Approved Methods (DEC, 2005). The Approved Methods describes two levels of impact assessment based on whether 'synthetic' worst-case meteorological data is used (Level 1) or whether detailed site-specific (or site-representative) data is used (Level 2). In this case a detailed site-specific data file has been developed.

The minimum meteorological data requirements for a Level 2 assessment are:

- At least one year of site-specific or site-representative meteorological data;
- The meteorological data must be at least 90% complete;
- Stability class should be calculated in accordance with the following methods in order of preference; Turner's 1964 Method, Solar Radiation – Delta T Method or Sigma Theta Method; and
- Mixing heights should be calculated from twice daily mixing height values, sunrise and sunset times and hourly stability class.

Where measured data is unavailable or is of insufficient quality for dispersion modelling purposes, a meteorological file may be generated using a prognostic meteorological model such as TAPM.

A2. Quality of available measured data

The nearest meteorological monitoring station is the on-site meteorological station, which measures wind speed and wind direction. The wind direction is recorded as the eight cardinal compass points and is not suitable for inclusion in the modelling as there is not sufficient information regarding the wind direction. Meteorological data from the Bureau of Meteorology and DECC have been assimilated into the meteorological simulation.

The TAPM dispersion model is considered an appropriate methodology by the DEC for generating meteorological data when suitable data is not available. The TAPM model can calculate the temperature at various elevations as well as the mixing heights for the site.

The TAPM model has been used to develop a site-specific meteorological data file for the subject site. The meteorological data file has been developed using the following data: wind speed, wind direction, temperature, solar radiation and mixing height generated from TAPM with data assimilation of the wind speed and wind direction using data from the Bureau of Meteorology's monitoring sites at Lucas Heights, Kurnell, Nowra, Camden Airport, Bellambi, Mossvale, Albion Park and Kiama and DECC's monitoring sites at Wollongong, Albion Park and Port Kembla as well as data from the neighbouring Blue Scope Steel facility.

Stability classification using the solar radiation/ delta T methodology, which has been calculated using the TAPM generated meteorological data.

A3. TAPM Configuration

The CSIRO model TAPM (Version 3.0.7, 2006) was used in this assessment to generate a meteorological file for use in Ausplume. This is a prognostic model that uses detailed data on terrain, synoptic meteorology, land use and soil moisture to calculate wind flows and other meteorological variables.

TAPM was developed by the CSIRO and has been validated by the CSIRO and Katestone Environmental for various sources and regions (see www.dar.csiro.au/TAPM/ for more details on the model and validation results from the CSIRO). TAPM was selected as the most suitable model, due to the capabilities of the model to handle strongly convective conditions which are likely to result in the greatest impacts.

TAPM was set up with the following parameters:

- Grid of 40 by 40 points, centred on latitude –34° 28", longitude 150°49.5";
- Nests of 20, 6, 3 and 1 kilometre spacing for meteorology;
- 25 vertical levels;
- Model year of 2004;
- AUSLIG 9 Second DEM terrain and landuse information;
- Windspeed and wind direction from DECC monitoring stations of Wollongong, Albion Park and Port Kembla were included in as data assimilation as well Bureau of Meteorology monitoring stations of Lucas Heights, Kurnell, Nowra, Camden Airport, Bellambi, Mossvale, Albion Park and Kiama. Wind data from the neighbouring Blue Scope Steel facility was also included; and
- Default options selected for advanced meteorological inputs

A4. Summary of meteorological statistics and data comparisons

A4.1. Wind speed and wind direction

Wind roses generated from TAPM for the BlueScope Steel site and for the meteorological data recorded by BlueScope Steel are presented in Figure A1 to A3.

Figure A2 illustrates the distribution of winds based on time of day. The wind rose indicates that very light to moderate wind speeds are commonly experienced at the site from a west to southwesterly direction in the morning, increasing to moderate winds from a northeasterly direction in the afternoon. During the evening these winds begin to weaken and return to light to moderate winds from a west to southwesterly direction.

Figure A3 illustrates the seasonal variation in winds. Summer winds are typically dominated by moderate northeasterly winds, while the light to moderate west and southwesterly winds occur during winter, light to moderate south westerly winds occur in autumn, and light northeasterly and southeasterly winds occur in spring.

A4.2. Stability class

The atmospheric stability was calculated from the TAPM generated data using the solar radiation/ delta T methodology. This methodology is different to the default methodology from TAPM that often underestimates the frequency of unstable atmospheric conditions. The stability classification was calculated using the temperatures at 2 metres and 10 metres generated using TAPM. A summary of the frequency of each stability class is presented in Table A1.

Table A1: Frequency of occurrence (%) of surface atmospheric stability conditions (Class A represents the most unstable conditions) for the meteorological information.

Pasquill-Gifford Stability Class	Frequency (%)	Classification
A	2.9	Extremely unstable
B	12.1	Unstable
C	16.0	Slightly unstable
D	47.3	Neutral
E	7.3	Slightly stable
F	14.3	Stable

Wind speed and wind direction frequencies for PKCT site, are shown as a function of stability class in Table A2(a) to (f).

Table A2: Wind speed and wind direction frequencies as a function of stability class (a) A, (b) B, (c) C, (d) D, (e) E and (f) F

(a) Stability Class A

(m/s)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	All
Calm <1	2.4	0	0.8	1.6	1.2	0.8	1.6	2.0	1.2	1.2	0.8	1.2	0.8	0.8	0	0.8	17.1
1-2	2.4	2.4	2.8	2.0	5.6	4.4	4.0	4.0	1.6	6.4	2.8	2.8	2.0	2.8	1.2	2.0	49.0
2-3	0.4	0.8	1.2	4.8	5.2	2.8	3.6	2.8	2.0	1.2	0.4	0.8	1.6	0.8	0.8	0.4	29.5
3-4	0	0.4	0	1.6	0.8	0.8	0	0	0	0	0	0.4	0	0.4	0	0	4.4
All	5.2	3.6	4.8	10.0	12.7	8.8	9.2	8.8	4.8	8.8	4.0	5.2	4.4	4.8	2.0	3.2	100.0

(b) Stability Class B

(m/s)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	All
Calm <1	0.4	0.8	0.8	0.5	0.9	1.3	0.7	0.8	0.7	0.9	1.1	1.1	0.9	0.7	0.9	1.4	13.6
1-2	0.9	1.7	1.1	0.6	0.9	1.0	1.3	0.8	1.7	2.7	3.9	2.7	2.0	2.1	3.1	2.2	28.6
2-3	0.7	0.4	0.9	1.1	0.9	0.9	0.9	0.7	1.3	0.6	0.8	1.1	0.5	0.2	0.9	0.9	12.7
3-4	0.8	1.0	2.9	3.3	2.6	1.4	3.1	0.9	0.4	0.5	0.1	1.0	0.9	0.3	0.3	0.6	20.1
4-5	0.3	0.7	5.1	4.7	3.0	0.8	2.3	1.4	1.0	0.8	0.4	1.3	1.3	0	0.2	0.1	23.2
5-6	0.1	0.2	0.6	0.3	0	0	0.1	0.1	0	0	0	0.2	0.1	0.1	0	0	1.7
All	3.1	4.7	11.4	10.4	8.3	5.4	8.4	4.6	5.1	5.5	6.2	7.5	5.7	3.3	5.4	5.1	100.0

(c) Stability Class C

(m/s)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	All
Calm <1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
1-2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
2-3	0.9	0.6	1.6	1.6	1.8	1.8	1.9	1.5	2	1.8	2.1	3	1.9	1.2	1.1	1.5	26
3-4	0.5	1.1	3.6	1.9	2	1.3	2.4	2.2	1.1	2.4	2.7	2.1	1.6	1.3	1.5	0.8	28
4-5	0.1	1.3	3.1	1.7	0.4	0.8	1.6	2.6	1.3	0.8	1.6	3.5	1.8	0.9	0.1	0.2	22
5-6	0.1	0.5	4.7	2.6	0.2	0.1	0.4	2.7	0.9	0.1	0	2	0.9	0.6	0.3	0	16
6-7	0	0.1	3.2	0.9	0	0	0.1	0.8	0.2	0	0	0.1	0.1	0	0	0	5.4
7-8	0	0	1.3	0.1	0	0	0	0.1	0	0	0	0.1	0.2	0	0	0	1.8
8-9	0	0.1	0.3	0	0	0	0	0	0	0	0	0.1	0	0	0	0	0.5
9<	0	0	0	0	0.1	0	0	0	0	0	0	0	0	0	0	0	0.1
All	1.6	3.7	18	8.7	4.5	4	6.3	9.8	5.5	5.1	6.4	11	6.6	4	3	2.48	100

(d) Stability Class D

(m/s)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	All
Calm <1	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.1	0.2	0.1	0.3	0.3	0.5	0.2	0.1	0.3	3.1
1-2	0.2	0.2	0.4	0.1	0.3	0.2	0.3	0.3	0.3	0.5	0.9	0.6	0.7	0.8	0.5	0.4	6.6
2-3	0.5	0.8	0.8	0.6	0.9	0.8	1.2	1.1	1.4	1.7	4.1	5.2	3.2	2.1	2.3	1.2	27.7
3-4	0.3	1.1	1.3	0.8	0.4	0.7	0.8	1.3	1.4	1.9	2.3	4.5	3.9	1.2	0.9	0.6	23.5
4-5	0.1	1.1	1.0	0.2	0.5	0.2	0.3	1.4	1.1	1.2	0.8	3.5	3.0	0.5	0.2	0.0	15.0
5-6	0.1	1.1	1.3	0.4	0.4	0.3	0.3	1.4	1.2	1.0	0.3	2.6	2.1	0.2	0.2	0	12.8
6-7	0	0.8	1.5	0.3	0.1	0.1	0.0	0.6	0.7	0.6	0.5	0.5	1.3	0.1	0.1	0	7.1
7-8	0	0.5	0.9	0	0	0	0	0.1	0.2	0.1	0.1	0.1	0.6	0.1	0.1	0	2.9
8-9	0	0.1	0.1	0.0	0	0.0	0	0.1	0.0	0.2	0	0	0.3	0.1	0	0	0.9
9-10	0	0	0	0	0	0.1	0.0	0.0	0	0.1	0	0	0.2	0.1	0	0	0.4
10<	0	0	0	0	0	0	0.0	0	0	0	0	0	0.0	0	0	0	0.1
All	1.2	5.8	7.3	2.6	2.8	2.5	3.1	6.3	6.5	7.4	9.4	17.4	15.6	5.3	4.3	2.5	100

(e) Stability Class E

(m/s)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	All
Calm <1	0	0	0	0	0	0	0	0	0	0.2	0.5	0	0.2	0.2	0	0	0.9
1-2	0	0	0.2	0.2	0.2	0.5	0.3	1.4	0.6	3	12	10	6.7	5.3	1.6	0.2	42
2-3	3.8	1.3	2.3	1.7	1.6	2	1.3	1.3	3.9	4.7	8.3	4.7	3.3	4.1	6.6	6.09	56
All	3.8	1.3	2.5	1.9	1.7	2.5	1.6	2.7	4.5	7.8	21	15	10	9.5	8.1	6.25	100

(f) Stability Class F

(m/s)	N	NNE	NE	ENE	E	ESE	SE	SSE	S	SSW	SW	WSW	W	WNW	NW	NNW	All
Calm <1	1.7	0.8	1.5	1.2	0.8	1.0	1.4	1.4	1.7	2.1	3.7	4.9	5.2	3.0	2.5	2.0	35
1-2	3.3	2.5	1.4	1.8	1.4	1.7	1.9	1.5	2.3	4.1	10.9	7.5	6.0	8.5	6.7	3.9	65
All	4.9	3.3	2.9	3.0	2.2	2.8	3.3	2.9	4.0	6.2	14.5	12.4	11.1	11.5	9.2	5.9	100

A4.3. Mixing height

The extent of the mixing height and the strength of the temperature inversion are very important features that can limit the degree of dispersion of pollutants. The height of the mixed layer changes with time of day and season. Shallow mixing heights occur at night under stable atmospheric conditions. Generally lower mixing heights occur during winter when stronger temperature inversions and reduced solar radiation restrict the growth of the mixing depth until later in the morning. The degree of dispersion or mixing within the mixed layer is determined by the atmospheric stability.

Under stable atmospheric conditions (most of the evening and nighttime) a buoyant plume will rise until it reaches the inversion height and will remain elevated and will be unlikely to give rise to any impact at ground level except if the plume strikes elevated terrain. Similarly, a plume that is released above the inversion height (such as from a tall stack) will remain elevated and unlikely to impact at ground level.

After daybreak the mixing height increases due to two processes. The first is solar radiation heating the ground and consequent heating of the air close to the ground causing the air to rise and secondly winds creating turbulence at the surface. Fumigation occurs for elevated plumes when the depth of the mixed layer grows to the height of the plume, causing the plume to be brought to ground. These events can typically be expected for a short period over the first few kilometres from the stack.

When the mixing height exceeds the height of the plume, the plume appears to have a sinuous vertical structure caused by strong convective heating of the air at ground level. The thermal elements take the plume alternatively upwards and to ground (with a typical period of 5-20 minutes). In this situation, maximum concentrations are experienced close to the stack and are usually the highest experienced throughout the day and night for stack sources. In the late afternoon the intensity of convection decreases, the plume regains a more coherent shape and any ground-level impact from stack sources is unlikely as the nighttime radiation inversion reforms.

Figure A5 shows the calculated mixing heights versus hour of day generated by the TAPM model for the subject site. The mixing heights show a typical diurnal profile increasing from 8 am and reducing from 1 pm. The highest average mixing heights are predicted from 11 pm to 1 pm, which is typical of strongly convective conditions.

A5. Validation

Table A1 shows a comparison between the TAPM simulated meteorology and the monitored data recorded at Blue Scope Steel. There is a strong correlation between the winds and temperatures measured at the monitoring stations and those modelled using TAPM for the same location.

Table A1: Statistics showing relationships between TAPM predicted and Blue Scope Steel measurements for various parameters for the Port area

Parameter	Mean predicted (TAPM)	Mean observed (BoM)	Pearson correlation coefficient	RMSE	IOA
Wind speed (m/s)	3.08	3.84	0.91	1.12	0.91
Wind vector U-component (east/west)	-0.498	-0.782	0.96	1.76	0.94
Wind vector V-component (north/south)	-0.37	-0.53	0.97	1.128	0.96
Temperature 2 m	18.2	18.2	0.86	2.73	0.91

Table note:
Mean= arithmetic mean, Pearson correlation coefficient (0- no correlation, 1- good correlation), RMSE= root mean square error, IOA= index of agreement (0- no agreement, 1- good agreement).

Figure A1: **Windroses for 2004 (a) Port Kembla Coal Terminal (TAPM generated) and (b) Blue Scope Steel (measured), all hours**

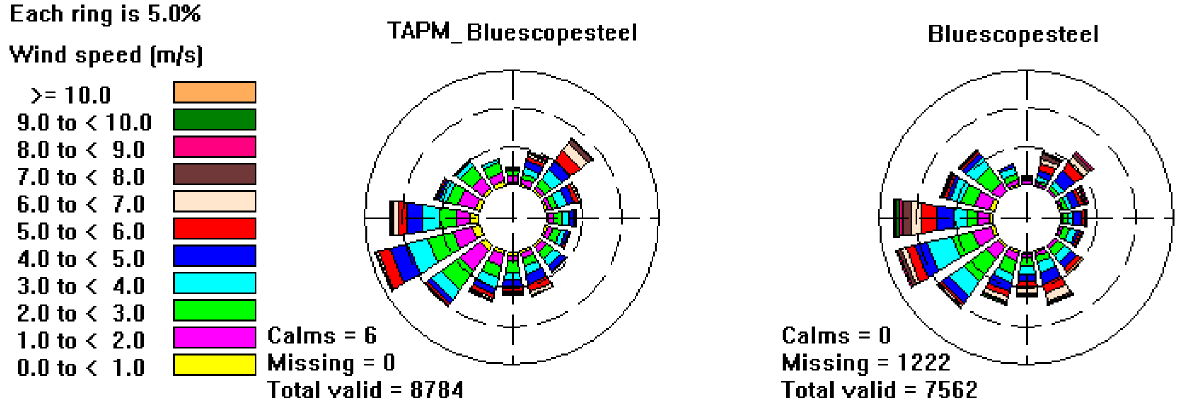
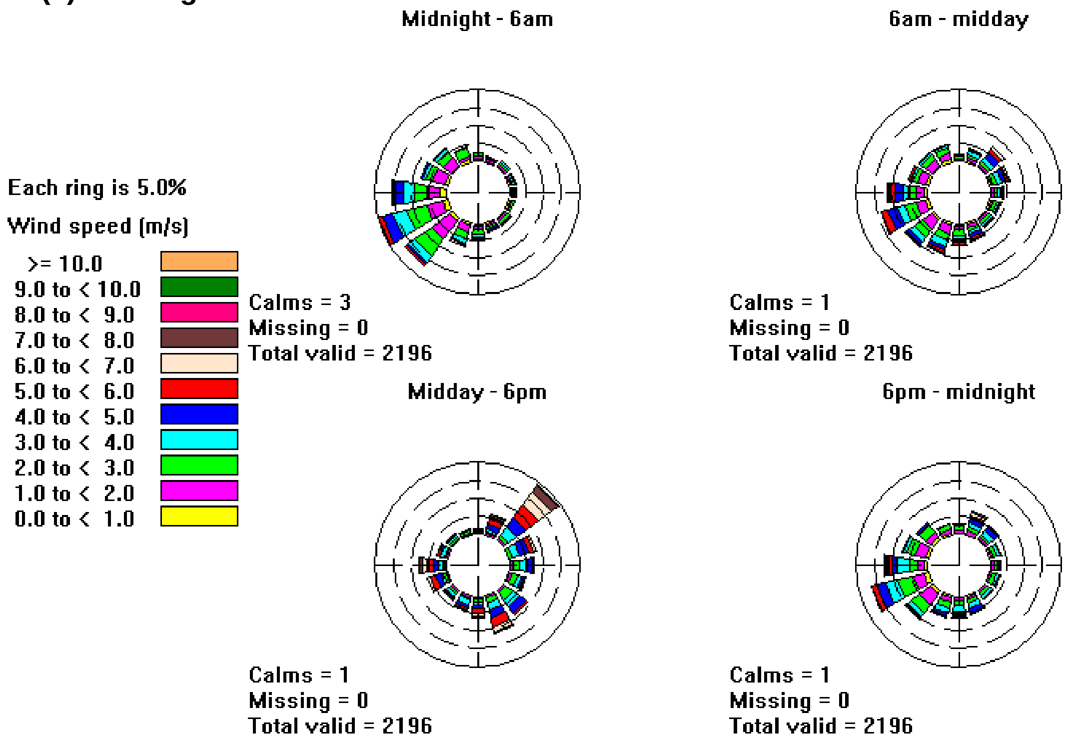


Figure A2: Windroses for 2004 (a) Port Kembla Coal Terminal (TAPM generated) and (b) Blue Scope Steel (measured), based on time of day.

(a) TAPM generated



(b) Blue Scope Steel

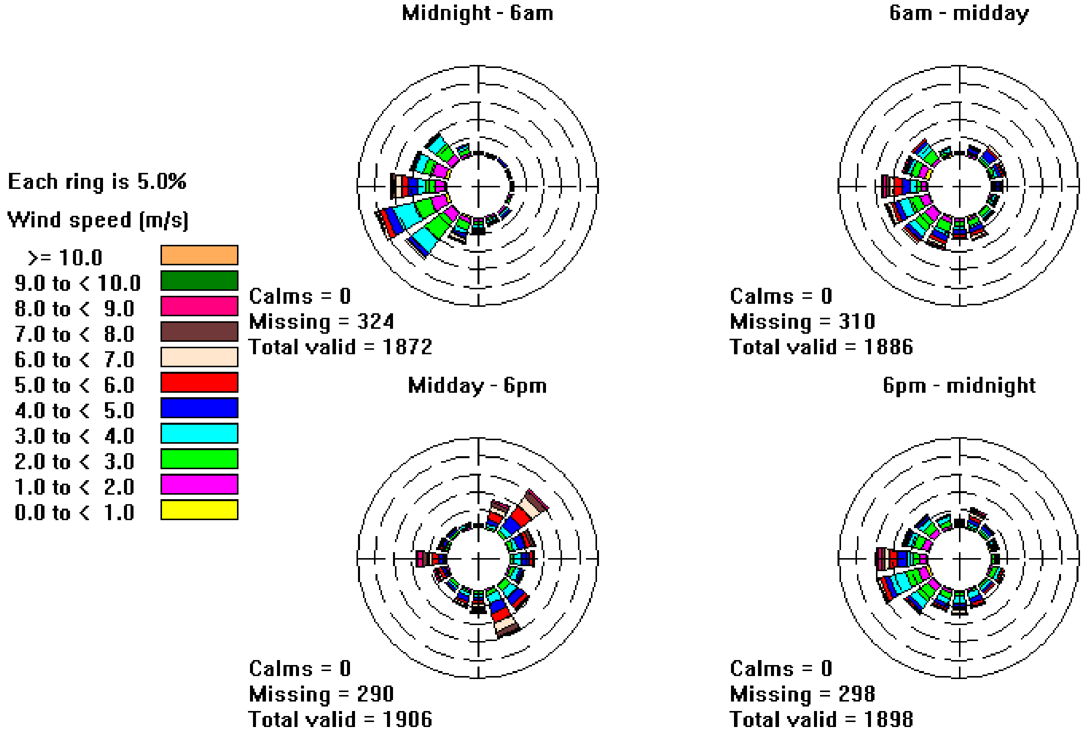
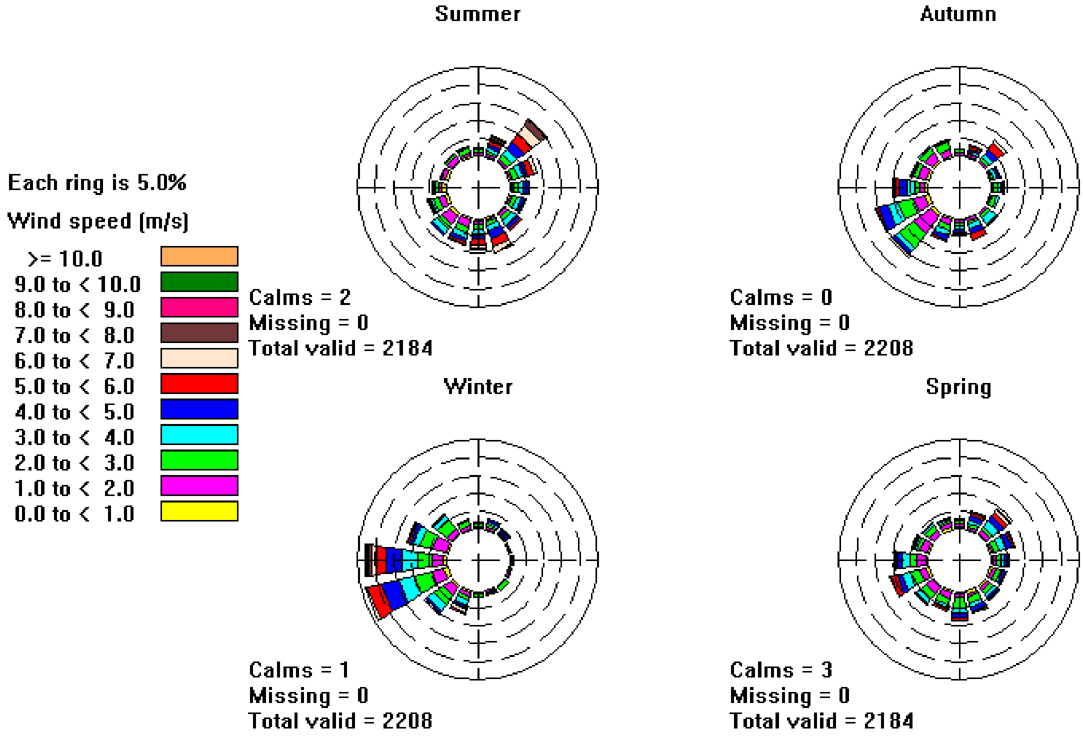


Figure A3: Windroses for 2004 (a) Port Kembla Coal Terminal (TAPM generated) and (b) Blue Scope Steel (measured), based on season.

(a) TAPM generated



(b) Blue Scope Steel

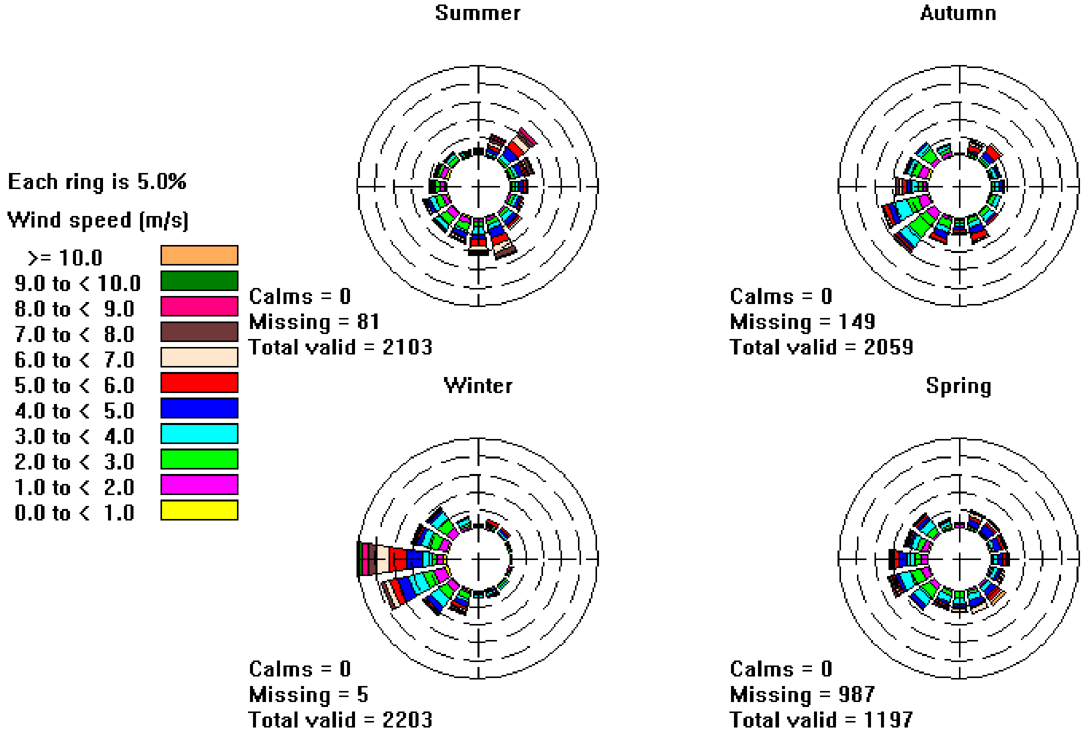


Figure A4: Diurnal profile of wind speed for PKCT site (TAPM generated)

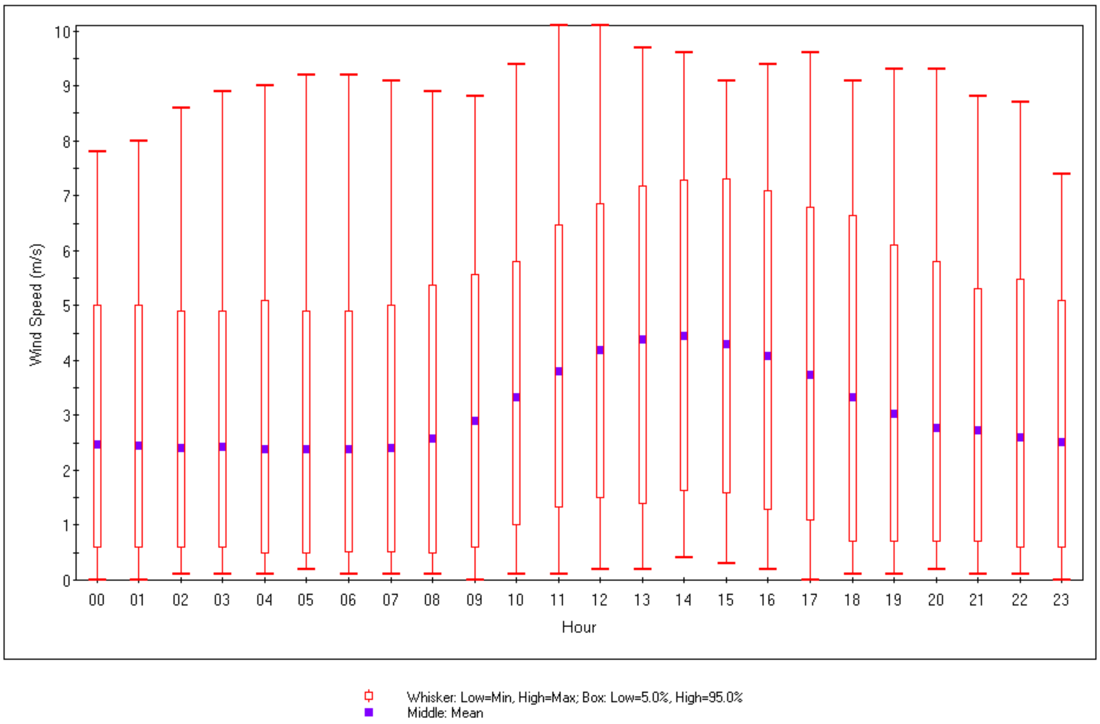
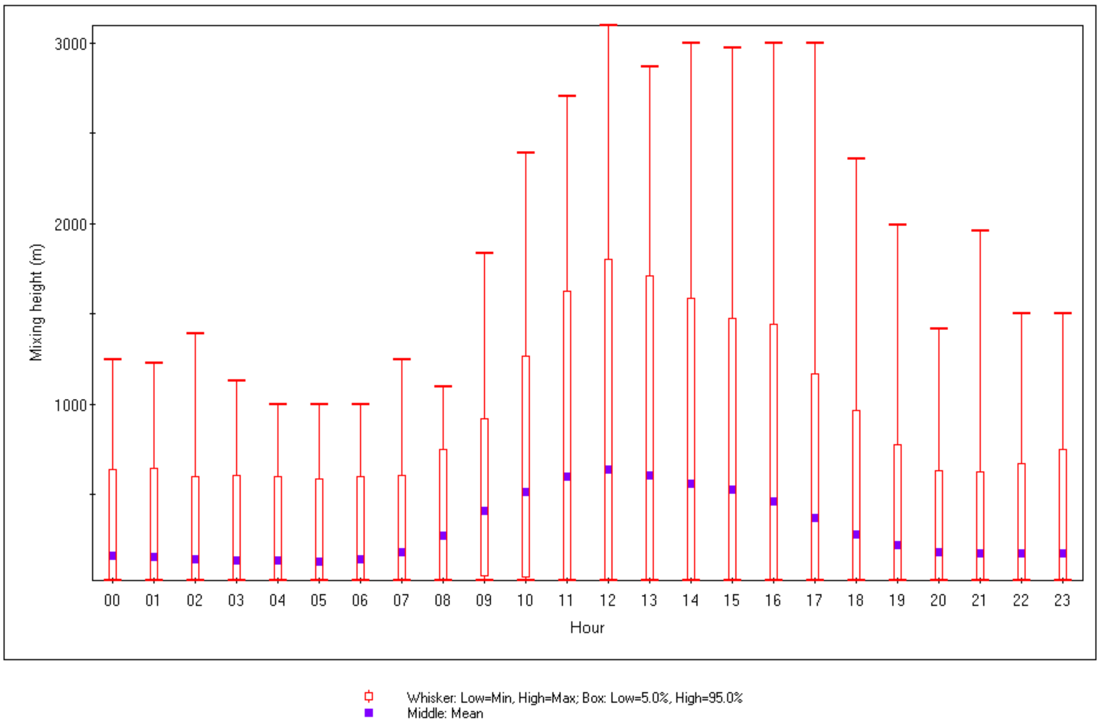


Figure A5: Diurnal profile of mixing height versus time of day for PKCT site (TAPM generated)



Appendix B – Methodology for calculating dust emissions from individual emission sources

B1. Summary of general parameters

The parameters shown in Table B1 have been used to quantify TSP and PM_{10} emissions from PKCT.

Table B1 Summary of general parameters

Parameter	PKCT
Total throughput (Mtpa)	17
Road receival throughput (Mtpa)	10
Rail receival throughput (Mtpa)	7
Stockpile height (m)	20-23
Coal stockpile area (ha)	7.4
Bulk products stockpile area (ha)	2.9
Silt content (%)	7
Moisture (%)	8
Raindays per year	101.2
Average wind speed at 10 metres (m/s)	3.1
Average wind speed at 23 metres (m/s)	3.8
% of winds greater than 5.4 m/s at 10 metres (%)	11.1
% of winds greater than 5.4 m/s at 23 metres (%)	21.8

B2. Road and Rail Receival

The rail receival at PKCT occurs within a partial enclosure. Road receival occurs in the open air with water sprays used to minimise dust emissions. The coal dumped into a hopper and is then transferred onto conveyors. The emission rates of TSP and PM_{10} have been calculated using the following USEPA emission factor equation (USEPA, AP-42, Chapter 13.2.4). A constant coal throughput was adopted for both road and rail receival.

$$E = k0.0016\left(\frac{U}{2.2}\right)^{1.3}\left(\frac{M}{2}\right)^{-1.4} kg/t$$

k = 0.74 for particles less than 30 μm
k = 0.35 for particles less than 10 μm
U = mean wind speed in m/s
M = material moisture content %.

A 70 % control factor has been applied to the rail receival as the train unloading occurs within a building enclosed on all sides except the two ends where the train enters and leaves. A 70% control factor has been applied to road receival as water sprays are used to suppress dust.

These control factors are recommended by the New South Wales Mineral Council (2000).

B3. Conveyor emissions

The dust emissions from conveyors are based on data reported by GHD/Oceanics (1975) for conveyor emissions measured at a wind speed of 10 m/s. Account has also been taken of the distribution of particle sizes in the samples collected and the average wind speed at the site. Control factors have been applied based on the level of enclosure and these are generally in accordance with industry recommendations (NSW Minerals Council, 2000).

The conveyor lengths, control factors and utilisation factors are summarised in Table B2 for PKCT.

Table B2: Details on the length, controls applied and utilisation of each of the proposed conveyors for PKCT.

Conveyor	Length (m)	Capacity (tph)	Throughput (Mtpa)	Utilisation (%)	Control (%) Control	
C1	192.6	3700	10	30.9	70	Fully enclosed
C2	57.1	3700	10	30.9	70	Fully enclosed
C3	67.4	3700	3.5	10.8	70	Fully enclosed
C4	87.1	3700	3.5	10.8	70	Fully enclosed
C5	265.7	3700	7	21.6	70	Fully enclosed
C6	82.7	3700	7	21.6	70	Fully enclosed
C7	145.2	3700	7	21.6	70	Fully enclosed
C8	1141.4	3700	8.5	26.2	40	Enclosed on two sides
C9	1089.6	3700	8.5	26.2	40	Enclosed on two sides
C10	35.7	3700	7	21.6	100	Fully enclosed inside a building, emissions are assumed to be zero
C11	1119.6	5000	17	38.8	40	Enclosed on two sides
C12	199.7	5000	17	38.8	40	Enclosed on two sides
C13	42.5	5000	17	38.8	40	Enclosed on two sides
C14	362.6	5000	17	38.8	40	Enclosed on two sides
C15	203.4	2200	0	0.0	40	Enclosed on two sides, conveyor not used

B4. Transfer points

Transfer points are locations within the coal loading system where coal is transferred from one conveyor to another or from a conveyor to a hopper. The emission rates of TSP and PM_{10} have been calculated using the following USEPA emission factor equation (USEPA, AP-42, Chapter 13.2.4).

$$E = k0.0016\left(\frac{U}{2.2}\right)^{1.3}\left(\frac{M}{2}\right)^{-1.4} kg/t$$

k = 0.74 for particles less than 30 µm
k = 0.35 for particles less than 10 µm
U = mean wind speed in m/s
M = material moisture content %.

Hourly wind speeds have been used to calculate the hourly emissions in kg/tonne.

The number of transfer points to and from each stockpile has been calculated based on the annual throughput of coal to and from each stockpile.

A 95 % control factor has been applied to all of the transfer points where emissions are enclosed within a building (NSW Minerals Council, 2000). Where the transfer point is not enclosed within a building but has enclosure of the transfer point using skirts etc. a control factor of 70% has been used.

Table B3: Details of the throughput and controls applied on the transfer points at PKCT.

Transfer Point	Throughput (Mtpa)	Controls	
TS1	10	95	Fully enclosed by a building
TS2	12	95	Fully enclosed by a building
TS3	8.5	95	Fully enclosed by a building
TS4	7	95	Fully enclosed by a building
TS5	10.5	95	Fully enclosed by a building
TS6	17	70	No building, enclosed with skirt
TS7	17	95	Fully enclosed by a building
TS8	17	95	Fully enclosed by a building
SL1&2	17	70	No building, enclosed with skirt etc

B5. Stacking/reclaiming

Stacking and reclaiming emissions of TSP and PM_{10} have been calculated using the following USEPA emission factor equation (USEPA, AP-42, Chapter 13.2.4).

$$E = k0.0016\left(\frac{U}{2.2}\right)^{1.3}\left(\frac{M}{2}\right)^{-1.4} kg/t$$

k = 0.74 for particles less than 30 µm
k = 0.35 for particles less than 10 µm
U = mean wind speed in m/s
M = material moisture content %.

A 25% control factor has been used to account for variable height machinery.

B6. Stockpiles

The emission rate of TSP from the stockpiles has been calculated using the following equation (NPI, 2001):

$$E = 1.9\left(\frac{s}{1.5}\right)365\left(\frac{365-p}{235}\right)\left(\frac{f}{15}\right) kg/ha/year$$

where:
s = silt content (%).
p = number of days when rainfall is greater than (0.25 mm).
f = percentage of time that wind speed is greater than 5.4 m/s.

A dust control factor of 50 % was applied to the stockpiles at PKCT for the use of stockpile water sprays.

B7. Ship loading

Shiploading emissions of TSP and PM_{10} have been calculated using the following USEPA emission factor equation (USEPA, AP-42, Chapter 13.2.4).

$$E = k0.0016\left(\frac{U}{2.2}\right)^{1.3}\left(\frac{M}{2}\right)^{-1.4} kg/t$$

k = 0.74 for particles less than 30 μm
k = 0.35 for particles less than 10 μm
U = mean wind speed in m/s
M = material moisture content %.

A 95 % control factor was applied to the ship loading activities. The ship loading is fully enclosed with minimal dust released.

References

Gutteridge Haskins & Davey (GHD) / Oceanics (1975), Hay Point Environmental Planning Study.

National Pollutant Inventory, (2001), "Emission Estimation Technique Manual for Mining". National Environment Protection Council.

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USEPA, Chapter 11.9 “Western Surface Coal Mining”, AP-42. USEPA Office of Air Quality Planning and Standards.

USEPA, Chapter 13.2.4 “Aggregate Handling and Storage Piles”, AP-42. USEPA Office of Air Quality Planning and Standards.

PORT KEMBLA COAL TERMINAL

NOISE ASSESSMENT OF SITE ACTIVITIES & ROAD HAULAGE

ACOUSTICS AND AIR

REPORT NO. 07355
VERSION C

WILKINSON MURRAY

PORT KEMBLA COAL TERMINAL

NOISE ASSESSMENT OF SITE ACTIVITIES & ROAD HAULAGE

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VERSION C

JULY 2008

PREPARED FOR

PKCT
PROT KEMBLA ROAD, INNER HARBOUR
WOLLONGONG NSW 2500

TABLE OF CONTENTS

1 INTRODUCTION

The Port Kembla Coal Terminal (PKCT) receives coal from coal mines associated with the Southern and Western New South Wales coal fields by road and rail for stockpile and loading onto ships for export. It is a major intermodal coal facility located in the Inner Harbour of Port Kembla, near Wollongong.

The onsite activities associated with the Terminal operate 24 hours a day, 365 days per year exporting approximately 11 million tonnes of coal per annum.

Transport of coal to the Terminal by road is limited such that the first delivery to the Terminal arrives at 7.00am. The restrictions on the hours are contained in the State Environmental Planning Policy (Infrastructure) 2007 (SEPP (Infrastructure) 2007) which supersedes three Development Approval conditions in relation to road haulage and delivery hours that PKCT is permitted to receive coal deliveries via road unless it is hauled from the steelworks adjacent to the terminal along Tom Thumb Road.

Wilkinson Murray (WM) has been engaged to conduct a noise assessment to assess the noise impact associated with increasing the capacity of coal accepted by road from the existing 4Mtpa (approximately) to a maximum of 10Mtpa over the next five (2013) to ten (2018) years and changing coal road transportation times to 24hr, 7 days. This would allow coal to be transported from BHP Billiton Illawarra Coal's (BHPBIC) West Cliff Coal Preparation Plant (CPP) and Gujarat NRE (GNRE) No.1 Mine to PKCT 24hr, 7 days a week. The noise assessment forms part of an Environmental Assessment (EA) to comply with the Director General Requirements under the provisions of Part 3A of the Environment Planning and Assessment (EP&A) Act, 1979.

Road traffic noise levels have been assessed in accordance with the NSW Government *Environmental Criteria for Road Traffic Noise (ECRTN)*, May 1999. Furthermore, this report also assesses the current and future noise emissions from on-site activities. These noise impacts are assessed using the NSW Government *Industrial Noise Policy (INP)*, January, 2000.

2 DESCRIPTION OF PROPOSAL & SURROUNDS

2.1 Description of the Current Operations

PKCT is a major coal intermodal facility that receives coal by road and rail for loading onto ships for export.

Consent (D79/44) for the construction of PKCT was approved by Wollongong City Council on the 25 June, 1979. In addition to the requirements of that Consent, SEPP (Infrastructure) 2007 requires that coal is not to be received by PKCT via public road either prior to 7.00am or after 6.00pm on any day and not at all on Sundays or Public Holidays. These restrictions were introduced in 1982 under SEPP 7 – Port Kembla Coal Loader (SEPP 7). SEPP 7 was repealed and superseded by SEPP (Infrastructure) 2007 in January 2008 with the road delivery constraints retained. Environmental Protection Licence (EPL 1625) also contains further controls of PKCT onsite activities.

Currently PKCT site operations are permitted 24 hours per day, 7 days per week. The site operations typically include:

- Delivery of material by road and rail to receival hoppers;
- Transfer of received coal via conveyor to stackers to be stockpiled prior to arrival of ship;
- Transfer of products received to Bulk Product Berth to stockpile via front end loader;
- Movement of stockpiled coal to the ship loader using bucket wheel reclaimers and conveyors;
- Loading of coal to ship using the ship loader at Berth 102; and
- Loading of product received at Bulk Product Berth to ship via ship loader at Berth 101.

Figure 2-1 shows the site plan of the PKCT site.

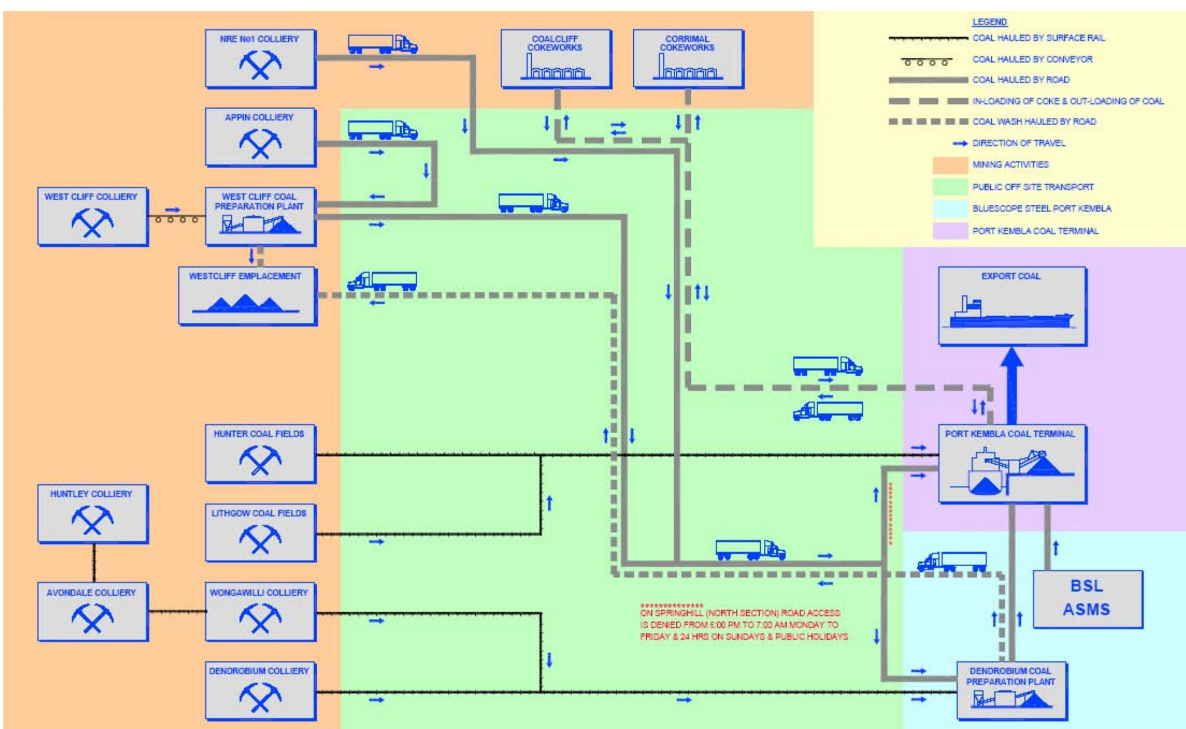
With respect to coal delivery of material to PKCT, both road and rail are used, Figure 2-2 shows the schematic of PKCT operations. The only mines which use the public road network are:

- Appin;
- West Cliff; and
- Gujarat Natural Resources Environment (GNRE) No.1.

Coal from Appin is delivered to West Cliff CPP by truck. Coal from West Cliff Colliery is delivered to West Cliff CPP via conveyor. The processed coal from Appin and West Cliff Collieries is delivered to PKCT via Appin Road, Mount Ousley Road, Southern Freeway, Masters Road, Springhill Road (left hand turn from Masters Road) and then into PKCT via Port Kembla Road between 7.00am and 6.00pm Monday to Saturday. Coal from the West Cliff CPP is transported to the port of Port Kembla 24 hours per day, 7 days per week with deliveries outside of 7.00am and 6.00pm Monday to Saturday to PKCT via BlueScope steelworks and Tom Thumb Road

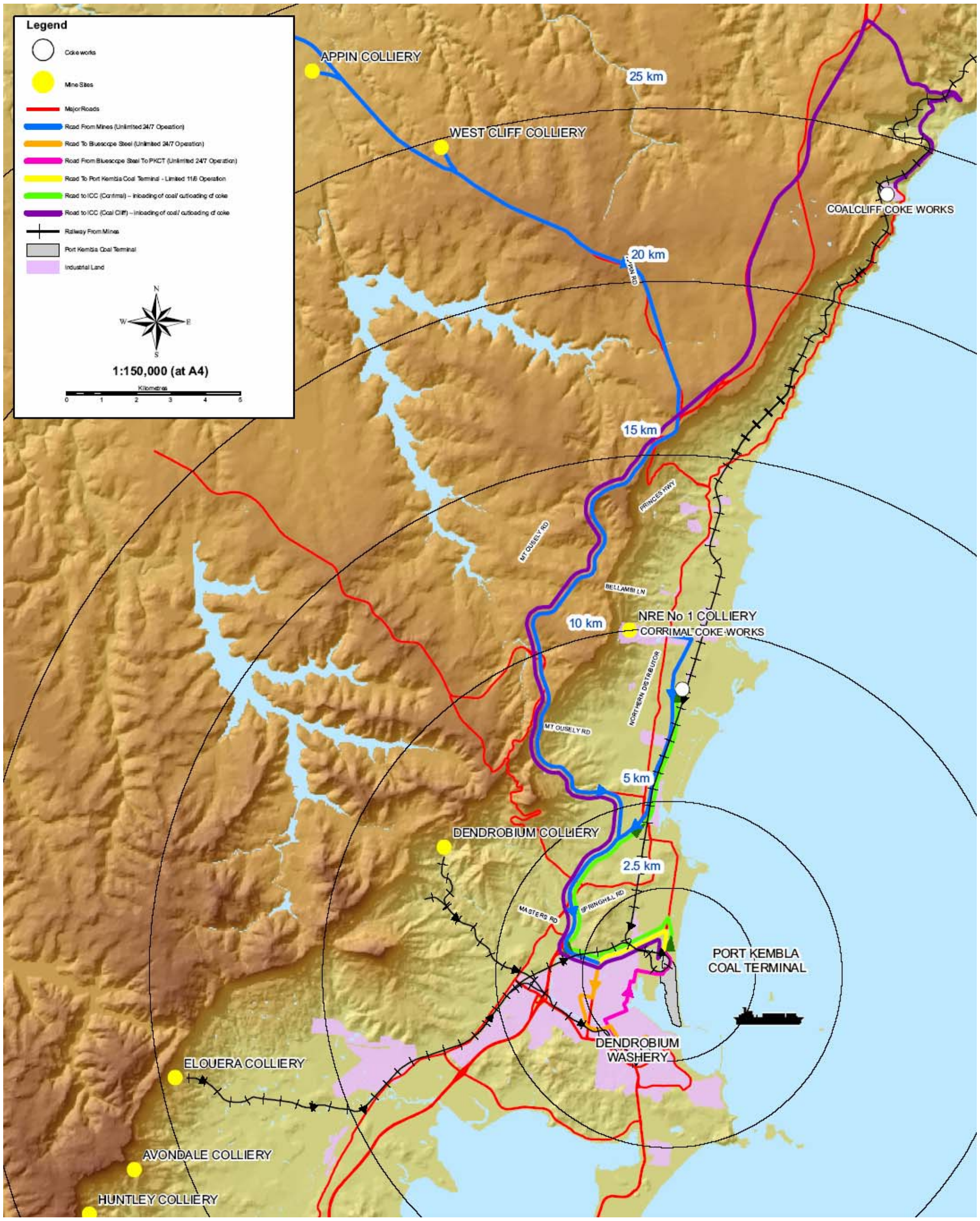
Figure 2-1 Site Plan for PKCT.

Figure 2-2 Showing Schematic of PKCT Operation.



Coal from GNRE No. 1 Mine is delivered to PKCT via Bellambi Lane, Northern Distributor, Southern Freeway, Masters Road, Springhill Road (left hand turn from Masters Road) and then into PKCT via Port Kembla Road. GNRE may only transport coal to PKCT between 7.00am and 6.00pm Monday to Saturday as they do not supply coal to the steelworks. GNRE currently have coal from the No. 1 Mine on Tuesdays, Thursdays, Fridays and Saturday's beginning from approximately 6:30am to approximately 5.00pm. Figure 2-3 shows a map of the road haulage routes.

Figure 2-3 Showing the Road Haulage Routes



2.2 Description of Proposed Operations

With respect to the movement of coal via the road network, the major changes are:

- An increase in tonnage from the existing approximately 4 Mtpa to a maximum of 10 Mtpa in the next five (2013) to ten (2018) years; and
- PKCT to receive coal via Springhill Road and Port Kembla Road 24hrs per day, 7 days per week.

It is important to note that the existing infrastructure at PKCT is sufficient to process this increased activity and will not require any upgrades or changes.

2.3 Identification of Surrounds and Location of Residential Receivers

The majority of the land uses around Port Kembla are industrial in nature and operate 24 hours per day, 7 days per week. The significant operators include:

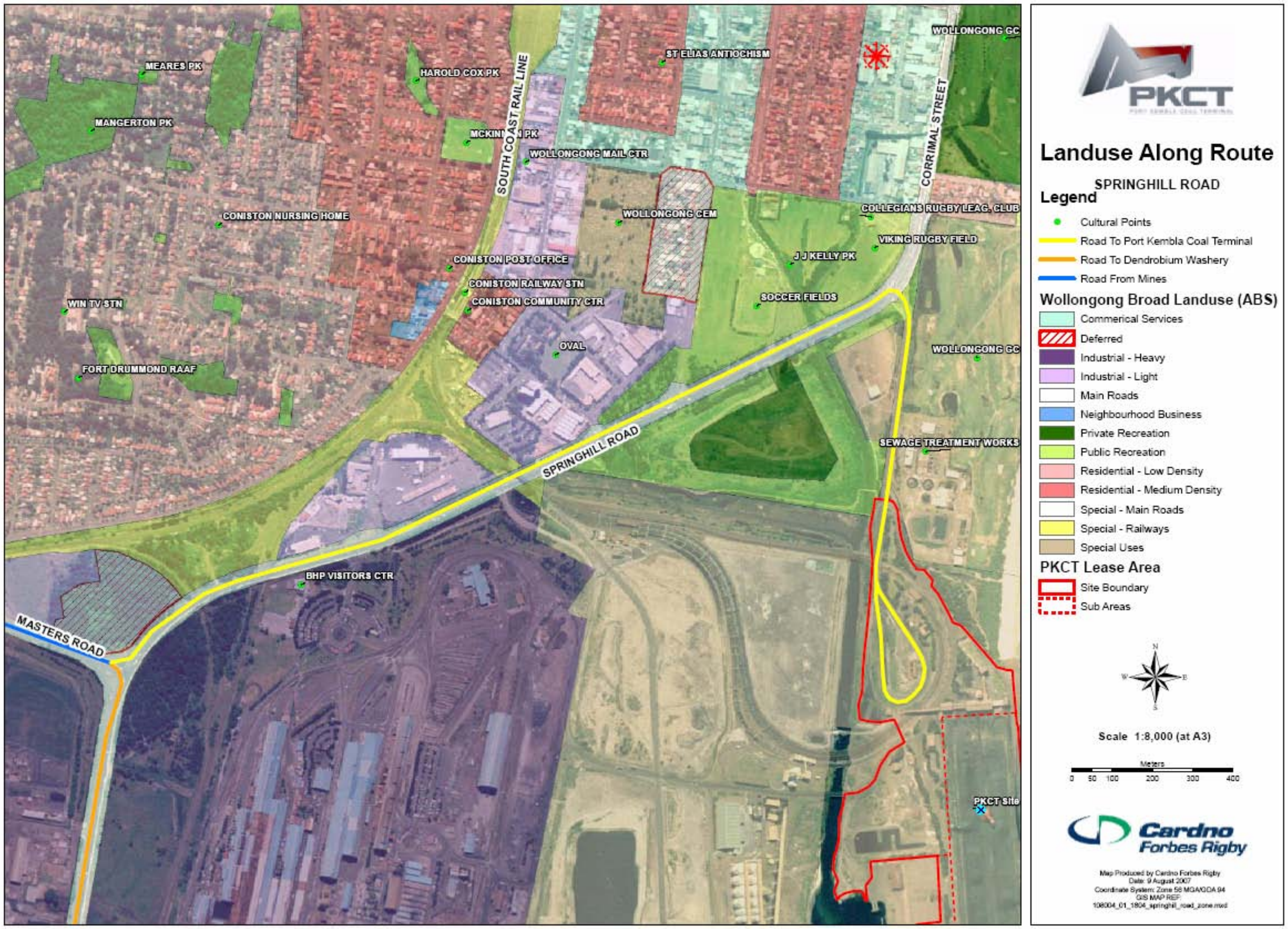
- BlueScope Steel;
- Grain Corp Grain Terminal;
- Port Kembla Coal Terminal;
- General Cargo Handling Facility (project approved but operation not yet fully commenced); and
- Sydney Water Sewage Treatment Plant.

With respect to sensitive receivers, the nearest and most affected residential receivers are located along Swan Street and Keira Street. Amongst these receivers are small industrial and commercial developments that generally only operate between the hours of 7.00am to 6.00pm.

Springhill Road, which is a sub-arterial road, is located between these receivers and PKCT.

Figure 2-4 shows the site, nearby roads and receivers.

Figure 2-4 Land Uses along the Springhill Road Route



3 EXISTING ACOUSTIC ENVIRONMENT

Traffic noise levels were measured at locations to represent the closest residences to the coal haulage routes, with the exception of Keira Street and Swan Street which also had the purpose of determining background noise levels around PKCT.

Noise loggers were placed at various locations to collect noise data from Saturday 9 to Saturday 22 March 2008.

Whilst this noise data was being collected, classified, directional traffic counts were performed and information on the coal truck movements (associated with West Cliff CPP and GNRE No. 1 Mine) delivering coal to PKCT was monitored. This information was processed by Cardno Eppell Olsen (CEO), who are the traffic consultants on this project, and provided to WM.

This data was collected during a period when a trial of 24/7 road haulage was permitted by the Director General of the Department of Planning (DoP).

Once the trial was completed, additional noise, traffic and coal truck monitoring was undertaken at the residences affected by the movement of PKCT coal trucks along Springhill Rd from Friday 2 to Friday 9 May 2008. The data concerning road traffic movements and coal truck movements was processed by CEO and provided to WM.

Previously, noise data was collected during February and March 2007 by HATCH at residences including those impacted by road traffic noise from F6, Mount Ousley Road and Masters Road. This data has been processed by WM to derive the required noise descriptors. Traffic data including PKCT coal truck movements was processed by CEO and provided to WM.

It should be noted that 24/7 road delivery had been permitted during February and March 2007 under emergency provisions of SEPP 7.

Table 3-1 below summarises the unattended noise measurement locations.

Table 3-1 Unattended Noise Measurement Locations

Truck Route	Measurement Location	Monitoring Period	Logger used for onsite activity or road haulage assessment?
Noise Monitoring Conducted by Wilkinson Murray			
Bellambi Lane	77 Bellambi Ln (front yard)	8 to 22 March 2008	Road Haulage
	91 Keerrong Ave (rear yard)	8 to 22 March 2008	Road Haulage
Northern Distributor	13 Eager St (rear yard)	8 to 22 March 2008	Road Haulage
	7 Albert St (rear yard)	14 to 22 March 2008	Road Haulage
Springhill Road	392 Keira St (front yard)	8 to 14 March 2008	Onsite activity and Road Haulage
	163 Kembla St (front yard – Swan St)	8 to 22 March 2008 24/7 coal haulage trial.	Onsite activity and Road Haulage
	163 Kembla St (front yard – Swan St)	2 to 9 May 2008 No coal haulage.	Onsite activity and Road Haulage

Truck Route	Measurement Location	Monitoring Period	Logger used for onsite activity or road haulage assessment?
Noise Monitoring Conducted by Hatch			
Mount Ousley Road	96 Dumfries Ave	26 February to 13 March 2007	Road Haulage
	6 Binda St	26 February to 13 March 2007	Road Haulage
F6	13 Phillips Cr(1)	26 February to 1 March 2007	Road Haulage
	36 Acacia Ave	26 February to 13 March 2007	Road Haulage
Masters Road	84 Taronga Ave	25 February to 16 March 2007	Road Haulage

Note: (1) Due to limited data, this location is not further assessed by WM. The data at Phillips Cr is considered sufficient and typical of the impact caused by road traffic noise from F6.

The noise loggers were set to an A-weighting, fast response and to continuously monitor and store (each and every 15 minutes) various noise level descriptors for later detailed analysis. All loggers used by WM have current calibration certificates and the calibration was checked in the field before and after the survey and no significant drift was noted.

The loggers determine a variety of noise descriptors (see Appendix A for definitions) of the existing noise environment.

The logger determines L_{A1}, L_{A10}, L_{A90} and L_{Aeq} levels of the existing noise environment. The L_{A1}, L_{A10} and L_{A90} levels are the levels exceeded for 1%, 10% and 90% of the sample time respectively. The L_{A1} is indicative of maximum noise levels due to individual noise events such as the occasional passby of a heavy vehicle. The L_{A90} level is normally taken as the background noise level. The L_{Aeq} level is the Equivalent Continuous Sound Level and has the same sound energy over the sampling period as the actual noise environment with its fluctuating sound levels. Whilst the L_{A10} has in the past been used as a descriptor for traffic noise, the L_{Aeq} is now the standard descriptor for traffic noise.

The detailed measurement results of the measured noise levels are presented in Appendix B.

3.1 Existing Onsite Noise

3.1.1 Rating Background Levels

With respect to background noise around the PKCT site, residential receivers located northwest, north and northeast of PKCT have an acoustic environment that is dominated by local road traffic with a small contribution from the Port Kembla industrial area. The residential developments located northeast are also subjected to surf noise that would vary through the year.

Additional noise data was collected in 2004 by Sinclair Knight Merz (SKM) as part of Proposed Expansion of General Cargo Handling Facility. SKM deployed 2 noise loggers, one at 10 Swan St and the other at 393 Keira St from 6 to 21 May, 2004 inclusive. The raw data has not been able to be obtained by CFR and as such not analysed by WM. Despite this WM has considered the RBL's obtained by SKM in Section 3.1.1 of this report.

Table 3-2 summarises the RBL and ambient noise levels derived from data collected during the unattended noise monitoring for those receivers located around PKCT.

Prior to determining the project specific noise criteria for the assessment of on-site activities to sensitive receivers, the derived RBL must not be influenced by current noise from the development in question, in this case noise from PKCT on-site operations. Furthermore, given that there are other industries in the Port Kembla area, the existing noise from industry is to be quantified (refer Section 3.1.2).

Table 3-2 Summary of Rating Background Levels

Measurement Location	Representative Receivers	RBL (dBA)		
		Day	Evening	Night
392 Keira Street	Residents to the northwest	50	44	38
163 Kembla Street	Residents to the north and northeast	46	45	44

Note: (1) The *INP* considers daytime (7.00am-6.00pm); evening (6.00pm-10.00pm); night time (10.00pm-7.00am). On Sundays and Public Holidays, daytime begins and night time ends at 8.00am.
Note: (2) RBL for 163 Kembla St derived from measurements taken both in March and May 2008.

As required by the *INP*, any effects due to adverse meteorological conditions (rain and wind greater than 5m/s at a height of 1.5m) have been excluded. To ascertain the typical weather conditions present while collecting noise data, meteorological data from BlueScope Steel was obtained. This weather station is located adjacent to Fitzgerald Street, Cringila and the weather data is considered representative of the location of the noise loggers.

The *INP* also requires the exclusion of any extraneous noise that will influence the RBL. Where measured noise levels were clearly affected by extraneous noise, these periods were also excluded in calculating the RBL values shown in Table 3-2.

SKM collected noise data in 2004 in the area and the RBL's as derived by SKM for 392 Keira were: Day 48dBA, Evening 45dBA and Night 45dBA. It can be seen that the RBL's during the day and evening are similar to what was measured in 2008 however the difference during the night-time between the WM and SKM measurements is 7dB. Differences of 2 to 3 dB would be expected, however WM have insufficient information to assess in detail the measurements undertaken by SKM. The RBL derived by WM for the night-time period has been used for this assessment to derive operational noise criteria which would result in a conservative criterion.

3.1.2 Noise from Industry Sources

In addition to the long-term noise measurements, attended noise measurements were undertaken during various times to determine the level of noise from industry.

During the deployment of the noise logger at 163 Kembla St (approximately 10.00pm Saturday, 8 March, 2008) no industrial noise was audible. The background at the time was typically 46dBA. Observations were again conducted at the same location as follows:

- Friday 14 March, 2008 at approximately 11.30am where the typical background (L_{A90}) was 47dBA and again no industrial noise was audible. This would indicate that industrial noise from PKCT would be less than 34dBA L_{Aeq} and other industrial noise would be less than 34dBA L_{Aeq}.

- Saturday 22 March, 2008 at approximately midday where the typical background was 50dBA and again no industrial noise was audible. This would indicate that industrial noise from PKCT would be less than 37dBA L_{Aeq} and other industrial noise would be less than 37dBA L_{Aeq}.

- Friday 2 May, 2008 at approximately 6:30pm where the typical background was 53dBA, industrial noise was barely audible and traffic noise dominated the noise in the area. It is important to note that during this time a gentle wind (estimated to be 2 to 2.5m/s at the microphone height) from the south/southwest was noticed. This would indicate that industrial noise from PKCT would be less than 40dBA L_{Aeq} and other industrial noise would be less than 40dBA L_{Aeq}.

- Friday 9 May, 2008 at approximately 8:30pm where the typical background was 45dBA and again no industrial noise was audible. This would indicate that industrial noise from PKCT would be less than 32dBA L_{Aeq} and other industrial noise would be less than 32dBA L_{Aeq}.

It is concluded that noise from PKCT is likely to be between 35-40 dBA L_{Aeq} at the front of residences in the vicinity of JJ Kelly Park depending on the weather conditions. Light winds and temperature inversions can enhance or even reduce noise levels, this is discussed later in the report. To the extent possible these estimated levels of PKCT onsite noise were used to calibrate the noise prediction model.

Industrial noise contribution other than PKCT would (conservatively) be at least 5dBA lower than the general background noise level at the front of residences in the vicinity of JJ Kelly Park. As such, a level of 40dBA has been estimated from all other industrial noise from the Port area during all time periods. During the daytime there maybe some influence from other industry located to the west of the residences along Keira Street. However, following site inspections and review of the noise logger charts, the industrial noise contribution other than PKCT at these residences would be less than 50dBA during the day. The Industrial noise contribution other than PKCT will be used to develop amenity criteria consistent with the INP.

3.2 Coal Haulage Route Assessment

3.2.1 Noise from Road Traffic as Represented by the L_{Aeq} Descriptor

Subjectively, the acoustic environment for residential receivers located adjacent to the coal haulage route is dominated by road traffic noise.

All roads that form part of the coal haulage route and pass residential receivers can be classified as either as arterial (including freeways) or sub-arterial roads (considering the *ECRTN*) Based on this, noise criteria will be assessed using two periods of time (note that the evening time period as per industrial noise is not used) as follows:

- Daytime 7.00am - 10.00pm (15 hours)
- Night time 10.00pm - 7.00am (9 hours)

Table 3-3 summarises both the $L_{Aeq,9hr}$ and $L_{Aeq,15hr}$ noise levels attributed to existing road traffic (including coal truck movements associated with PKCT) for weekdays and weekend days. The noise levels were measured 1m from facades (as required by the ECRTN) and as such include a façade correction.

Table 3-3 Summary of Measured Road Traffic Noise

Truck Route	Measurement Location	Descriptor		Traffic Noise Level Measured			
				Weekday		Weekend	
		Day	Night	Day	Night	Day	Night
Noise Monitoring Conducted by Wilkinson Murray							
Bellambi Lane[2]	77 Bellambi Lane (front yard)	$L_{Aeq, 1hrs}$	$L_{Aeq, 1hrs}$	71.3	64.3	69.5	63.4
	91 Keerrong Ave (rear yard)	$L_{Aeq, 1hrs}$	$L_{Aeq, 1hrs}$	56.6	48.5	54.7	48
Northern Distributor	13 Eager St (rear yard)	$L_{Aeq, 15hrs}$	$L_{Aeq, 9hrs}$	54.2	48.3	53.2	48.6
	7 Albert St (rear yard)	$L_{Aeq, 15hrs}$	$L_{Aeq, 9hrs}$	60.6	53.8	58.5	53.7
Springhill Road	392 Keira St (front yard)	$L_{Aeq, 15hrs}$	$L_{Aeq, 9hrs}$	63.3	53.8	58.2	52.8
	163 Kembla St (front yard – Swan St) – March 2008 Trial (24/7 Access)	$L_{Aeq, 15hrs}$	$L_{Aeq, 9hrs}$	60.7	54.1	57.8	53.8
	163 Kembla St (front yard – Swan St) – May 2008 Post Trial (11/6 Access)	$L_{Aeq, 15hrs}$	$L_{Aeq, 9hrs}$	62.9	55.4	57.7	53.1
Noise Monitoring Conducted by Hatch							
Mount Ousley Road	96 Dumfries Av	$L_{Aeq, 15hrs}$	$L_{Aeq, 9hrs}$	65.0	61.9	62.2	59.1
	6 Binda St	$L_{Aeq, 15hrs}$	$L_{Aeq, 9hrs}$	59.5	57.5	56.9	54.3
	36 Acacia Ave	$L_{Aeq, 15hrs}$	$L_{Aeq, 9hrs}$	62.2	58.8	58.6	54.3
Masters Road	84 Taronga Ave	$L_{Aeq, 15hrs}$	$L_{Aeq, 9hrs}$	58.4	54.9	53.4	51.7
Springhill Road	Swan St - 2007 Emergency Provisions (24/7 Access)	$L_{Aeq, 15hrs}$	$L_{Aeq, 9hrs}$	59.1	52	58.5	51

Note: (1) Noise levels presented to 1 decimal place for illustrative and comparative purposes only.

(2) Bellambi Lane is currently an arterial road however since traffic volumes are reducing on Bellambi Lane due the Northern Distributor Extension opening, Bellambi Lane's road category is changing to a collector road. Therefore measured noise levels for Bellambi Lane are reported as the highest tenth percentile hourly A-weighted L_{eq} during the relevant period consistent with assessing a collector road.

3.2.2 Summary of Measured Maximum Noise Levels

Table 3-4 to Table 3-7 present the existing maximum noise levels on an average Weekday or Weekend as well as the number of events for the residential receivers along the Springhill Rd route and the Bellambi Lane route. These receivers, currently experience maximum noise levels during the night, however, are not subjected to coal truck movements associated with PKCT during these times.

The noise levels are categorised as the number of maximum events between 15 to 20dB above the average $L_{Aeq, 1hour}$ or the number of maximum events > 20dB above the average $L_{Aeq, 1hour}$.

Springhill Road Route

Table 3-4 Number of L_{Amax} events at 163 Swan Street – Average Weekday

Hour Starting	March 2008– During the Trial $L_{Aeq, 1hour}$	March 2008– During the Trial, Number of Events: $L_{Amax} > L_{Aeq} + 15$ or $L_{Amax} < L_{Aeq} + 20$	March 2008– During the Trial, Number of Events: $L_{Amax} > L_{Aeq} + 20$	May 2008 – After the Trial $L_{Aeq, 1hour}$	May 2008 – After the Trial, Number of Events: $L_{Amax} > L_{Aeq} + 15$ or $L_{Amax} < L_{Aeq} + 20$	May 2008 – After the Trial, Number of Events: $L_{Amax} > L_{Aeq} + 20$
10pm	55	Up to 8	Up to 2	56	Up to 20	Up to 6
11pm	53	Up to 6	Up to 5	53	Up to 12	Up to 3
12am	52	Up to 5	Up to 2	52	Up to 7	Up to 7
1am	51	Up to 2	Up to 1	53	Up to 4	Up to 3
2am	51	Up to 2	Up to 1	53	Up to 7	Up to 4
3am	51	No events	No events	52	Up to 3	Up to 4
4am	52	Up to 3	Up to 4	53	Up to 3	Up to 3
5am	53	Up to 17	Up to 3	56	Up to 10	Up to 3
6am	56	Up to 22	Up to 3	60	Up to 6	Up to 3

Note: Maximum noise level (L_{Amax}) are used to assess the potential of sleep disturbance from road traffic noise in situations when the L_{Aeq} descriptor does not sufficiently characterise the effect of sleep disturbance. The maximum noise levels in this instance have been identified using noise loggers fitted with MadMax 3. This device has been designed and constructed by SoundScience, a division of WM and takes an output from the logger and stores the instantaneous noise level every 100ms (10 times per second).

Table 3-5 Number of L_{Amax} events at 163 Swan Street – Average Weekend

Hour Starting	March 2008– During the Trial $L_{Aeq, 1hour}$	March 2008– During the Trial, Number of Events: $L_{Amax} > L_{Aeq} + 15$ or $L_{Amax} < L_{Aeq} + 20$	March 2008– During the Trial, Number of Events: $L_{Amax} > L_{Aeq} + 20$	May 2008 – After the Trial $L_{Aeq, 1hour}$	May 2008 – After the Trial, Number of Events: $L_{Amax} > L_{Aeq} + 15$ or $L_{Amax} < L_{Aeq} + 20$	May 2008 – After the Trial, Number of Events: $L_{Amax} > L_{Aeq} + 20$
10pm	55	Up to 14	Up to 3	51	Up to 14	Up to 10
11pm	54	Up to 12	Up to 2	54	Up to 56	Up to 15
12am	50	Up to 12	Up to 11	51	Up to 4	Up to 8
1am	49	Up to 7	Up to 3	52	Up to 6	Up to 3
2am	51	Up to 7	Up to 5	51	Up to 9	Up to 14
3am	47	Up to 4	Up to 2	50	Up to 5	Up to 5
4am	50	Up to 7	Up to 1	51	Up to 5	Up to 3
5am	55	Up to 5	No events	54	Up to 6	Up to 3
6am	57	Up to 5	No events	56	Up to 33	Up to 1

Bellambi Lane Route

Table 3-6 Number of L_{Amax} events at Bellambi Lane

Hour Starting	March 2008– During the Trial			May 2008 – After the Trial		
		Number of Events			Number of Events	
	$L_{Aeq, 1hour}$	$L_{Amax} > L_{Aeq} + 15$ or $L_{Amax} < L_{Aeq} + 20$	$L_{Amax} > L_{Aeq} + 20$	$L_{Aeq, 1hour}$	$L_{Amax} > L_{Aeq} + 15$ or $L_{Amax} < L_{Aeq} + 20$	$L_{Amax} > L_{Aeq} + 20$
10pm	64	Up to 7	No events	65	Up to 4	No events
11pm	62	Up to 12	Up to 2	63	Up to 2	No events
12am	59	Up to 13	Up to 1	61	Up to 14	Up to 1
1am	57	Up to 18	Up to 2	59	Up to 28	Up to 2
2am	57	Up to 14	Up to 3	58	Up to 22	Up to 6
3am	57	Up to 16	Up to 4	56	Up to 22	Up to 10
4am	61	Up to 13	Up to 1	60	Up to 23	Up to 2
5am	66	Up to 10	No events	64	Up to 6	Up to 1
6am	70	Up to 2	No events	68	Up to 6	No events

Table 3-7 Number of L_{Amax} events at Keerrong Avenue

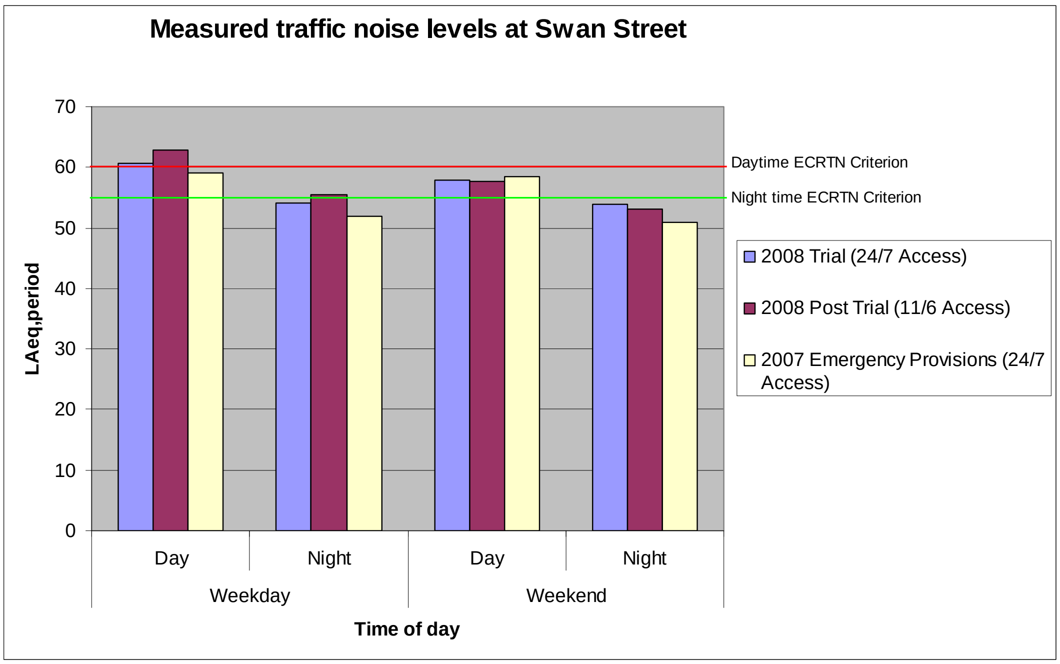
Hour Starting	March 2008– During the Trial			May 2008 – After the Trial		
		Number of Events			Number of Events	
	$L_{Aeq, 1hour}$	$L_{Amax} > L_{Aeq} + 15$ or $L_{Amax} < L_{Aeq} + 20$	$L_{Amax} > L_{Aeq} + 20$	$L_{Aeq, 1hour}$	$L_{Amax} > L_{Aeq} + 15$ or $L_{Amax} < L_{Aeq} + 20$	$L_{Amax} > L_{Aeq} + 20$
10pm	50	Up to 8	Up to 4	49	Up to 4	Up to 4
11pm	48	Up to 1	Up to 2	47	Up to 4	Up to 2
12am	45	Up to 5	Up to 14	45	Up to 2	Up to 8
1am	44	Up to 2	Up to 15	45	Up to 3	Up to 6
2am	43	Up to 3	Up to 2	44	Up to 7	Up to 10
3am	43	Up to 5	Up to 5	40	Up to 24	Up to 7
4am	45	Up to 3	Up to 32	44	Up to 6	Up to 2
5am	50	Up to 6	Up to 4	48	Up to 7	Up to 2

During the trial, GNRE No. 1 Mine was unable to deliver coal during the night-time hours. The values presented in Table 3-6 and Table 3-7 therefore, do not include coal truck movements associated with PKCT.

3.3 Comparison of Trial and Post Trial Noise Measurements

Figure 3-1 shows a traffic noise level comparison during 2007 Emergency Provisions 24/7 access, trial 24/7 access and post trial 11/6 access. The indications are that the movements of coal trucks along Springhill Road do not appear to influence the overall traffic noise levels during the day and night at residential facades along Swan Street and as such it is more likely that the presented noise levels are due to local events unassociated with public road deliveries of coal to PKCT.

Figure 3-1 Comparison of traffic noise levels during 2007 Emergency Provisions 24/7 access, trial 24/7 access and post trial 11/6 access.



Comparing the results during the trial when night time truck movements occurred against no night truck movements, Table 3-4 and Table 3-5 indicate that the movements of coal trucks along this route during the night-time hours do not appear to influence the maximum noise levels impinging on residential facades along Keira Street and Swan Street and as such it is more likely that the presented noise levels are due to local events unassociated with public road deliveries of coal to PKCT. This conclusion is further reinforced from attended monitoring, where maximum levels due to coal trucks along Springhill road at the façade of 163 Swan Street were in the order of 52dBA which is below the average $L_{Aeq,\ 1hour}$ noise level.

In the event that truck movements associated with PKCT utilised Bellambi Lane, the following would result with the final impact dependant on the number of truck movements per hour:

- Increase the $L_{Aeq,\ 1hour}$; and
- Increase the number of and level of maximum events.

4 OPERATIONAL NOISE CRITERIA

The NSW DoP has provided the environmental assessment requirements under Part 3A of the Environmental Planning & Assessment Act 1979 (Application Number 08_0009). The environmental assessment requirements require the assessment to be conducted consistent with the following policy guidelines published by the NSW Department of Environment & Climate Change (DECC):

- *NSW Industrial Noise Policy (INP)*, dated January 2000;
- *Environmental Criteria for Road Traffic Noise (ECRTN),* dated May 1999; and
- *Environmental Noise Control Manual (ENCM),* dated 1984.

DoP requires an assessment of noise from both on-site activities as well as noise associated with coal trucks delivering to PKCT on the road network.

DECC specifically required the impacts of traffic noise and vibration be assessed in accordance with:

- *ECRTN; and*
- *Environmental Noise Management Manual (ENMM),* dated December 2001, prepared by the Roads and Traffic Authority (RTA) NSW.

A review of these recommended guideline documents by WM consider them to all be relevant for use in this assessment with the exception of *ENCM*. That document has been superseded by other DECC guidelines with the exception of developing criteria for construction activities (a specific document is currently being prepared by the DECC). Given that this development will not involve any construction activities the *ENCM* is not relevant and will not be referred to in this assessment.

In addition to these guidelines, WM has considered the DECC's *Noise Guide for Local Government (NGLG)*, dated June, 2004 in order to assess sleep disturbance of nearby residences from on-site activities.

4.1 On-Site Noise from the PKCT Site

Noise emanating from the PKCT site is to be assessed using the *INP* for continuous and semi-continuous noise sources and the *NGLG* where short-term, high level noises occur during the night-time period. As mentioned previously, the following time periods are defined by DECC for "industrial noise":

- Daytime 7.00am to 6.00pm;
- Evening 6.00pm to 10.00pm; and
- Night-time 10.00pm to 7.00am.

However on Sundays and Public Holidays, daytime begins (night-time ends) at 8.00am.

4.1.1 Continuous and Semi-Continuous Noise Sources

The *INP* is designed to assess industrial noise using the more stringent of the following two approaches:

- Intrusive noise impacts in the short term for residences; and
- Amenity for particular land uses such as residences.

The *INP's* intrusive criterion is set 5dBA above the Rating Background Level (RBL) for each time period of interest as defined by DECC for "industrial noise". The RBLs are derived from the measured L_{A90} noise levels as per the DECC guideline.

The amenity criterion sets an upper limit to the total noise level (L_{Aeq}) affecting a location from all industrial noise (existing and future). At the affected location, the appropriate criterion for a new source depends on the time of day, area classification, the total measured L_{Aeq} and contribution from existing industrial noise.

With guidance from the *INP*, the potentially affected areas northwest, north and north east of PKCT are considered to be Urban for the purpose of noise assessment. Given this, the acceptable amenity levels (L_{Aeq}) which apply over the whole day, evening or night period are presented below and are applicable on the basis that there are no other industrial noise sources:

- Daytime 60 dBA;
- Evening 50 dBA; and
- Night time 45 dBA.

The aim of the amenity criteria is to ensure that overall levels of industrial noise do not creep above these recommended levels. When the existing levels of industrial noise are above or close to the recommended L_{Aeq} levels, the *INP* achieves this by setting the amenity criteria for a new development below these existing levels. The amenity criterion is then derived from using Table 2.2 of the *INP* such that when the new noise source is added to the existing industrial noise so that the overall industrial noise level does not exceed the Acceptable Noise Level.

Given that a level of existing industrial noise (other than PKCT) has been estimated for night-time periods to be 40dBA the amenity criterion for PKCT should be 2dBA below the acceptable amenity level of 45 dBA resulting in an amenity criterion of 43dBA.

Refer to Table 4-1 showing the intrusive and amenity criteria for the project.

4.1.2 Instantaneous Noise Sources and Sleep Disturbance

Peak noise level events, such as reversing beepers, noise from heavy items being dropped or other high noise level events, may cause sleep disturbance. The potential for high noise level events at night and effects on sleep should be addressed in noise assessments. The *INP* however does not specifically address sleep disturbance from noise events with a short duration and high noise level. The appropriate guideline document is the *NGLG* and will be used in this assessment.

With reference to the *NGLG,* the current sleep disturbance criterion of an $L_{A1,1min}$ not exceeding the $L_{A90,15min}$ by more than 15 dB is not ideal. Nevertheless, as there is insufficient evidence to determine what should replace it, DECC will continue to use it as a guide to identify the likelihood of sleep disturbance. This means that where the criterion is met, sleep disturbance is not likely, but where it is not met, a more detailed analysis is required. The criterion is relevant during the hours 10.00pm-7.00am (8.00am on Sundays and Public Holidays) and assessed external to a bedroom window.

4.1.3 Project Specific Operational Noise Criteria

Table 4-1 provides a summary of the operational noise criteria applicable to this project.

Table 4-1 Operational Noise Criteria from PCKT Site

Residence	Time Period	Criteria (dBA)		
		Continuous Noise		Intermittent Noise
		Intrusive $L_{Aeq,15min}$	Amenity $L_{Aeq,period}$	Sleep Disturbance $L_{A1,1min}$
North and Northeast of PKCT (along Swan St)	Daytime	***51***	60	n/a
	Evening	***50***	50	n/a
	Night Time	***49***	***43***	***59***
Northwest of PKCT (along Kiera St)	Daytime	***55***	60	n/a
	Evening	***49***	50	n/a
	Night Time	***43***	43	***53***

The relevant project specific noise levels are identified in bold italics. Essentially however, both criteria are relevant however where the intrusive criteria are lower than those of amenity, both criteria will be met if the specific intrusive criterion is met. However, with respect to the residential receivers to the north and northeast, both the intrusive criterion and amenity criterion are relevant, particularly given that the criterion for intrusiveness is higher than that of amenity.

Further to this, the *INP* requires that where noise (applicable to continuous/semi-continuous noise and not instantaneous noise) contains certain characteristics, such as tonality, impulsiveness, intermittency or dominant low frequency content, a modifying factor of +5dBA (to a maximum of +10dBA) should be applied because these type of noises typically cause greater annoyance to the community.

These modifying factors take effect at the residential receiver and would typically be judged by measurement at the residential receiver where the measurement would be made up of both the site noise and existing ambient noise environment as currently experienced by the residential receiver.

Given that the residential receivers are currently impacted by traffic noise and as such the ambient noise is high and includes low frequency content, the risk that greater annoyance from industrial noise is unlikely and the application of modifying factors not warranted.

4.2 Noise from Road Traffic Generated by the PKCT Site along the Road Network

PKCT is a development that generates vehicle movements on the road network. This is primarily due to the movement of coal via heavy vehicles (trucks) from the West Cliff CPP and GNRE No. 1 Mine to PKCT (and the return of those trucks).

The most relevant document with respect to noise criteria is the *ECRTN* which recommends that road traffic noise be assessed using two periods of time (note that the evening time period as per industrial noise is not used) as follows:

- Daytime 7.00am - 10.00pm; and
- Night time 10.00pm - 7.00am.

The RTA has also published the *ENMM* to assist in implementing the *ECRTN*.

4.2.1 Noise from Road Traffic as Represented by the L_{Aeq} Descriptor

In order to assign noise criteria, the functional category of the roads being used are to be determined. In discussion with CEO all of the roads used for coal transportation from the mines to PKCT are currently either arterial roads or freeways. Based on this, Table 4-2 outlines the relevant criteria as contained in the *ECRTN*.

Table 4-2 Noise Criteria – Freeway / Arterial Roads / Sub Arterial Roads

Type of Development	Criteria		
	Day (7.00am-10.00pm) dBA	Night (10.00pm-7.00am) dBA	Where Criteria Are Already Exceeded
Land use developments with potential to create additional traffic on existing freeways/arterials	$L_{Aeq,15hr}$ 60	$L_{Aeq,9hr}$ 55	Where feasible and reasonable, existing noise levels should be mitigated to meet the noise criteria. Examples of applicable strategies include appropriate location of private access roads; regulating times of use; using clustering; using "quiet" vehicles; and using barriers and acoustic treatment. In all cases, traffic arising from the development should not lead to an increase in existing noise levels of more than 2dB.

Once the Northern Distributor Extension opens (beginning of 2009), the RTA proposes to reclassify Bellambi Lane so that it will be maintained by Wollongong City Council. Table 4-3 shows a comparison of the existing (2008) average daily traffic volumes and estimated 2009 and 2013 traffic volumes. As can be seen from Table 4-3 traffic volumes as a result of the opening of the Northern Distributor Extension are likely to be reduced by half on Bellambi Lane. The functional category of the road from an acoustic perspective would therefore change from an arterial road to a local road.

Table 4-3 Traffic Volumes for Bellambi Lane.

	2008 (existing)		2009 (Northern Distributor extension operating)		2013	
	Weekday	weekend	Weekday	weekend	Weekday	weekend
Bellambi Lane	11,785	9,814	4,982	4,149	5,227	4,359

Despite this proposed reclassification, the *ECRTN* acknowledges that industries such as mines may need to use local roads and that document states the following:

> *"It is noted that some industries (such as mines and extractive industries) are, by necessity, in locations that are often not served by arterial roads. Heavy vehicles must be able to get to their bases of operation, and this may mean travelling on local roads. Good planning practice recognises that we must acknowledge this type of road use and develop ways of managing any associated adverse impacts. To this end, the concept of 'principal haulage routes' has been endorsed by the Department of Urban Affairs and Planning's (now known as DoP) North Coast Extractive Industries Standing Committee. Ways of identifying 'principal haulage routes' and managing associated adverse impacts have not yet been fully defined. Where local authorities identify a 'principal haulage route', the noise criteria for the route should match those for collector roads, recognising the intent that they carry a different level and mix of traffic to local roads."*

With respect to movements from GNRE No. 1 Mine to PCKT, Bellambi Lane provides the most direct route to the Northern Distributor and then to PKCT. This route has been used by the mine since the Northern Distributor opened in December 1992 which resulted in the Princes Highway south of Bellambi Lane to be reclassified to a local road. The mine was then sold in 2004 and reopened in 2005.

Based on the above, it is considered reasonable by WM that Bellambi Lane be identified as a 'principal haulage route' and be assigned the noise criteria for a collector road. The criteria is summarised in Table 4-4.

Table 4-4 Noise Criteria – Collector Roads

Type of Development	Criteria: Day (7.00am-10.00pm) dBA	Criteria: Night (10.00pm-7.00am) dBA	Criteria: Where Criteria Are Already Exceeded
Land use developments with potential to create additional traffic on existing collector road	$L_{Aeq,1hr}$ 60	$L_{Aeq,1hr}$ 55	Where feasible and reasonable, existing noise levels should be mitigated to meet the noise criteria. Examples of applicable strategies include appropriate location of private access roads; regulating times of use; using clustering; using "quiet" vehicles; and using barriers and acoustic treatment. In all cases, traffic arising from the development should not lead to an increase in existing noise levels of more than 2dB.

4.2.2 Noise from Road Traffic as Represented by the L_{Amax} Descriptor

Although there are no specific criteria relating to sleep disturbance in *ECRTN,* the document recommends that an assessment of such levels be undertaken where impacts may occur during the night. The only guidance offered in terms of acceptable maximum noise levels are:

- *Maximum internal noise levels below 50-55dBA are unlikely to cause awakening reactions*
- *One or two noise events per night with maximum internal noise levels of 65-70dBA are not likely to significantly affect health and wellbeing*

The RTA's *ENMM* puts forward a protocol for assessing maximum traffic noise levels. In Practice Note (iii) the document states:

> *At locations where road traffic is continuous rather than intermittent, the $L_{Aeq,9hr}$ target noise levels should sufficiently account for sleep disturbance impacts.*
>
> *A "maximum noise event" can therefore be defined as any pass-by for which L_{Amax}-$L_{Aeq,\ 1hr} \geq 15$dBA (provided that the level is > 65dBA)*

This value is to be assessed externally, outside a bedroom window. Assuming a conservative reduction across an open bedroom window of 10dB, an external level of 65dBA would correspond to an internal level of 55dBA. As mentioned previously, events at this level are unlikely to cause awakening reactions.

4.2.3 Project Specific Road Traffic Noise Criteria

In order to establish road traffic noise criteria (as defined by the L_{Aeq} noise descriptor), the traffic noise levels excluding the effect of any coal truck movements need to be established. The traffic noise levels excluding the effect of any coal truck movements are presented in Table 4-5. These levels are used to establish the road traffic noise criteria as presented in Table 4-6.

In this regard the initial "base" year that will be considered will be 2008. The following section addresses the methodology required to arrive at the relevant criteria for each of the routes.

The traffic noise levels excluding the effect of any coal truck movements have been calculated using the Federal Highways traffic noise prediction method (FHWA). With the exception of the Springhill Rd haulage route, it has been assumed that the measured traffic noise levels (Table 3-3) are from the haul route in question. For Springhill Road Haul route where Springhill Rd is at least 200m from the nearest residential receiver (Swan Street and Keira Street) road traffic noise is a contribution of Swan Street, Keira Street and Springhill Rd. To estimate traffic noise levels excluding the effect of any coal truck movements the noise contribution from Swan Street, Keira Street and Springhill Rd where specifically modelled.

Bellambi Lane and Northern Distributor Route

Traffic noise level measurements were undertaken in 2008 at 2 receivers along each of these routes. An adjustment is therefore required to remove the noise associated with PKCT movements (attributed to GNRE No.1 mine). This occurred primarily within daytime hours (7.00am to 10.00pm), with some movements in the hour 6.00am to 7.00am).

Mount Ousley Route

Traffic noise level measurements were undertaken in 2007 (by HATCH) at 2 receivers along this route. An adjustment is therefore required to remove the noise associated with PKCT movements (attributed to West Cliff CPP) in 2007. And adjustment is also required to allow for the natural growth in road traffic experienced between 2007 and 2008. Movements along this route are permitted 24hrs, 7days per week.

F6 Route

Traffic noise level measurements were undertaken in 2007 (by HATCH) at a receiver along this route. An adjustment is therefore required to remove the noise associated with PKCT movements (attributed to both West Cliff CPP and GNRE No.1 mine) in 2007. And adjustment is also required to allow for the natural growth in road traffic experienced between 2007 and 2008. Movements along this route are permitted 24hrs, 7days per week.

Masters Road Route

Traffic noise level measurements were undertaken in 2007 (by HATCH) at a receiver along this route. An adjustment is therefore required to remove the noise associated with PKCT movements (attributed to both West Cliff CPP and GNRE No.1 mine) in 2007. And adjustment is also required to allow for the natural growth in road traffic experienced between 2007 and 2008. Movements along this route are permitted 24hrs, 7days per week.

Springhill Road Route

Traffic noise level measurements were undertaken in 2008 (March 2008 and May 2008) at 2 receivers along each of this route. An adjustment is therefore required to remove the noise associated with PKCT movements attributed to both West Cliff CPP and GNRE No.1 mine).

Table 4-5 Summary of Road Traffic Noise Levels for Base Year – 2008 excluding the effect of any coal truck.

Truck Route	Measurement Location	*ECRTN Criteria*		Traffic Noise Level(1)			
				Weekday		**Weekend**	
		Day	**Night**	**Day**	**Night**	**Day**	**Night**
Bellambi Lane(2)	77 Bellambi Lane (front yard)	$L_{Aeq,1hr}$ 60	$L_{Aeq,1hr}$ 55	***71.1***	***64.1***	***69.2***	***63.1***
	91 Keerrong Ave (rear yard)	$L_{Aeq,1hr}$ 60	$L_{Aeq,1hr}$ 55	56.4	48.3	54.4	47.7
Northern Distributor	13 Eager St (rear yard)	$L_{Aeq,15hr}$ 60	$L_{Aeq,9hr}$ 55	54.1	48.3	53.1	48.6
	7 Albert St (rear yard)	$L_{Aeq,15hr}$ 60	$L_{Aeq,9hr}$ 55	***60.5***	***53.8***	***58.4***	***53.5***
Springhill Road	392 Keira St (front yard)	$L_{Aeq,15hr}$ 60	$L_{Aeq,9hr}$ 55	***63.3***	***53.7***	***58.2***	52.6
	163 Kembla St (front yard – Swan St) – March 2008	$L_{Aeq,15hr}$ 60	$L_{Aeq,9hr}$ 55	***60.6***	***53.8***	57.7	***53.6***
Mount Ousley Road	96 Dumfries Ave	$L_{Aeq,15hr}$ 60	$L_{Aeq,9hr}$ 55	***65.1***	***62.1***	***62.4***	***59.3***
	6 Binda St (rear yard)	$L_{Aeq,15hr}$ 60	$L_{Aeq,9hr}$ 55	***59.6***	***57.7***	57.1	***54.5***
F6	36 Acacia Ave	$L_{Aeq,15hr}$ 60	$L_{Aeq,9hr}$ 55	***62.0***	***58.8***	***58.6***	***54.3***
Masters Road	84 Taronga Ave (rear yard)	$L_{Aeq,15hr}$ 60	$L_{Aeq,9hr}$ 55	***58.2***	***54.9***	53.2	51.8

Note: (1) Noise levels presented to 1 decimal place for illustrative and comparative purposes only.

(2) Bellambi Lane is currently an arterial road however since traffic volumes are reducing on Bellambi Lane due the Northern Distributor Extension opening, Bellambi Lane's road category is changing to a collector road. Therefore measured noise levels for Bellambi Lane are reported as the highest tenth percentile hourly A-weighted L_{eq} during the relevant period consistent with assessing a collector road.

As expected, the noise levels from traffic in 2008 during the weekdays either exceed or are within 2dB of criteria (shown in bold italics) at all residential receivers with the exception of:

- rear yard of residences fronting Keerrong Avenue – likely due to setback, shielding from rear fence and angle of view of traffic; and
- rear yards residences fronting Eager Street – likely due to setback and road side noise barriers.

When considering the weekend time periods, as can be seen in Table 4-5, there are a number of locations that are below criteria, namely:

- rear yard of residences fronting Keerrong Avenue;
- rear yards of residences fronting Eager St;
- rear yards of residences fronting Binda St;
- rear yards of residences fronting Taronga Ave;
- Keira St; and
- Swan St.

Table 4-6 Project Specific Traffic Noise Criteria

Truck Route (Road fronting)	Criteria (L_{Aeq})			
	Weekday		Weekend Day	
	Day	Night	Day	Night
Bellambi Lane (front yard Bellambi Lane)	Existing L_{Aeq}+2.0	Existing L_{Aeq}+2.0	Existing L_{Aeq}+2.0	Existing L_{Aeq}+2.0
Bellambi Lane (rear yards Keerrong Ave)	(60) or Existing L_{Aeq}+3.6	(55) or Existing L_{Aeq}+6.7	(60) or Existing L_{Aeq}+5.6	(55) or Existing L_{Aeq}+7.3
Northern Distributor (rear yards Eager St)	(60) or Existing L_{Aeq}+5.9	(55) or Existing L_{Aeq}+6.7	(60) or Existing L_{Aeq}+6.9	(55) or Existing L_{Aeq}+6.4
Northern Distributor (rear yards Albert St)	Existing L_{Aeq}+2.0	Existing L_{Aeq}+2.0	Existing L_{Aeq}+2.0	Existing L_{Aeq}+2.0
Mount Ousley Rd (Dumfries Ave)	Existing L_{Aeq}+2.0	Existing L_{Aeq}+2.0	Existing L_{Aeq}+2.0	Existing L_{Aeq}+2.0
Mount Ousley Rd (rear yards Binda St)	Existing L_{Aeq}+2.0	Existing L_{Aeq}+2.0	(60) or Existing L_{Aeq}+2.9	Existing L_{Aeq}+2.0
F6 Freeway (Acacia Ave)	Existing L_{Aeq}+2.0	Existing L_{Aeq}+2.0	Existing L_{Aeq}+2.0	Existing L_{Aeq}+2.0
Masters Rd (rear yard Taronga Ave)	Existing L_{Aeq}+2.0	Existing L_{Aeq}+2.0	(60) or Existing L_{Aeq}+6.8	(55) or Existing L_{Aeq}+3.2
Springhill Rd (front yard Kiera St)	Existing L_{Aeq}+2.0	Existing L_{Aeq}+2.0	Existing L_{Aeq}+2.0	(55) or Existing L_{Aeq}+2.4
Springhill Rd (front yard Swan St)	Existing L_{Aeq}+2.0	Existing L_{Aeq}+2.0	(60) or Existing L_{Aeq}+2.3	Existing L_{Aeq}+2.0

The objective of the ECRTN is to meet the base criteria. Where criteria are exceeded all reasonable and feasible mitigation options are to be considered prior to adopting the 2dB allowance.

The following justification is given for the use of the 2dB allowance goal for Springhill Road, Masters Road, F6 Freeway, Mount Ousley Road and Northern Distributor:

- each of the roads used by PKCT coal haulage trucks is either an arterial/freeway or sub-arterial, purposely designed to carry heavy vehicle movements and remove them from other more dense residential corridors;
- many of the roads used by the coal haulage trucks have already undergone mitigation treatments in the form of road side barriers and noise monitoring and as such all reasonable and feasible noise mitigation has been installed; and
- the route used is the most direct and would impact on the least number of residential receivers.

5 PREDICTIONS OF ON-SITE OPERATIONAL NOISE

5.1 Introduction

Intervening topography attenuates noise before it reaches receivers. Additionally, noise propagation over distances of at least several hundred metres is influenced by meteorological factors such as wind speed, wind direction and the presence of temperature inversions. In addition to increasing noise levels, these meteorological conditions significantly reduce the attenuating effect of intervening topography (and bunds) since the sound waves follow a curved path that can go over such barriers.

For this assessment, noise predictions were made using the Environmental Noise Model (ENM) modelling software algorithm. This is a point-to-point model that takes into account the attenuation factors including; distance, topography, ground absorption, air absorption and meteorological conditions. ENM predictions have been validated in the field (on Australian projects) by many researchers and are approved to be used in NSW by the DECC.

5.2 Noise Model Inputs

ENM requires a variety of inputs including sound power levels (SWL) of each source, location of sources (including height above ground), topographic information and the ground type. Meteorological conditions are also required.

5.2.1 Meteorological Conditions

During the night time period, the worst case noise levels are likely to be experienced during temperature inversions and with wind in the direction from source(s) to receiver. Temperature inversions are rarely present during the daytime or evening periods. Therefore, the most significant meteorological effect during these periods is wind. Acoustically neutral conditions (calm wind) have also been considered.

WM has developed a process to assess the weather conditions in an area, and their effect on noise, that is more rigorous than that required by the *INP*. It provides the impact at all receivers during all weather conditions by calculating the noise level that is exceeded 10% of the time for each DECC defined time period (day, evening and night) during each season (Summer, Winter, Spring and Autumn). This is presented at each receiver and is compared against the relevant criteria. This process has been accepted by the DECC.

All meteorological data modelled is presented in Appendix C.

Daytime

Acoustically neutral conditions – calm wind (≤0.5m/s), together with a temperature of 18.9ºC and relative humidity of 63.7%. Wind speed at; 0.75m/s, 1.25m/s, 1.75m/s, 2.25m/s and 2.75m/s (encompassing a 0.25m/s range either side). Wind direction at every 45 degrees (encompassing a 22.5 degree range either side). A total of 41 conditions are considered for both the day and evening for each season.

Evening

Acoustically neutral conditions – calm wind (≤0.5m/s), together with a temperature of 18.0°C and relative humidity of 74.6%. Wind speed at; 0.75m/s, 1.25m/s, 1.75m/s, 2.25m/s and 2.75m/s (encompassing a 0.25m/s range either side). Wind direction at every 45 degrees (encompassing a 22.5 degree range either side). A total of 41 conditions are considered for both the day and evening for each season.

Night

Acoustically neutral conditions – calm wind (≤0.5m/s) together with a temperature of 17.2°C and relative humidity of 78.5%. All wind speeds and directions as described above are modelled, both with a temperature inversion of 3°/100m and without a temperature inversion. A total of 82 conditions are considered for each season.

5.2.2 Topography

Cardno Forbes Rigby (CFR) supplied a 3D digital terrain map of the immediate surrounding area using 2m contours.

5.3 Assessment of ONSITE operational noise

This section of the report assesses the potential operational noise from onsite activities impacting the existing residential receivers.

5.4 Operational Activities

Following a visit of the site (9th January 2008) and discussions with site personnel, the primary site operations that will emit noise include:

- Delivery of material by road and rail to their respective receival hoppers onto conveyors;
- Transfer of received coal via conveyor to stackers to be stockpiled prior to arrival of ship;
- Transfer of products received to Bulk Product Berth to stockpile via front end loader;
- Movement of stockpiled coal to the ship loader using bucket wheel reclaimers and conveyors;
- Loading of coal to ship using the ship loader at Berth 102; and
- Loading of product received at Bulk Product Berth to ship via ship loader at Berth 101.

5.5 Source Noise Levels

During the site visit, noise level measurements were conducted of the main plant and machinery. Table 5-1 summarises the overall noise emissions used for noise modelling.

A typical worst case scenario has been modelled where in a 15 minute period all the operations as per Table 5-1 occur. This includes up to 3 trucks and a train being unloaded and as such assumes all transfer stations would be operating at capacity for the entire 15 minute period.

It must be noted that there will be periods where neither trains nor trucks will be unloaded or a ship in harbour and as such transfer stations, stackers, reclaimers and ship loaders may not be operational.

Table 5-1 Source Noise Emissions of Main Operations

Operation	Source Sound Power Level L_{Aeq} (dBA)	Height (m)
West Yard Conveyor (CV)	85	3.5
Middle North Yard CV	89	3.5
Middle South Yard CV	89	3.5
East Yard CV	85	3.5
Trucks (engine)(1)	65.5	1.5
Ship loader CV (land)	85	3.5
Ship loader CV (ship)	85	3.5
Trucks (exhaust)(1)	57.5	3.6
Truck Dump Area	90	2
Train Dump Station	100	5
Transfer Station 2 (TS4)	105	6.5
TS5 (Nth - Big)	107	10
TS3 (Nth)	105	6.5
TS4 (Nth)	105	6.5
TS6 (Sth)	105	6.5
TS7 (Sth)	105	6.5
Reclaimer	105	5
West Yard CV - North Stacker	106	10
West Yard CV - South Stacker	106	10
Ship loader CV Drive (land)	105	3.5
East Yard CV - Stacker	106	10
Ship loader CV Drive (ship)	100	10
CV Tunnel North	78	10
CV Tunnel South	78	10
CV Tunnel West	78	10
CV Tunnel East	78	10
Truck tailgate striking body	113 (L_{Amax})	1.5

Note: (1) Sound power level has been modelled as dBA/m

5.6 Calculated Noise Levels

The noise levels have been calculated using the ENM modelling software and are summarised in Table 5-2. Levels for meteorological conditions that will enhance the propagation of noise and acoustically neutral (no enhancement) are presented.

Figure 5-1 and Figure 5-2 present the worst case contours considering the residential receivers along Keira Street for the day-time and night time periods. At this location, the calculated evening noise levels are identical to those at night-time and as such this contour is not presented.

Table 5-2 Summary of Calculated Noise Levels to Residences – 10% Exceedance

Residence	Time Period	Calculated Noise Level (dBA)					Noise Criteria $L_{Aeq,15min}$ (dBA)
		Meteorological Condition					
		Non-Enhanced	Enhanced				
			Autumn	Spring	Summer	Winter	
Corner of Swan/Kembla Streets)	Day	34	41	42	40	41	51
	Evening	35	43	44	44	42	50
	Night	36	43	43	44	42	49
Corner of Swan/Corrimal Streets)	Day	37	42	42	40	42	51
	Evening	37	43	45	44	43	50
	Night	38	44	44	44	43	49
Corner of Keira Street/Fox Avenue	Day	40	43	44	42	43	55
	Evening	40	44	45	45	43	49
	Night	41	***44***	***45***	***45***	43	43

Note: Exceedances are shown in bold italics.
Calculated (point to point) levels as presented in Table 5-2 are more accurate than the contours.

Figure 5-1 Noise Contour - Night-Time - Summer

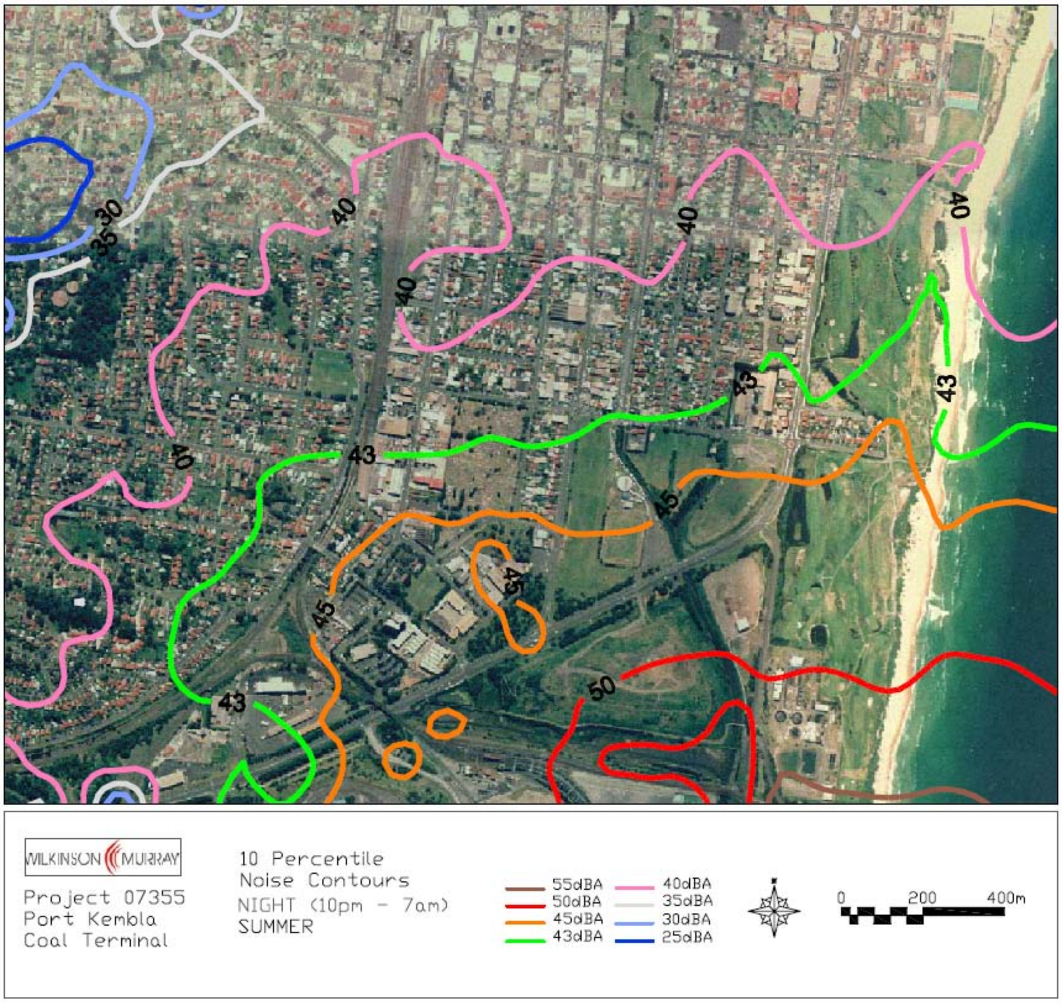
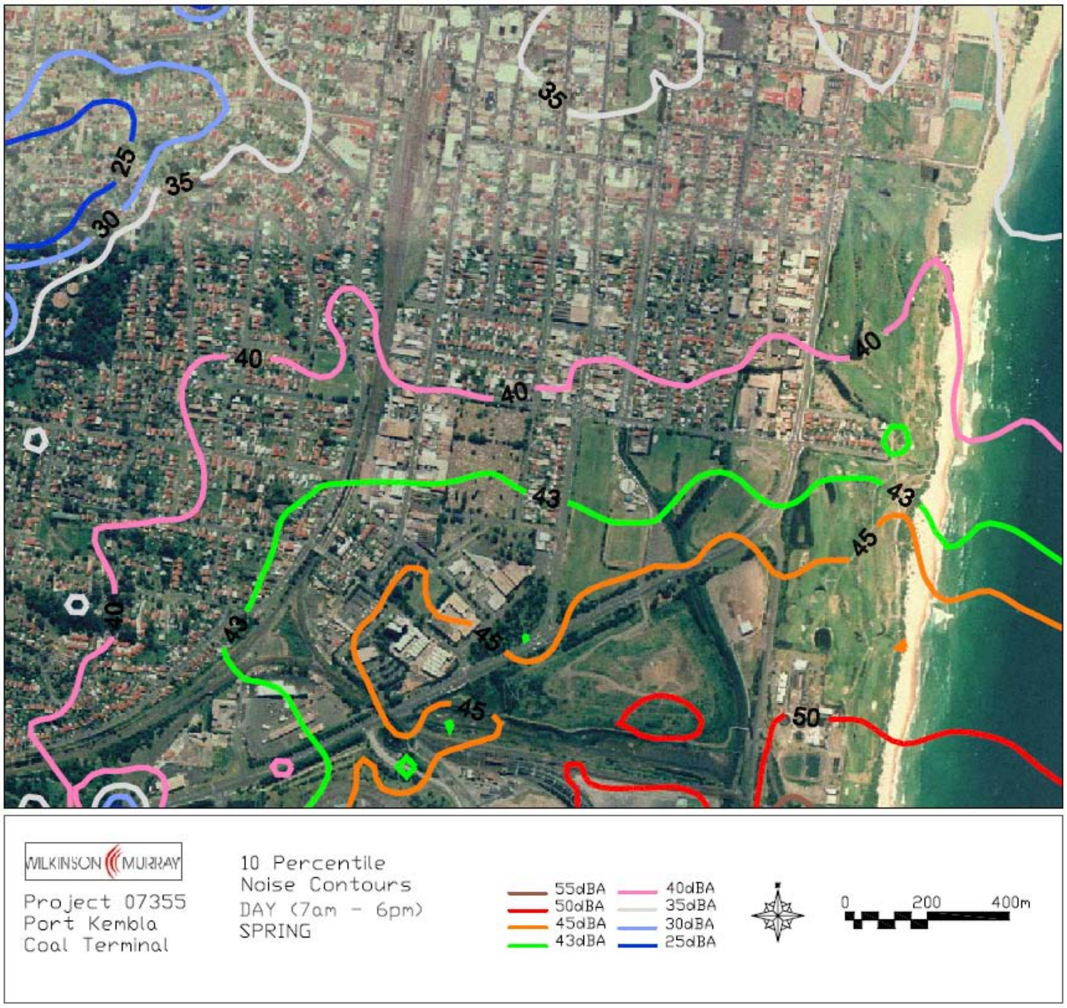


Figure 5-2 Noise Contour - Daytime - Spring



As can be seen in the above table, the calculated noise levels for non-enhanced meteorological conditions meet the noise criteria. In the event of meteorological conditions that enhance the noise from source to receiver and if at these times the assumed typical worst case scenario occurs, there are exceedances of between 1 and 2dBA at the closest residential receivers along Keira Street.

These exceedances, should they be realised are considered to be minor. Receivers that experience noise levels that exceed criteria can be separated into the following categories:

- 0-2dB(A): minor exceedances;
- 2-5dB(A): marginal exceedances; and
- >5dB(A): significant exceedances

Furthermore, the *INP* indicates:

> *The industrial noise source criteria ... are best regarded as planning tools. They are not mandatory, and an application for a noise-producing development is not determined purely on the basis of compliance or otherwise with the noise criteria. Numerous other factors need to be taken into account in the determination. These factors include economic consequences, other environmental effects and the social worth of the development. The criteria help to determine consent/licence conditions because they provide information on the likely effect of any environmental noise associated with the development.*

5.7 Assessment of the Potential for Sleep Disturbance

The potential for sleep disturbance within the residences will be greatest during the early morning hours when background noise levels are at their lowest.

In discussions with site personnel and based on site visits, events identified that will produce instantaneous, short-duration, high-level noise events would be limited to events such as the tailgates of trucks striking the truck body. This scenario has been identified by the community via consultation with PKCT personnel and will be assessed by WM.

The predicted noise level from such an event has been calculated to be L_{Amax} 37dBA at the nearest of the residential receivers. Given that this noise level is below the general background noise level in the area (38dBA), it can be concluded that the potential risk of such an event disturbing the sleep of nearby residences is unlikely.

6 ROAD TRAFFIC NOISE ASSESSMENT

In order to calculate the change in noise levels due to the change in traffic flows attributed to the PKCT facility, the following information has been supplied by CEO:

- Traffic route and location of sensitive receivers;
- Typical hourly traffic flows (classified) over a period of at least 7 days along the roads of the route which pass sensitive receivers (such as residences) and where noise impact is likely – this is to include existing and a forecast of future movements;
- Number of coal haulage truck movements each hour associated with the delivery of coal from the respective mine to PKCT (and back) – this is to include existing and a forecast of future movements; and
- Classification of trucks used.

The base case is considered to be the year 2008 with the movements associated with the delivery of coal from the respective mine to PKCT (and back) excluded.

6.1 Existing and Future Road Traffic Movements

CEO has undertaken an analysis of likely future traffic movements and has provided WM the likely hourly distribution of vehicles for various future scenarios along the haul route.

In addition, BHPBIC and GNRE have provided CEO with the number of coal trucks currently travelling to PKCT from the West Cliff CPP and GNRE No. 1 Mine, including the anticipated number of trucks each hour has been provided in the event that truck movements occur up to 24 hours 7 (24/7). This forecast is for the existing coal volume (approximately 4Mtpa) and for when volume reaches 10Mtpa. The exact time when this volume is reached is not accurately known at this stage, however, it is understood to be between 5 and 10 years. As such for the purpose of this assessment, it is assumed that 10Mtpa would be delivered by road beginning 2013. An assessment in 2013 would represent a worst case impact with respect to noise if compared to 2018 given that the traffic volumes in 2013 would be less than in 2018, however the number of truck movement to deliver 10Mtpa would not change.

Using the above information, CEO has provided WM the likely hourly distribution of coal trucks (associated with West Cliff CPP, GNRE No. 1 Mine and PKCT) for various future scenarios. With respect to acoustic impact, the scenarios that have been considered include:

- Average coal road haulage of 4Mtpa in 2009 based on 24/7 movements along the haul route.
- Average coal road haulage of 10Mtpa in 2013 based on 24/7 movements along the haul route.

The changes in road traffic noise levels have been calculated as a result of the anticipated changes in coal truck movements for various scenarios as described.

6.2 Calculated L_{Aeq} Noise Level Changes

Bellambi Lane and Northern Distributor currently only carry coal trucks associated with PKCT within day-time hours (with some movements in the hour from 6.00am), similarly along Springhill Road, coal trucks travelling to PKCT are only permitted to enter the Terminal via Port Kembla Rd during restricted hours. However Mount Ousley Road, Southern Freeway and Masters Road already permit coal trucks delivering to PKCT on a 24/7 basis.

With respect to acoustic impact an assessment has been undertaken of the impact during the 4Mtpa Scenario (existing) in 2009 and the 10Mtpa Scenario (24/7) in 2013. A calculation for the year 2013 is considered to represent a worst case as this is the earliest that haulage would reach 10Mtpa capacity.

The changes in road traffic noise levels that have been calculated as a result of the predicted changes in coal truck movements are summarised as follows in Table 6-1 for the following scenarios:

- Average coal road haulage of 4Mtpa in 2009 based on 24/7 movements along the haul route.
- Average coal road haulage of 10Mtpa in 2013 based on 24/7 movements along the haul route.

Table 6-1 Calculated L_{Aeq} Noise Level Changes

Location	Noise Level Change (dB)							
	2009 24/7 4Mtpa				**2013 24/7 10Mtpa**			
	Weekday		Weekend		Weekday		Weekend	
	Day	Night	Day	Night	Day	Night	Day	Night
Bellambi Lane[(1)]	0.2	0.6	0.3	1.0	Refer to Section 6.2			
Northern Distributor	0.1	0.3	0.2	0.6	0.5	1.4	0.7	1.9
Mount Ousley Rd	<0.1	0.1	<0.1	0.1	<0.1	0.1	0.1	0.2
F6 (north)	0.1	0.2	0.2	0.4	0.3	0.5	0.4	0.8
F6 (south)	0.1	0.2	0.2	0.4	0.3	0.5	0.4	0.8
Masters Rd	0.4	0.6	0.8	0.9	0.8	1.3	1.6	1.9
Springhill Rd	0.1	0.1	0.1	0.1	0.2	0.2	0.2	0.2

Note: (1) Prior to Northern Distributor Extension opening.

Table 6-1 shows that in 2009 24/7 4Mtpa and 2013 24/7 10Mtpa, the 2dB allowance criterion is met for all major roads comfortably.

6.3 Calculated L_{Aeq} Noise Level for Bellambi Lane

As a result of the opening of the Northern Distributor Extension in early 2009, the traffic flows are expected to decrease as are the number of heavy vehicle movements (not including coal trucks). As such increasing the number of coal truck movements delivering to PKCT along Bellambi Lane may result in potential noise impacts. Therefore a more detailed assessment has been conducted, not just calculating changes in noise level but also absolute levels. Considering the year 2009 (Northern Distributor extension opening) and 2013 and 24/7 haulage, Table 6-2 show the predicted noise levels. For reference the base year 2008 noise levels are presented in Table 4.5.

Table 6-2 Calculated L_{Aeq} Noise Level for Bellambi Lane for 24/7 haulage scenario.

Scenario	Location Bellambi Lane	Approximate number of houses impacted	ECRTN Criteria		Predicted the highest tenth percentile hourly A-weighted L_{eq} for the relevant period. Noise Level Change in comparison to 2008 base Year, (dB).			
			Day $L_{Aeq,1hr}$	Night $L_{Aeq,1hr}$	Weekday		Weekend	
					Day $L_{Aeq,1hr}$	Night $L_{Aeq,1hr}$	Day $L_{Aeq,1hr}$	Night $L_{Aeq,1hr}$
2009 24/7 4M	front yard Bellambi Lane	29	60	55	68.1 (-3.0)	65.9 (+1.8)	66.9 (-2.3)	63.3 (+0.2)
	rear yards Keerrong Ave	36			53.4(-3.0)	50.1 (+1.8)	52.1 (-2.3)	47.9 (+0.2)
2013 24/7 10M	front yard Bellambi Lane	29			70.9(-0.2)	71.1(+7.0)	70.9 (+1.7)	67.3 (+4.2)
	rear yards Keerrong Ave	36			56.2(-0.2)	55.3 (+7.0)	56.1 (+1.7)	51.9 (+4.2)

As can be seen in Table 6-2 the daytime noise levels for the houses fronting Bellambi Lane reduce in 2008 even with additional haulage truck movements. At night the traffic noise levels however increase. The increase is below the allowance goal of 2dB. With regard to the houses along Keerong Avenue (rear facing Bellambi Lane) the noise levels show the same trend, however, all noise levels are below the ECRTN noise criteria.

For 2013 assuming road receival is operating at 10 Mtpa at PKCT the daytime noise levels for the houses fronting Bellambi Lane are back to the base year (2008 no haul trucks) noise level. At night exceedances of up to 7 dB above the base year (2008 no haul trucks) noise levels have been calculated. These increases in the night time noise levels are interpreted as presenting significant night time noise impacts. Particularly as the additional truck movements would also significantly increase the maximum noise level events. It should however be noted that the noise levels at the houses along Keerong Avenue (rear facing Bellambi Lane) are within 1dB of the ECRTN during the day and within the night time criterion.

It is recognised that 2013 24/7 coal haulage on Bellambi Lane has the potential for significant night time noise impacts. Therefore it is proposed to use a 15 hour 5 weekday and 10 hour 2 weekend day (15/5+10/2) delivery pattern. The (15/5+10/2) delivery pattern will allow for greatest residential amenity, while allowing GNRE to efficiently deliver coal to PKCT up to maximum forecast volumes.

Compared to 24/7 deliveries the (15/5+10/2) delivery pattern will increase the frequency of coal trucks along Bellambi Lane during the day if GNRE are to meet predicted amounts which are attributed to a portion of the total 10mtpa delivered by road to PKCT. This will increase daytime noise levels from coal trucks along Bellambi Lane. Table 6-3 presents that calculated noise level increases based on the (15/5+10/2) delivery pattern to meet the predicted 10mtpa in 2013.

Table 6-3 Calculated L_{Aeq} Noise Level Changes for Bellambi Lane in 2013

Scenario	Location Bellambi Lane	Approximate number of houses impacted	ECRTN Criteria		Predicted the highest tenth percentile hourly A-weighted L_{eq} for the relevant period. Noise Level Change in comparison to 2008 base Year, (dB).			
					Weekday		Weekend	
			Day $L_{Aeq,1hr}$	Night $L_{Aeq,1hr}$	Day $L_{Aeq,1hr}$	Night $L_{Aeq,1hr}$	Day $L_{Aeq,1hr}$	Night $L_{Aeq,1hr}$
2009 15-10 4M	front yard Bellambi Lane	29	60	55	68.5(-2.6)	60.4(-3.7)	66.8(-2.4)	59.4 (-3.7)
	rear yards Keerrong Ave	36			53.8(-2.6)	44.6(-3.7)	52.0(-2.4)	44.0 (-3.7)
2013 15-10 10M	front yard Bellambi Lane	29			71.9 (+0.8)	60.6(-3.5)	70.3(+1.1)	59.6 (-3.5)
	rear yards Keerrong Ave	36			58.5(+0.8)	44.8 (-3.5)	55.5 (+1.1)	44.2 (-3.5)

As can be seen in Table 6-3 the daytime noise levels for the houses fronting Bellambi Lane have increased by approximately 1 dB during the day compared to the baseline 2008 traffic noise levels. The increase is below the allowance goal of 2dB. At night the traffic noise levels however decrease substantially increasing residential amenity substantially.

As the noise assessment has shown that noise levels are minimised on Bellambi Lane through the 15/5+10/2 delivery pattern. Therefore, it is suggested that the approval of this application contain a condition restricting road deliveries of coal from GNRE along Bellambi Lane to 7am – 10pm Monday to Friday and 7am to 6pm on Weekends and Public Holidays.

The 15/5+10/2 restriction is believed to be a satisfactory mitigation measure to allow GNRE to increase coal exports and protect residential amenity from unacceptable noise impacts. This is for the following reasons:

- Noise impacts associated with Coal Trucks on Bellambi Lane are primarily maintained to levels similar to the base lane 2008 levels;
- Mitigation measures which preclude GNRE No 1 mine from 24/7 deliveries will be enforced. There will continue to be no coal trucks delivering to PKCT along Bellambi Lane at night to protect residential amenity.
- As identified in the noise assessment the properties along Keerong Avenue (rear facing Bellambi Lane) will comply with ECRTN noise criteria due to set backs, fences, existing structures and vegetation.
- Bellambi Lane constitutes the most direct route for NRE No 1 mine to the Northern Distributor with the impacts on the lowest number of residential properties.

- GNRE operations provide benefits to the State and region in terms of employment, tax and exports, constraints greater than 15/5+10/2 will unreasonably constrain GNRE reducing these benefits

On balance, the loss in noise reduction for Bellambi Lane properties is not believed to be a justifiable reason to prevent daytime deliveries at 15/6+10/2 out of GNRE No 1 mine.

7 CONCLUSION

A noise assessment has been undertaken of existing and proposed noise generated by PKCT onsite activities and road deliveries, in accordance with the Director Generals Requirements.

Road traffic noise levels have been assessed in accordance with the NSW Government *Environmental Criteria for Road Traffic Noise (ECRTN)*, May 1999. Furthermore, this report also assesses the current and future noise emissions noise from on-site activities. These noise impacts are assessed using the NSW Government *Industrial Noise Policy (INP)*, January, 2000.

Onsite Noise Assessment

The onsite noise assessment has found that the calculated noise levels for non-enhanced meteorological conditions meet the noise criteria. In the event of meteorological conditions that enhance the noise from source to receiver and if at these times the assumed typical worst case scenario occurs, there are exceedances of between 1 and 2dBA at the closest residential receivers along Keira Street.

These exceedances, should they be realised are considered to be minor. Receivers that experience noise levels that exceed criteria can be separated into the following categories:

- 0-2dB(A): minor exceedances;
- 2-5dB(A): marginal exceedances; and
- >5dB(A): significant exceedances

Furthermore, the *INP* indicates:

> *The industrial noise source criteria ... are best regarded as planning tools. They are not mandatory, and an application for a noise-producing development is not determined purely on the basis of compliance or otherwise with the noise criteria. Numerous other factors need to be taken into account in the determination. These factors include economic consequences, other environmental effects and the social worth of the development. The criteria help to determine consent/licence conditions because they provide information on the likely effect of any environmental noise associated with the development.*

Road Haulage Noise Assessment

PKCT predict that coal deliveries by road will reach 10mtpa between 2013 and 2018. In order to establish road traffic noise criteria (as defined by the L_{Aeq} noise descriptor), the background traffic noise levels, which exclude coal truck movements associated with PKCT, are established and then compared to criteria. The calculation of noise per coal truck and knowledge of the number of coal trucks along the haulage routes from the Traffic Study allow the coal truck noise level for existing and future delivery amounts to be calculated.

In summary traffic noise levels on the major roads such as Mt Ousley, F6, Northern Distributor, Masters Road and Spring Hill Road for 2009 24/7 4Mtpa and 2013 24/7 10Mtpa comply with the ECRTN allowance goal of the 2dB.

For Bellambi Lane the noise assessment has shown that 24/7 coal haulage has potential night noise impacts. Recognising that 2013 24/7 coal haulage on Bellambi Lane has the potential for significant night noise impacts it is proposed to use a 15 hour 5 weekday and 10 hour 2 weekend (15/5+10/2) delivery pattern. The (15/5+10/2) delivery pattern will allow for greatest residential amenity, while allowing GNRE to efficiently deliver coal to PKCT up to maximum forecast volumes.

Compared to 24/7 deliveries the (15/5+10/2) delivery pattern will increase the frequency of coal trucks along Bellambi Lane during the day if GNRE are to meet predicted amounts which are attributed to a portion of the total 10mtpa delivered by road to PKCT. This will increase daytime noise levels from coal trucks along Bellambi Lane.

The 15/5+10/2 restriction is believed to be a satisfactory mitigation measure to allow GNRE to increase coal exports and protect residential amenity from unacceptable noise impacts. This is for the following reasons:

- Noise impacts associated with Coal Trucks on Bellambi Lane are primarily maintained to levels similar to the base l2008 levels;
- Mitigation measures which preclude GNRE No 1 mine from 24/7 deliveries will be enforced. There will continue to be no coal trucks delivering to PKCT along Bellambi Lane at night to protect residential amenity.
- As identified in the noise assessment the properties along Keerong Avenue (rear facing Bellambi Lane) will comply with ECRTN noise criteria due to set backs, fences, existing structures and vegetation.
- Bellambi Lane constitutes the most direct route for NRE No 1 mine to the Northern Distributor with the impacts on the lowest number of residential properties.
- GNRE operations provide benefits to the State and region in terms of employment, tax and exports, constraints greater than 15/5+10/2 will unreasonably constrain GNRE reducing these benefits

On balance, the loss in noise reduction for Bellambi Lane properties is not believed to be a justifiable reason to prevent daytime deliveries at 15/6+10/2 out of GNRE No 1 mine.

Therefore, it is suggested that the approval of this application contain a condition restricting road deliveries of coal from GNRE along Bellambi Lane to 7am – 10pm Monday to Friday and 7am to 6pm on Weekends and Public Holidays.

Note

All materials specified by Wilkinson Murray Pty Limited have been selected solely on the basis of acoustic performance. Any other properties of these materials, such as fire rating, chemical properties etc. should be checked with the suppliers or other specialised bodies for fitness for a given purpose.

Quality Assurance

We are committed to and have implemented AS/NZS ISO 9001:2000 “Quality Management Systems – Requirements”. This management system has been externally certified and Licence No. QEC 13457 has been issued.

AAAC

This firm is a member firm of the Association of Australian Acoustical Consultants and the work here reported has been carried out in accordance with the terms of that membership.

Version	Status	Date	Prepared by	Checked by
A	Draft	3 June 2008	Sam Demasi	John Wassermann
B	Draft	10 June 2008	John Wassermann	-
C	Final	1 July 2008	John Wassermann	Brian Clarke

APPENDIX A

GLOSSARY OF TERMS

GLOSSARY

Most environments are affected by environmental noise which continuously varies, largely as a result of road traffic. To describe the overall noise environment, a number of noise descriptors have been developed and these involve statistical and other analysis of the varying noise over sampling periods, typically taken as 15 minutes. These descriptors, which are demonstrated in the graph overleaf, are here defined.

Maximum Noise Level (L_{Amax}) – The maximum noise level over a sample period is the maximum level, measured on fast response, during the sample period.

L_{A1} – The L_{A1} level is the noise level which is exceeded for 1% of the sample period. During the sample period, the noise level is below the L_{A1} level for 99% of the time.

L_{A10} – The L_{A10} level is the noise level which is exceeded for 10% of the sample period. During the sample period, the noise level is below the L_{A10} level for 90% of the time. The L_{A10} is a common noise descriptor for environmental noise and road traffic noise.

L_{Aeq} – The equivalent continuous sound level (L_{Aeq}) is the energy average of the varying noise over the sample period and is equivalent to the level of a constant noise which contains the same energy as the varying noise environment. This measure is also a common measure of environmental noise and road traffic noise.

L_{A50} – The L_{A50} level is the noise level which is exceeded for 50% of the sample period. During the sample period, the noise level is below the L_{A50} level for 50% of the time.

L_{A90} – The L_{A90} level is the noise level which is exceeded for 90% of the sample period. During the sample period, the noise level is below the L_{A90} level for 10% of the time. This measure is commonly referred to as the background noise level.

ABL – The Assessment Background Level is the single figure background level representing each assessment period (daytime, evening and night time) for each day. It is determined by calculating the 10th percentile (lowest 10th percent) background level (L_{A90}) for each period.

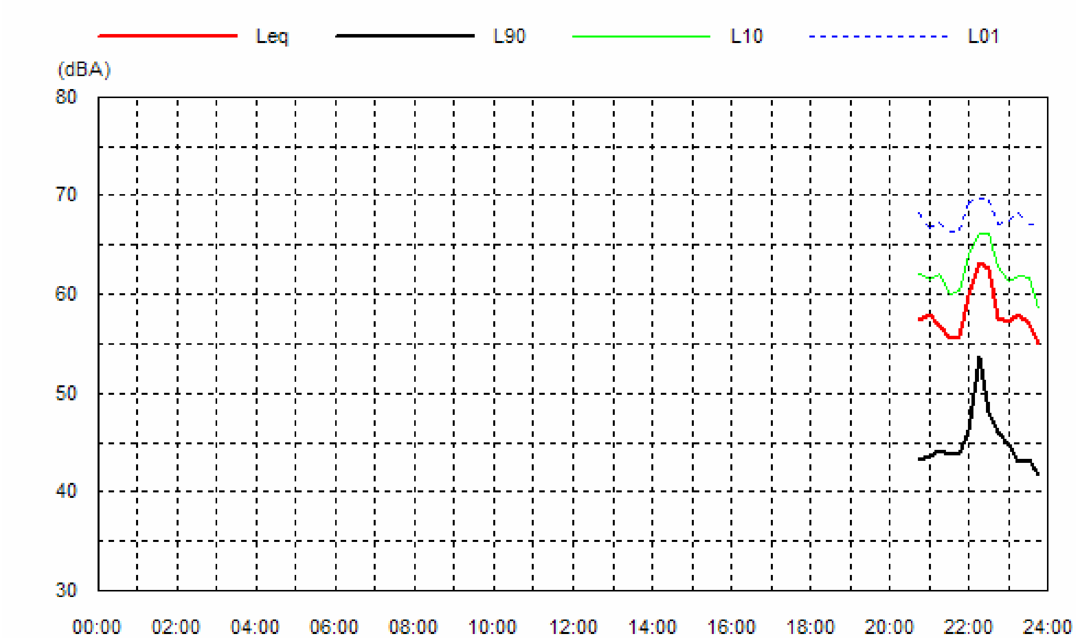
RBL – The Rating Background Level for each period is the median value of the ABL values for the period over all of the days measured. There is therefore an RBL value for each period – daytime, evening and night time.

APPENDIX B

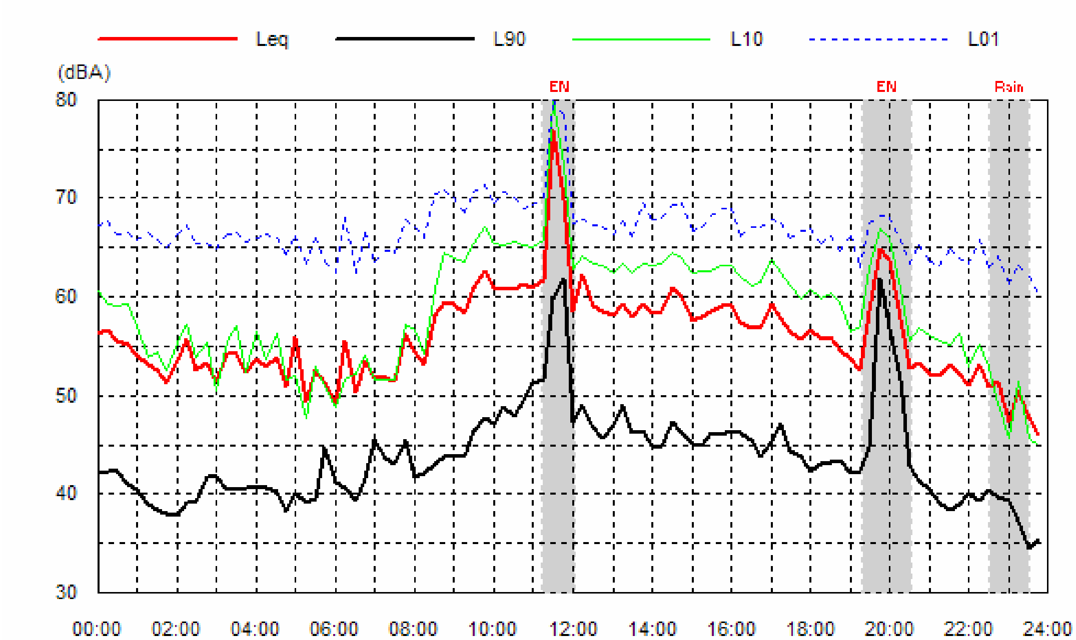
BACKGROUND NOISE DATA

Location: 1. 392 Keira Street
Data shaded: EN; Wind; Rain

Sat 08 Mar 08

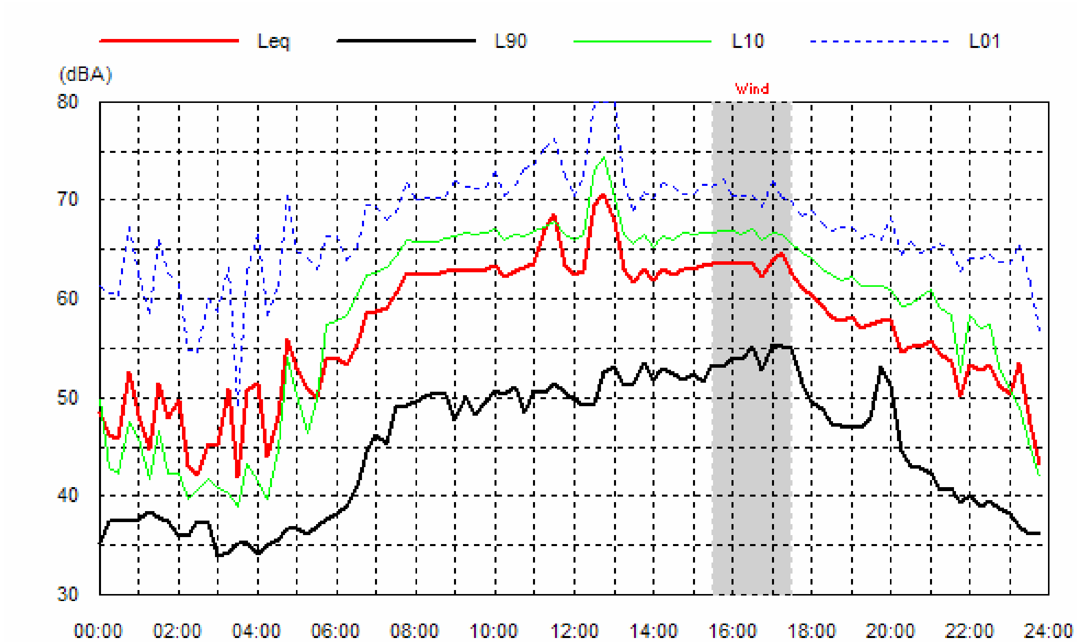


Sun 09 Mar 08

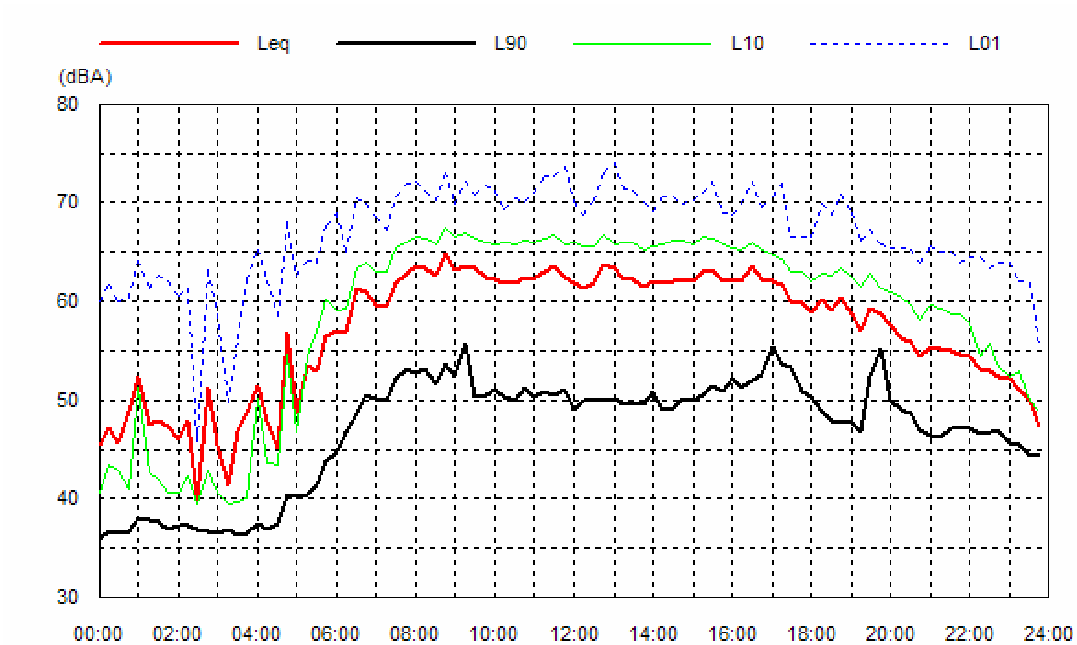


Location: 1. 392 Keira Street
Data shaded: EN; Wind; Rain

Mon 10 Mar 08

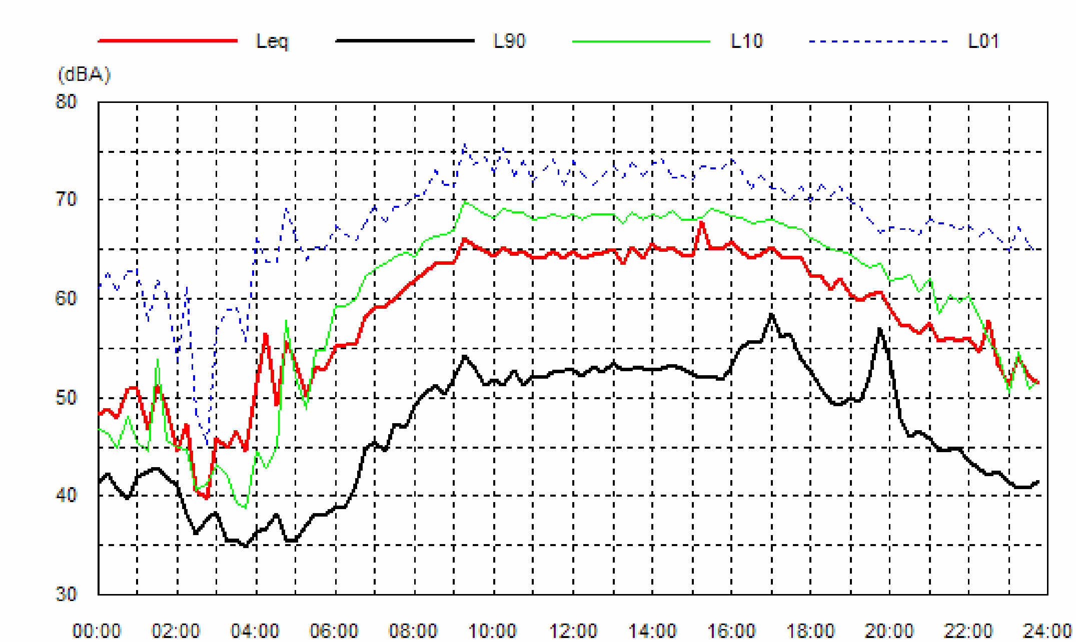


Tue 11 Mar 08

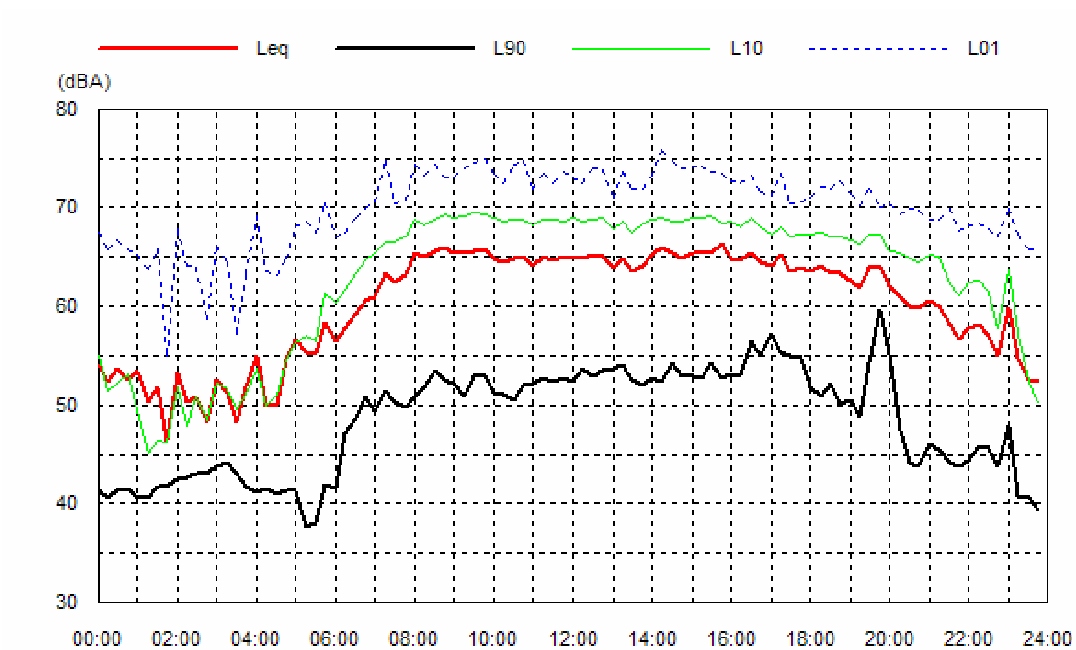


Location: 1. 392 Keira Street
Data shaded: EN; Wind; Rain

Wed 12 Mar 08

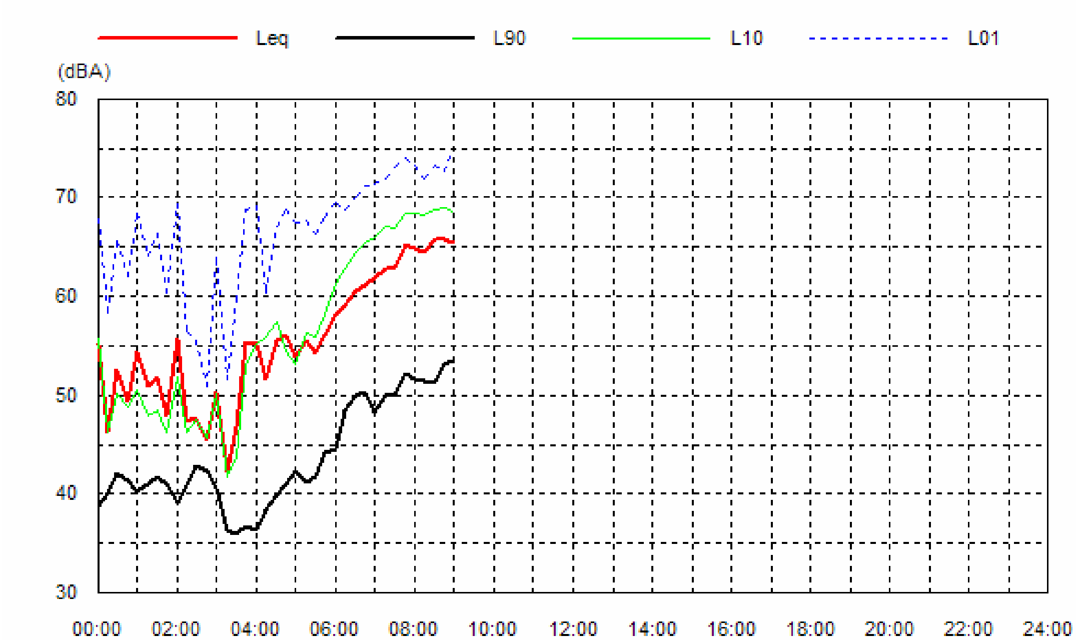


Thu 13 Mar 08



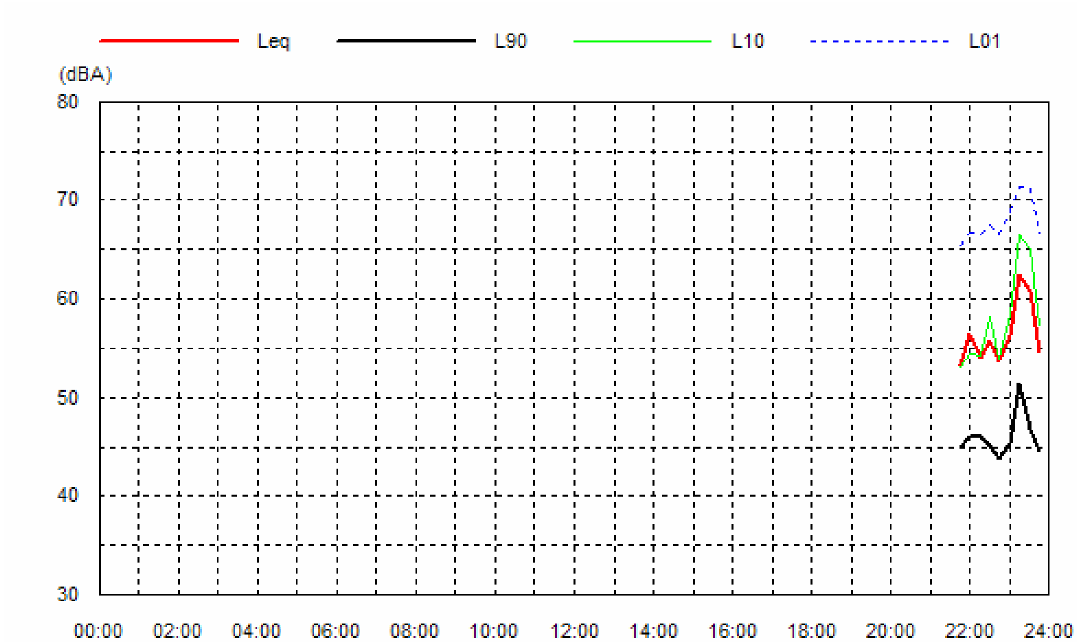
Location: 1. 392 Keira Street
Data shaded: EN; Wind; Rain

Fri 14 Mar 08



Location: 2. 163 Swan Street
Data shaded: EN; Wind; Rain

Sat 08 Mar 08



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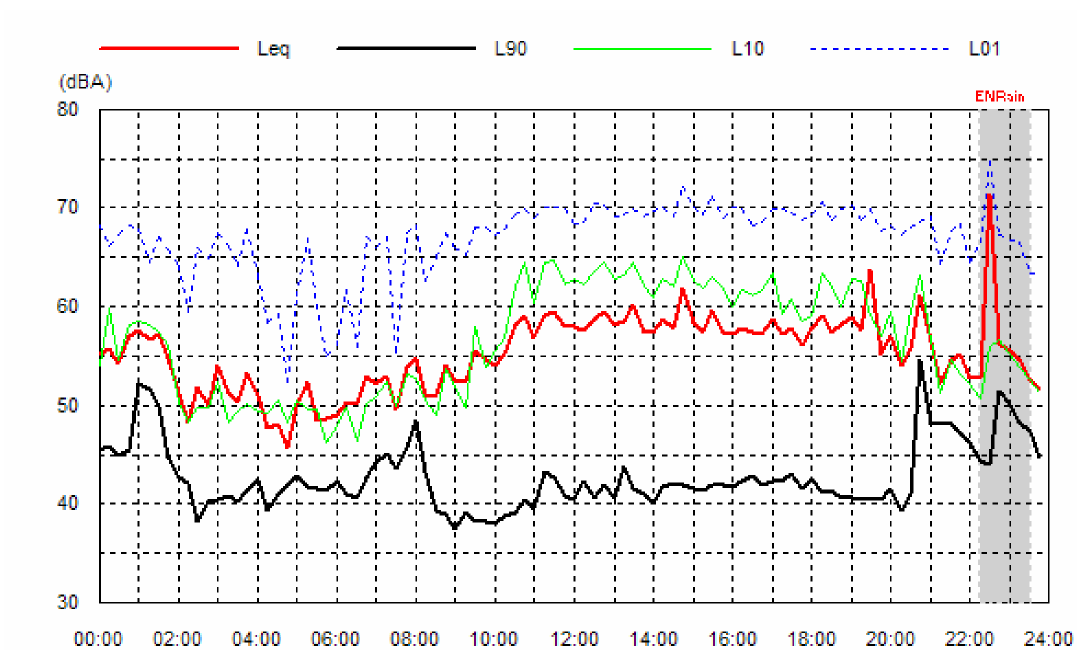
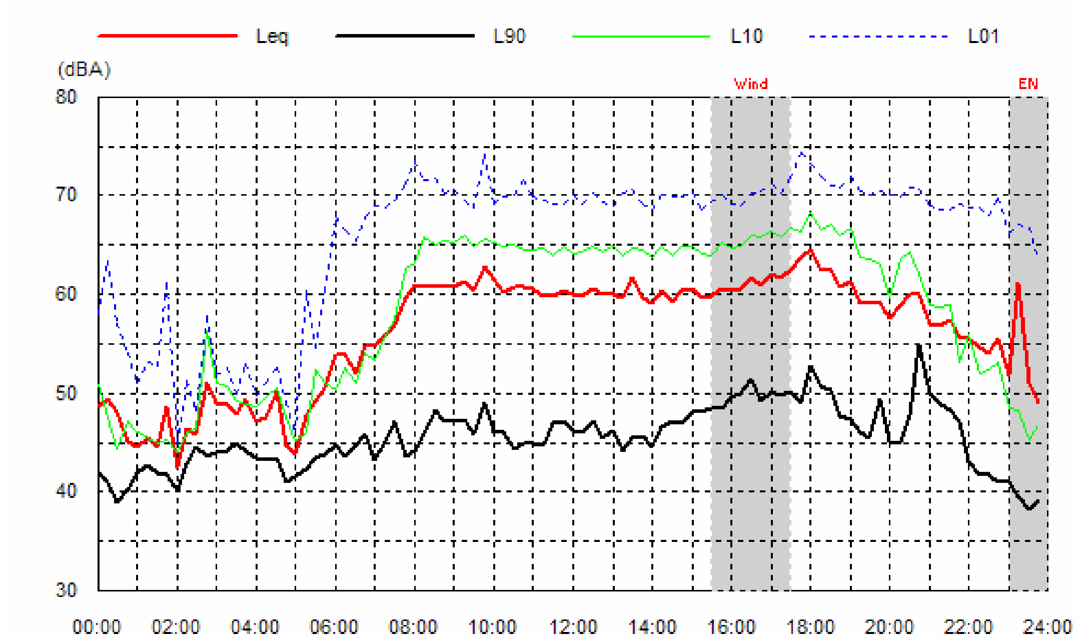
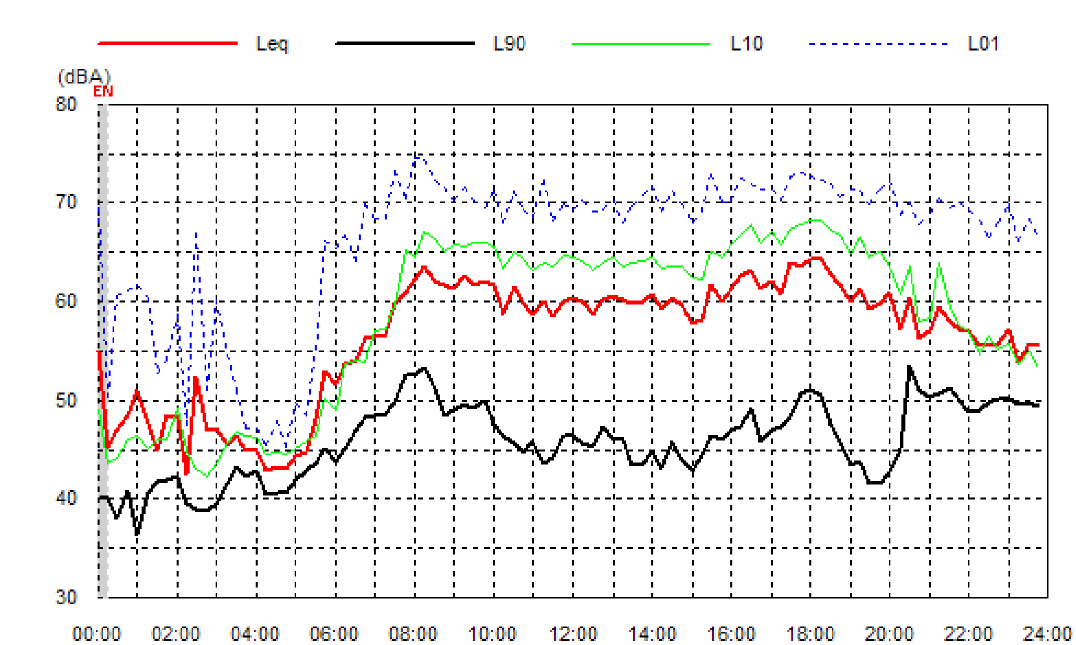


Location: 2. 163 Swan Street
Data shaded: EN; Wind; Rain

Mon 10 Mar 08

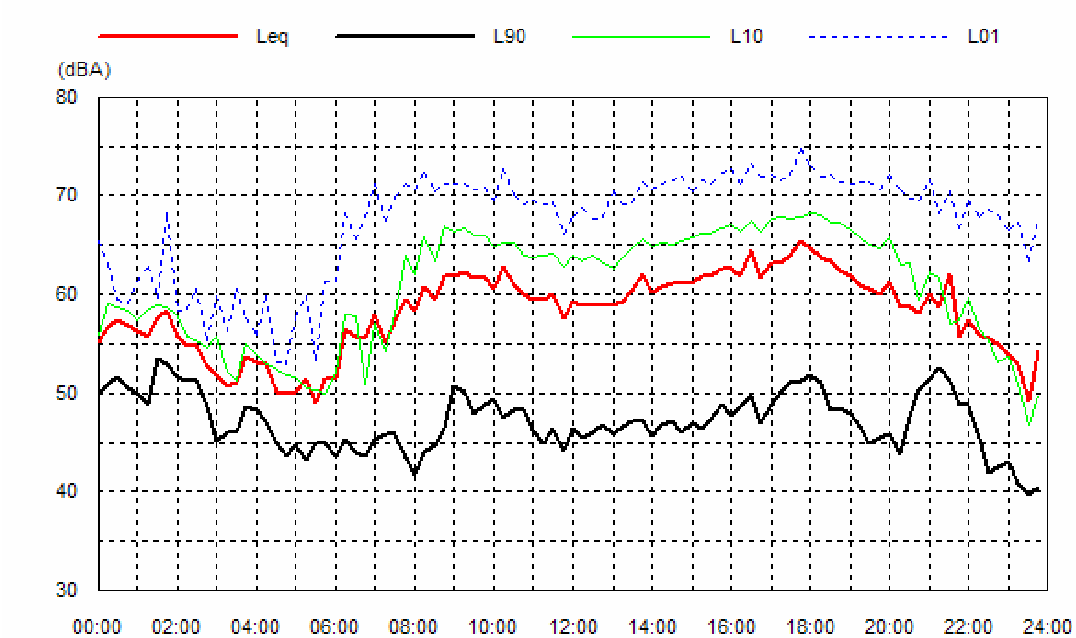


Tue 11 Mar 08



Location: 2. 163 Swan Street
Data shaded: EN; Wind; Rain

Wed 12 Mar 08



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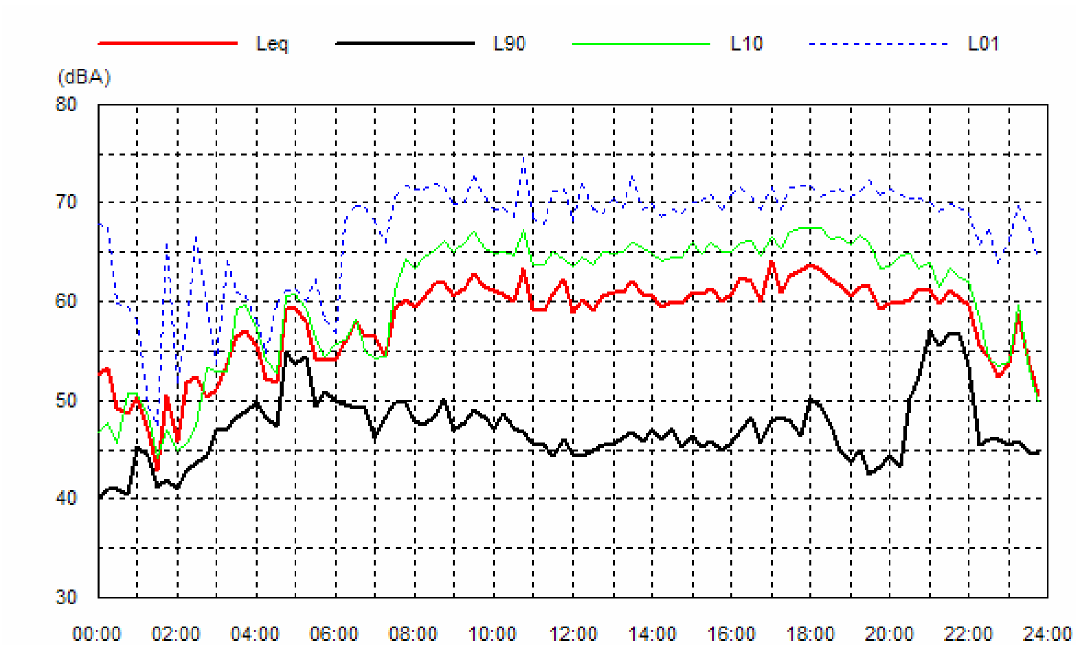
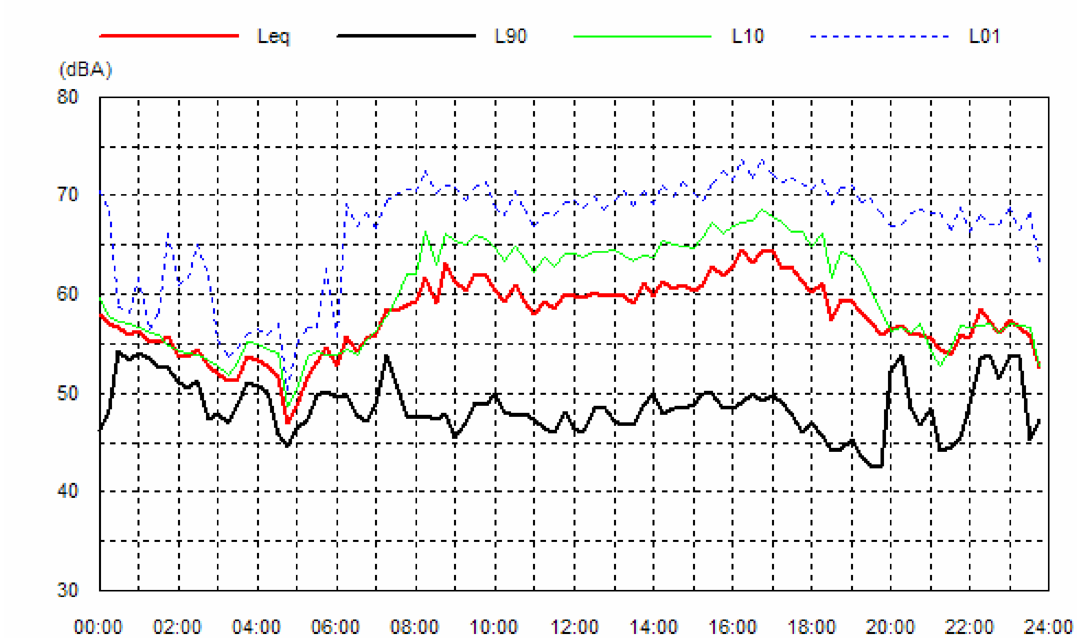


Location: 2. 163 Swan Street
Data shaded: EN; Wind; Rain

Fri 14 Mar 08



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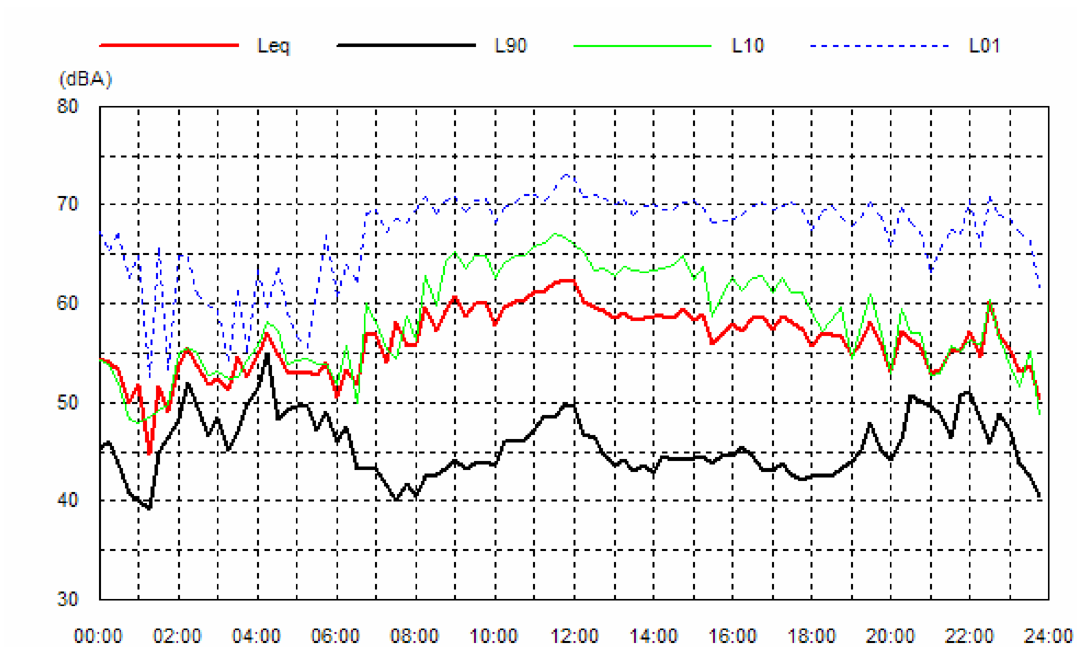
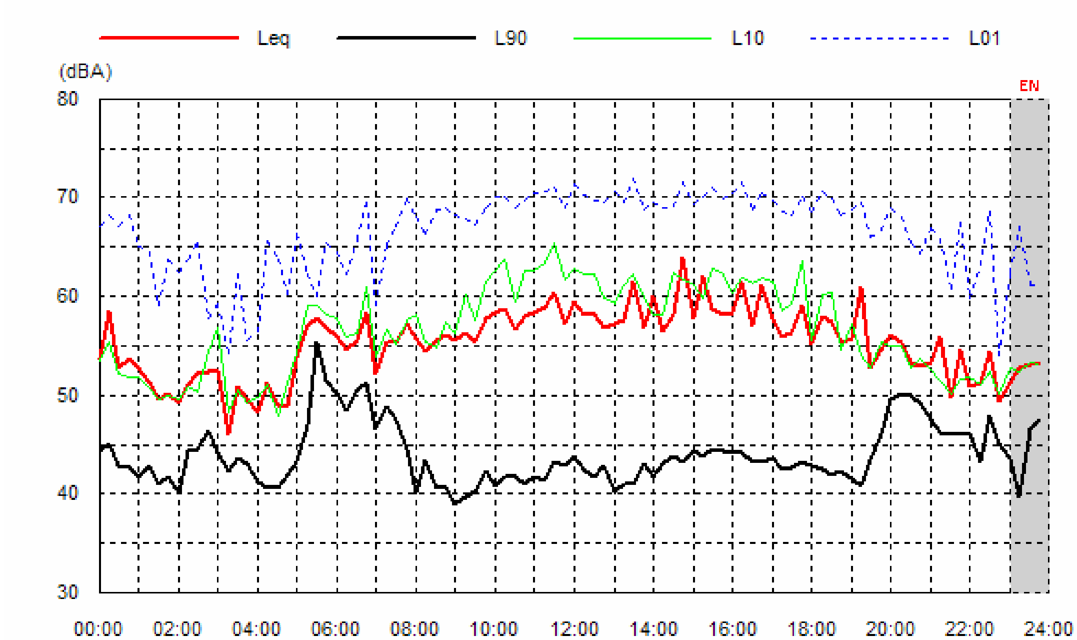


Location: 2. 163 Swan Street
Data shaded: EN; Wind; Rain

Sun 16 Mar 08



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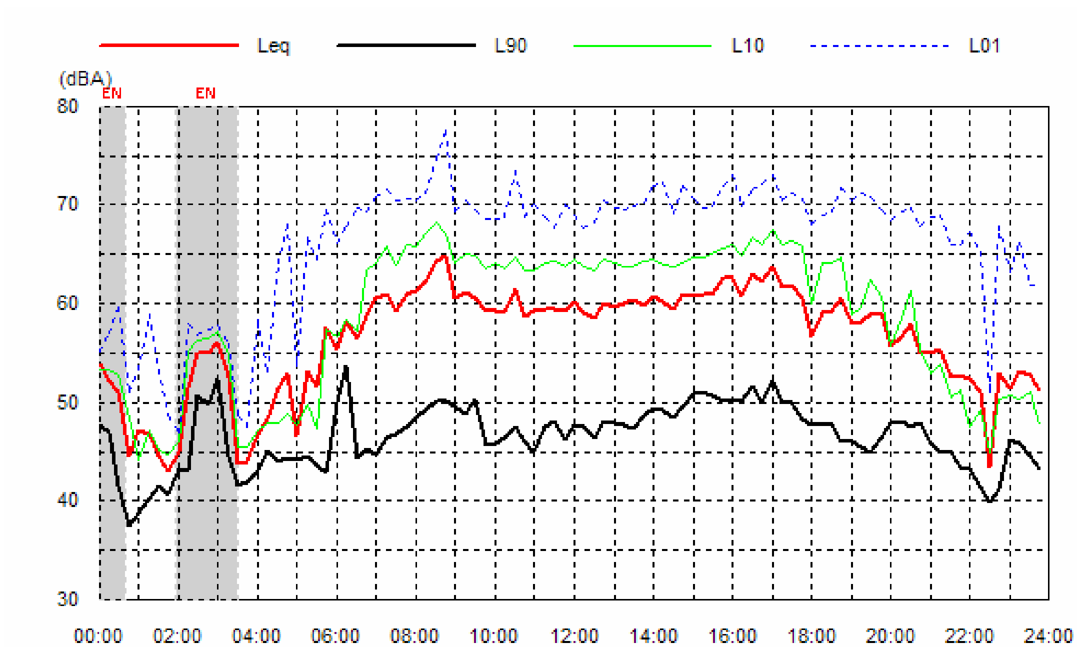

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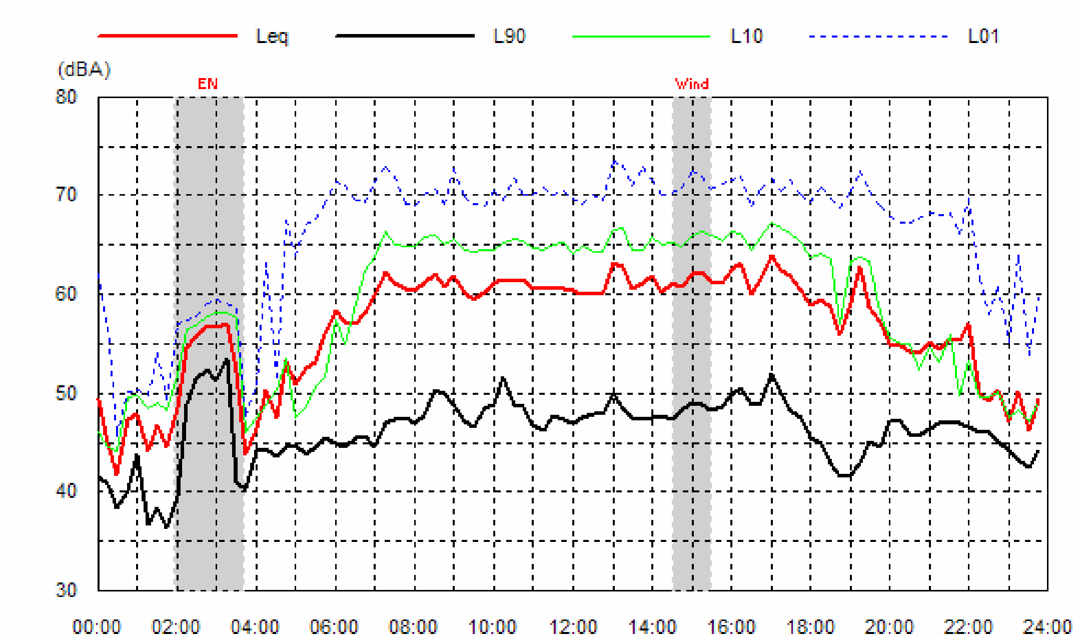
Data shaded: EN; Wind; Rain

Tue 18 Mar 08



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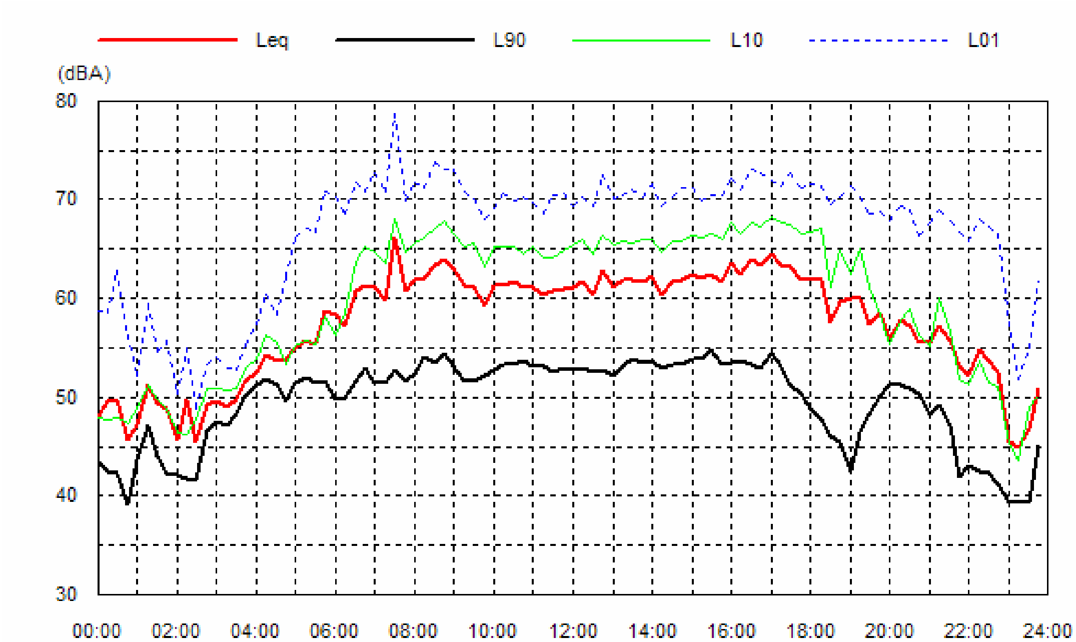

Location: 2. 163 Swan Street
Data shaded: EN; Wind; Rain

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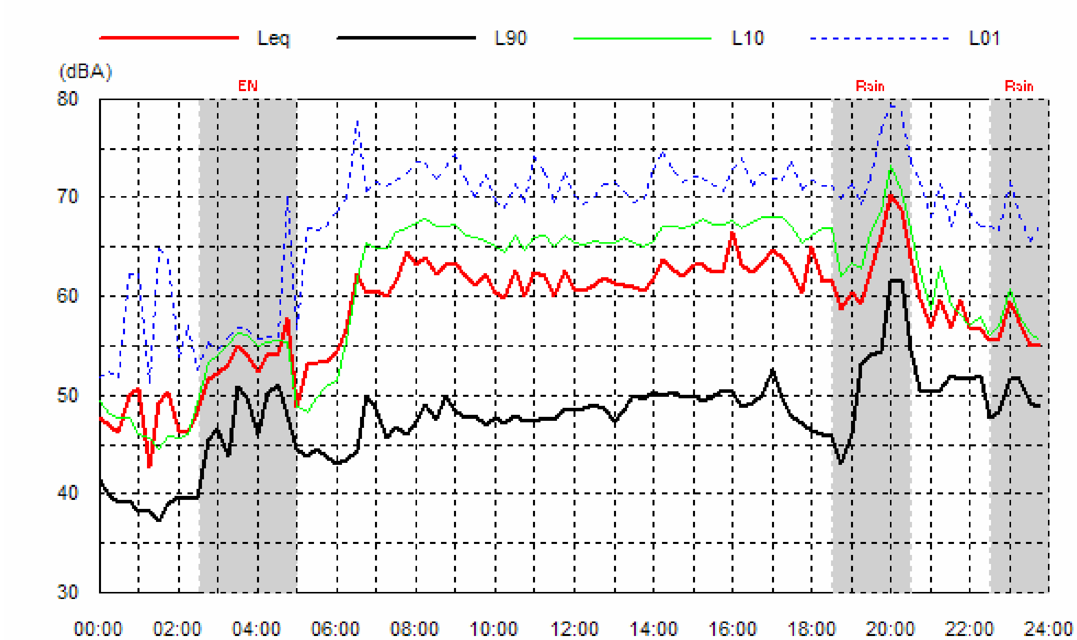

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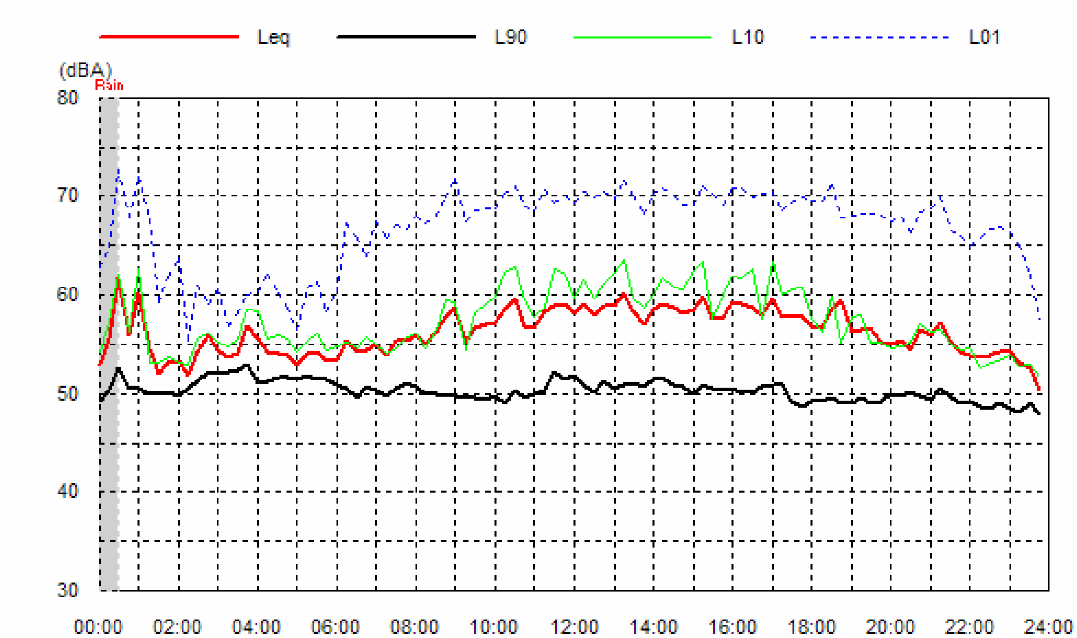
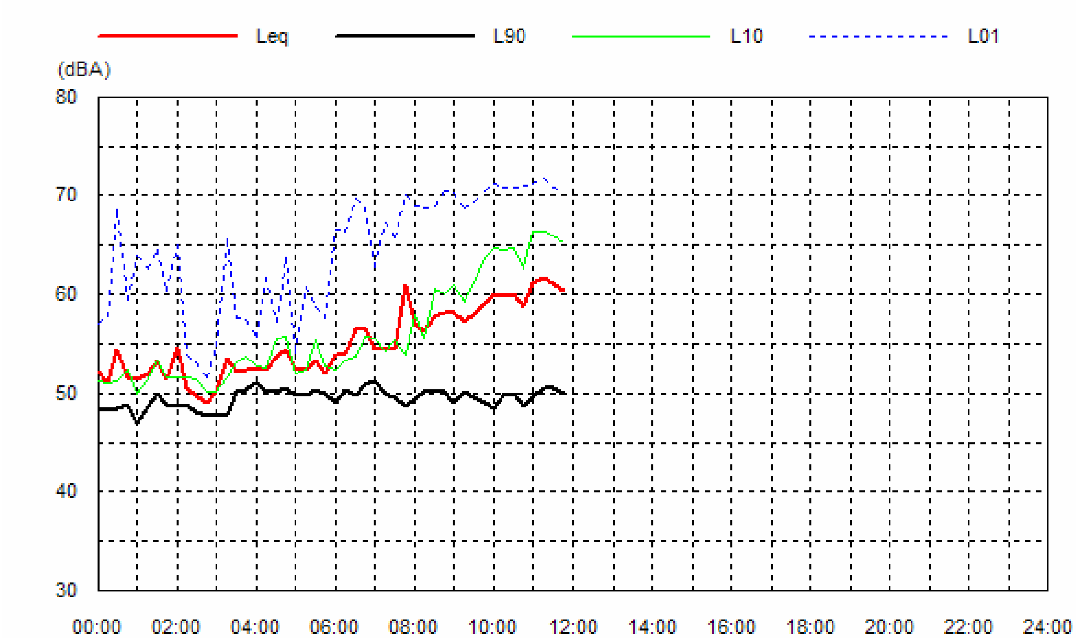


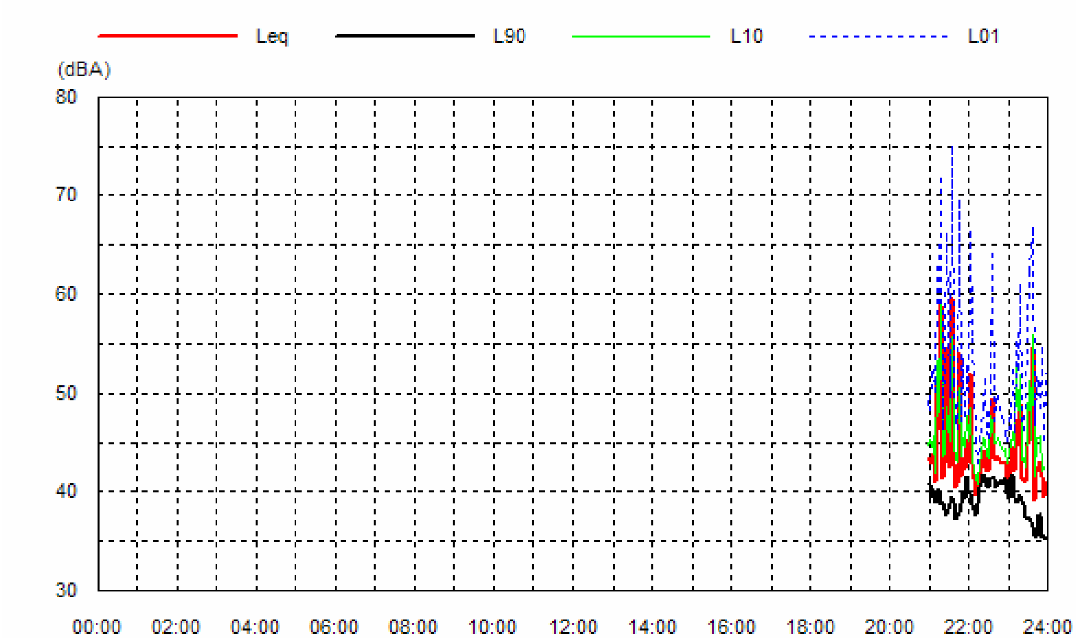
Location: 2. 163 Swan Street
Data shaded: EN; Wind; Rain

Sat 22 Mar 08



Location: 3. 119 Gladstone Avenue
Data shaded: Wind; Rain

Sat 08 Mar 08



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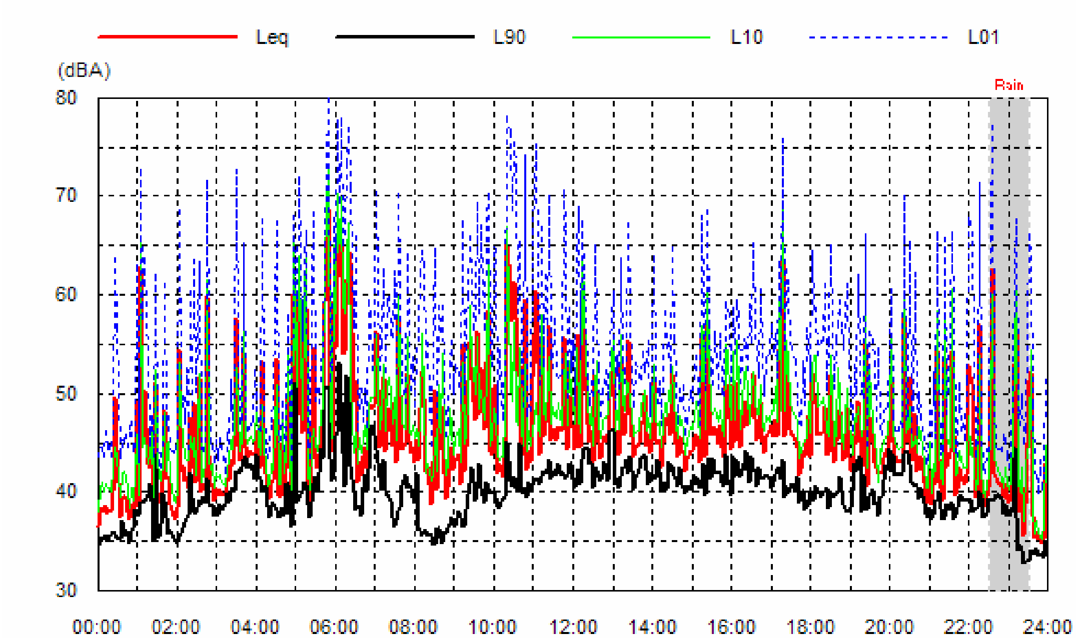
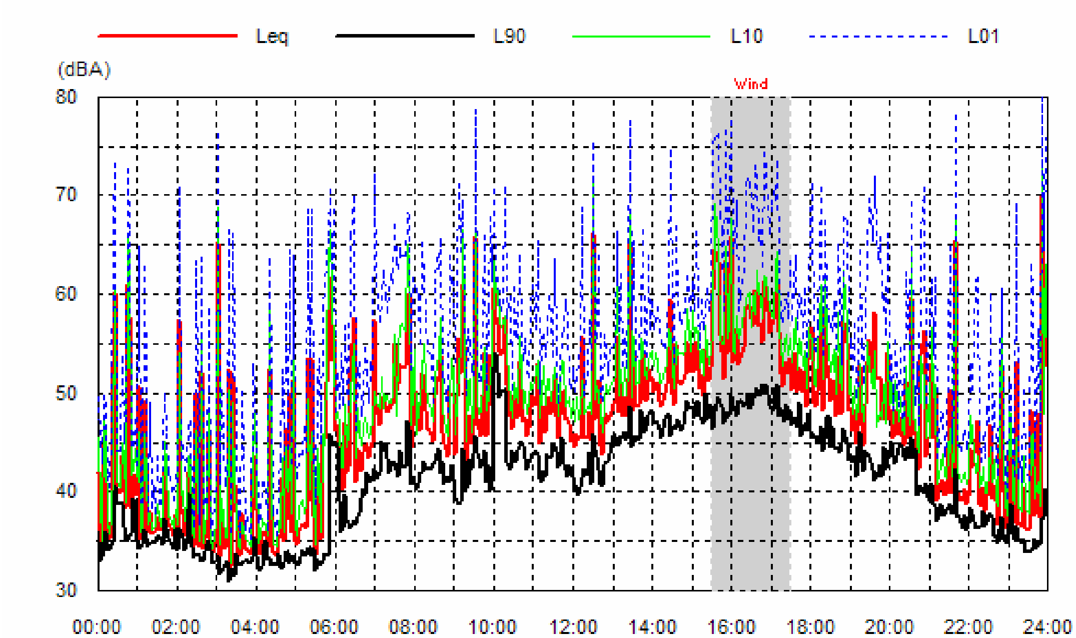


Location: 3. 119 Gladstone Avenue
Data shaded: Wind; Rain

Mon 10 Mar 08



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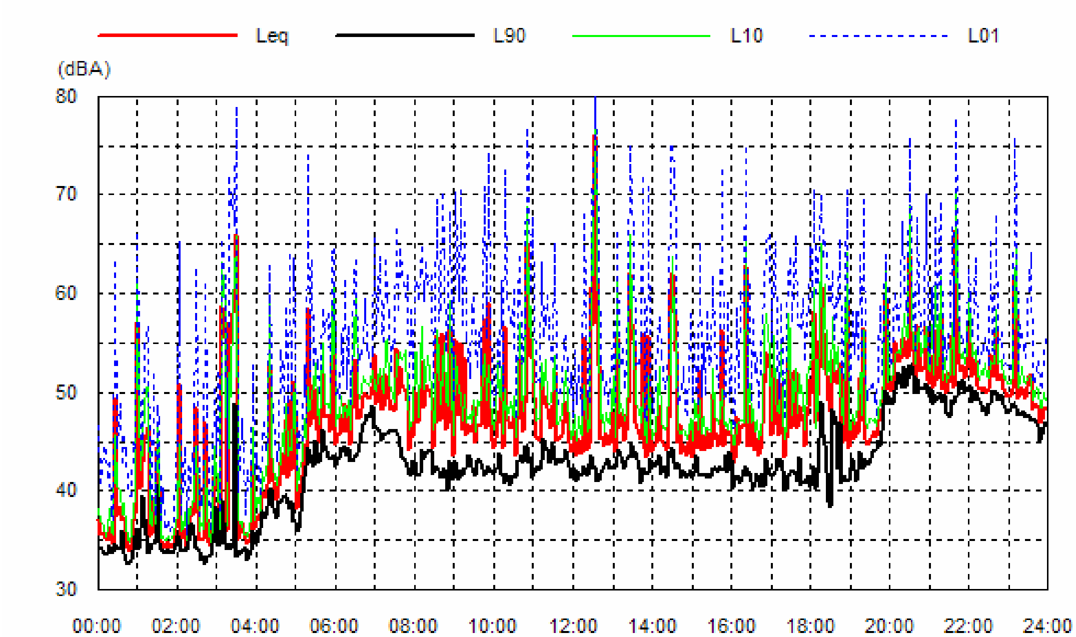

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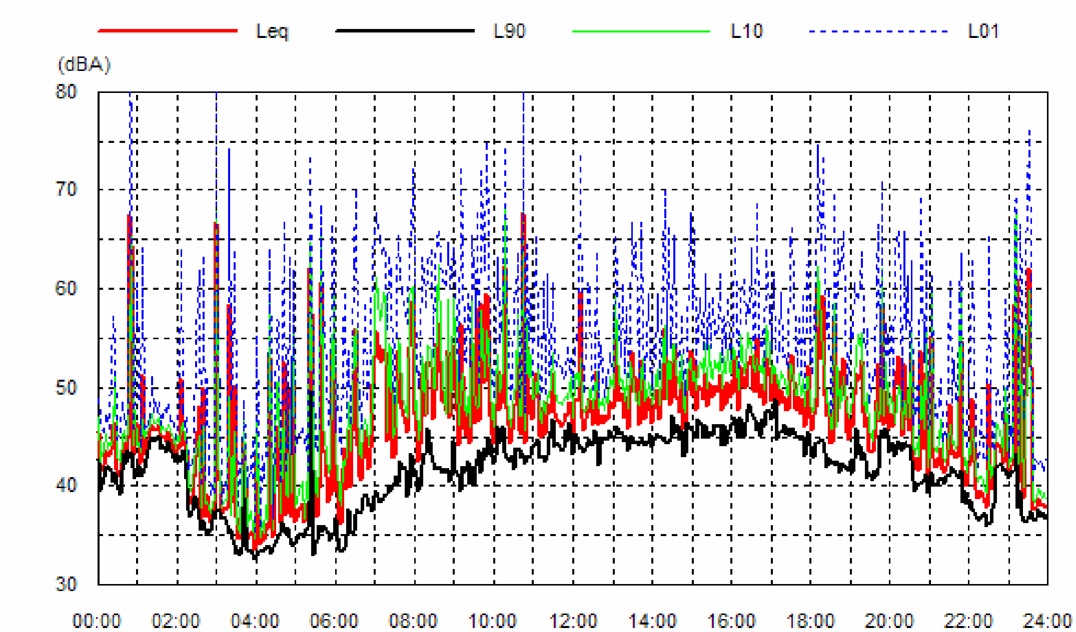
Data shaded: Wind; Rain

Wed 12 Mar 08



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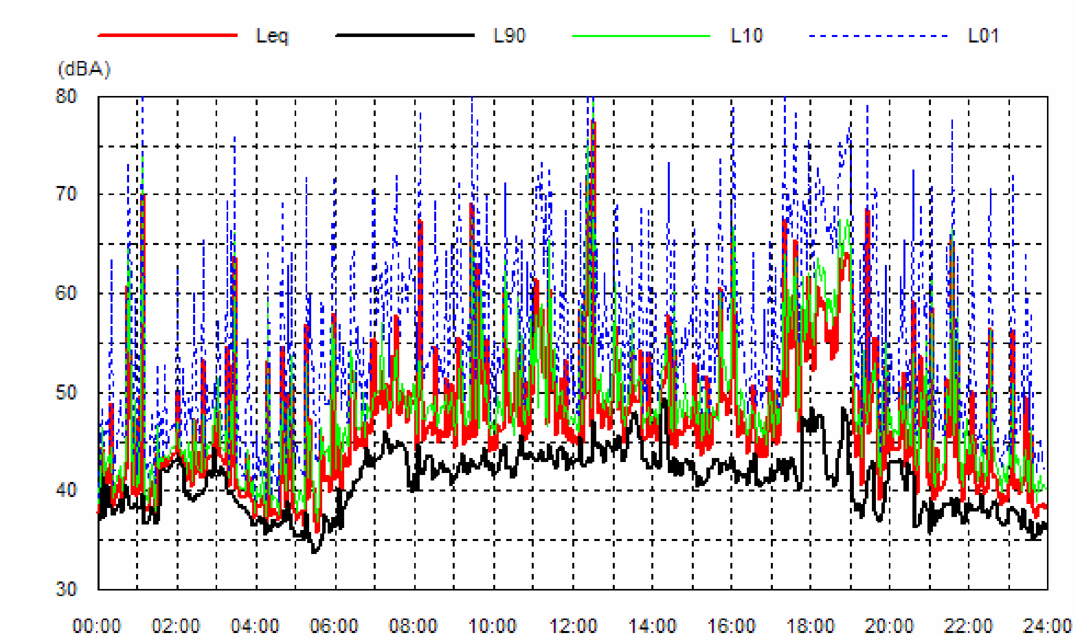
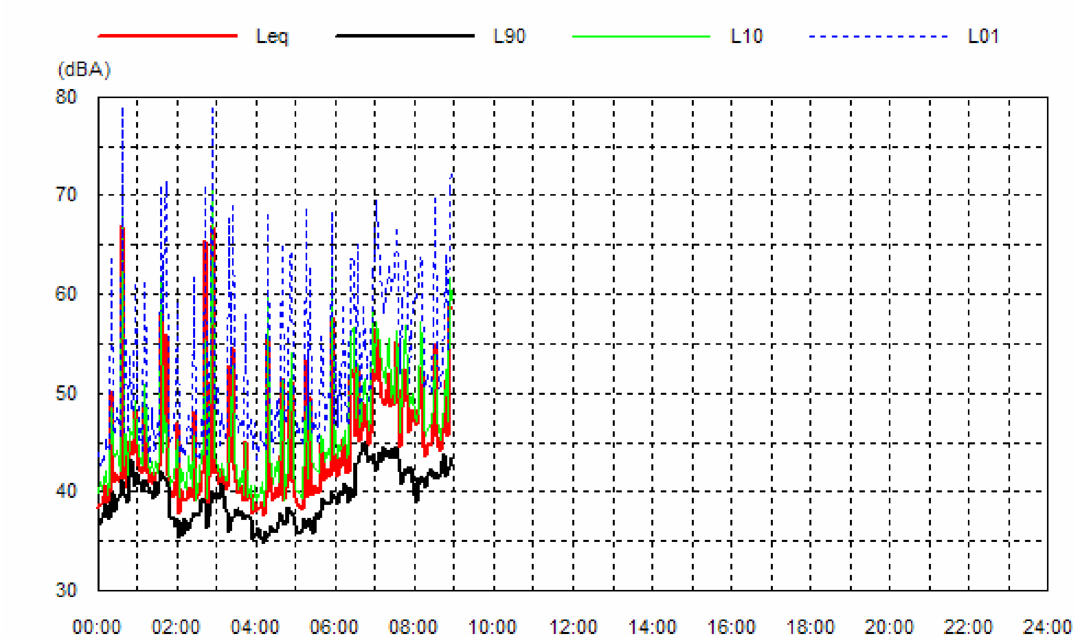


Location: 3. 119 Gladstone Avenue
Data shaded: Wind; Rain

Fri 14 Mar 08



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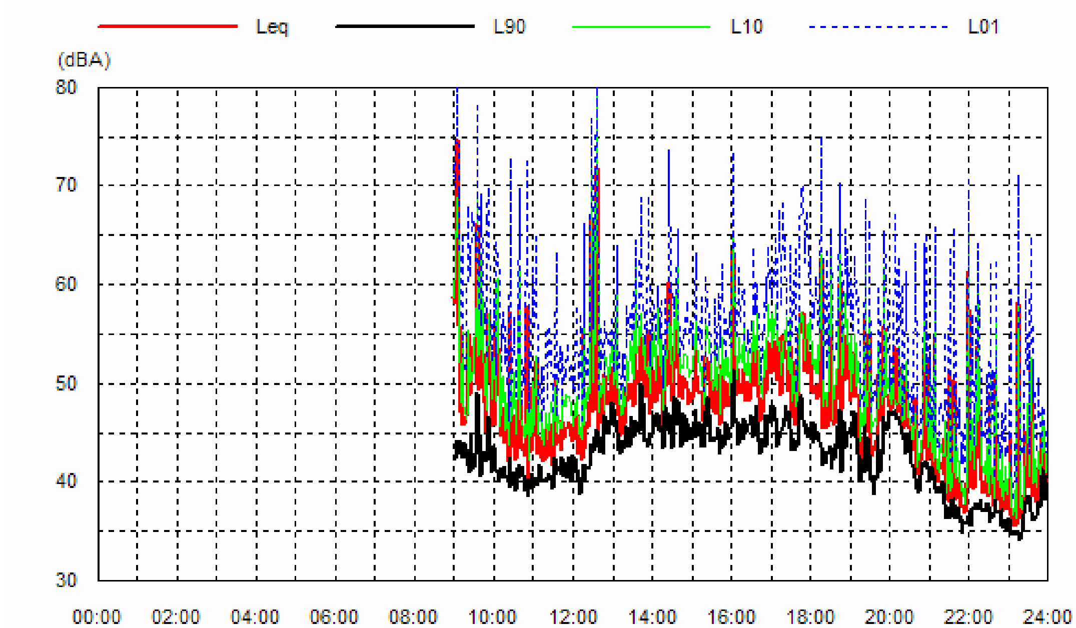
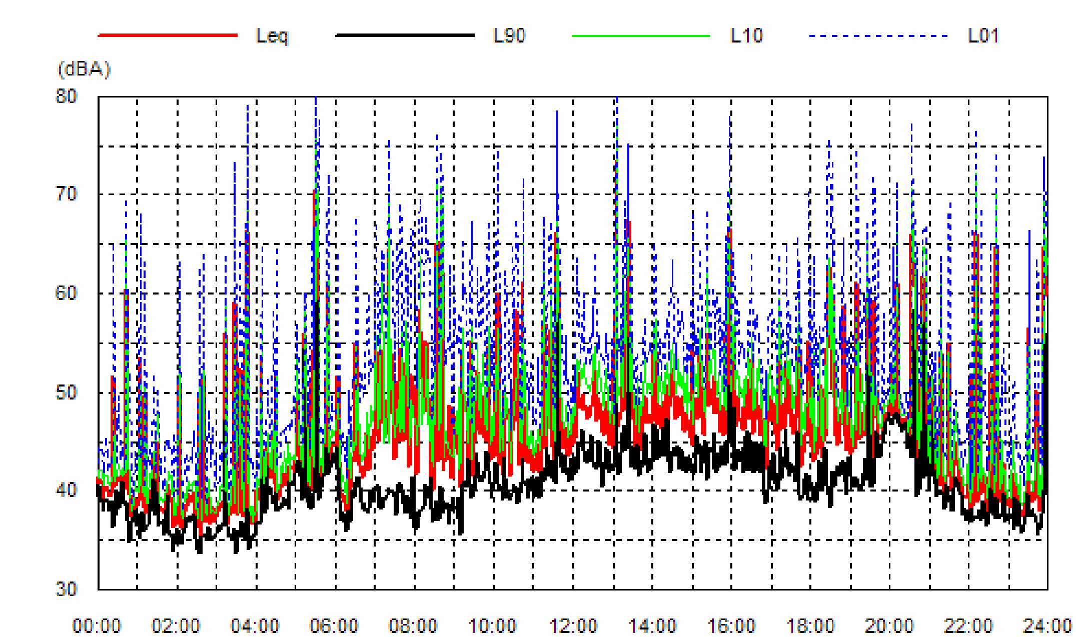
Data shaded: Wind; Rain

Fri 14 Mar 08

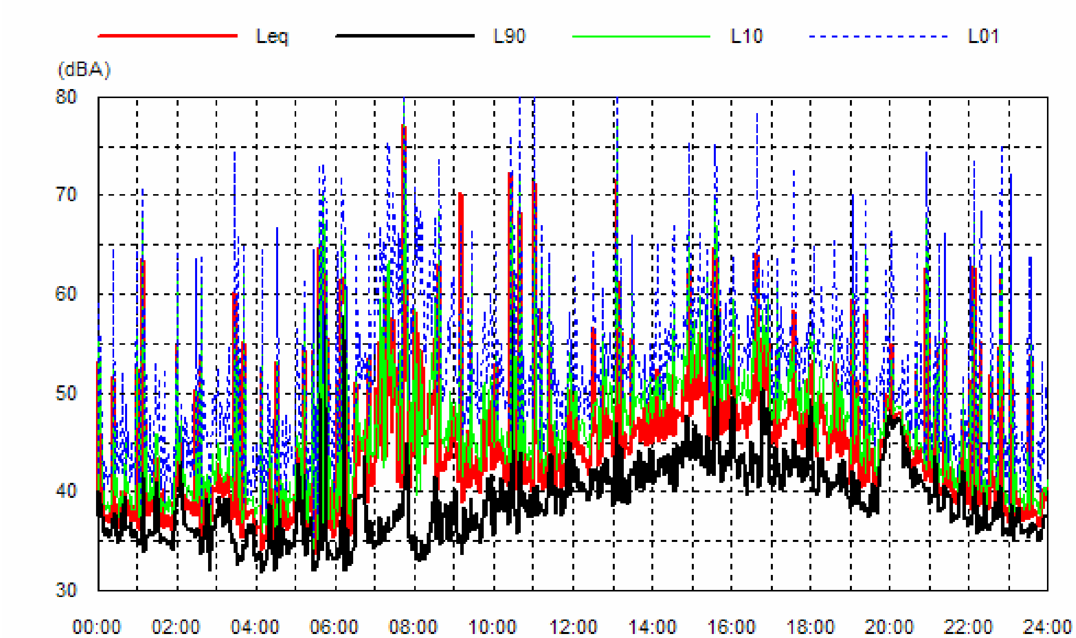


Sat 15 Mar 08



Location: 3. 119 Gladstone Avenue
Data shaded: Wind; Rain

Sun 16 Mar 08



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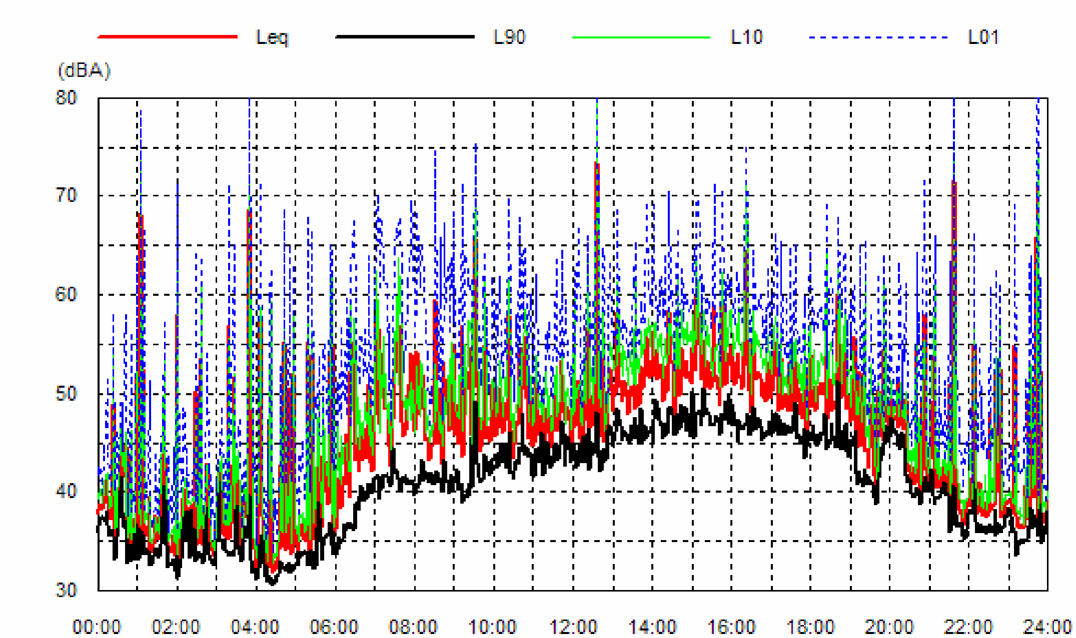
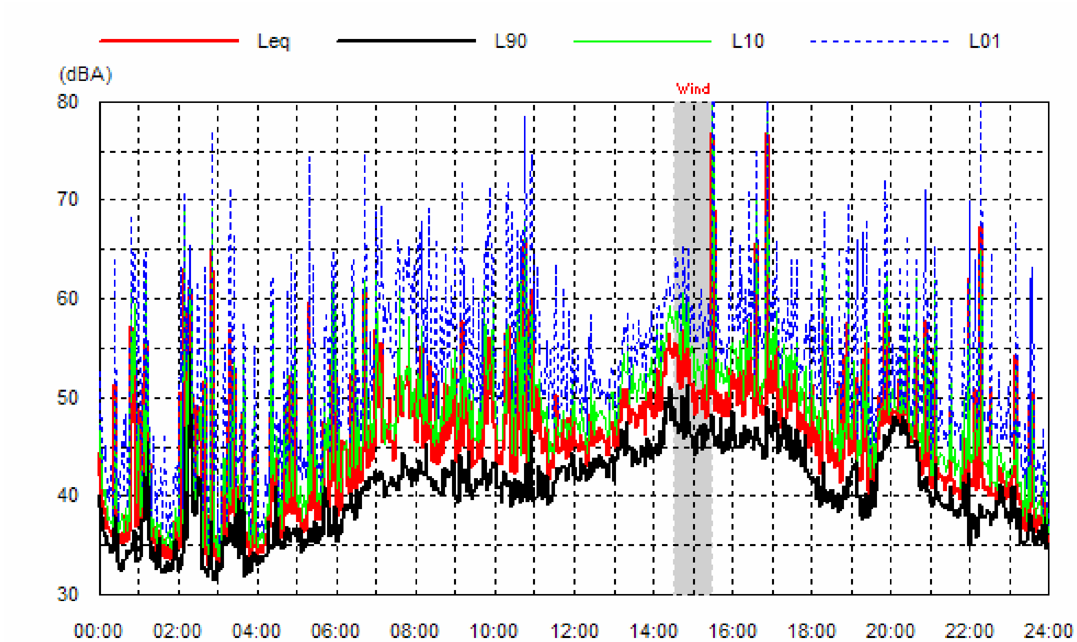


Location: 3. 119 Gladstone Avenue
Data shaded: Wind; Rain

Tue 18 Mar 08



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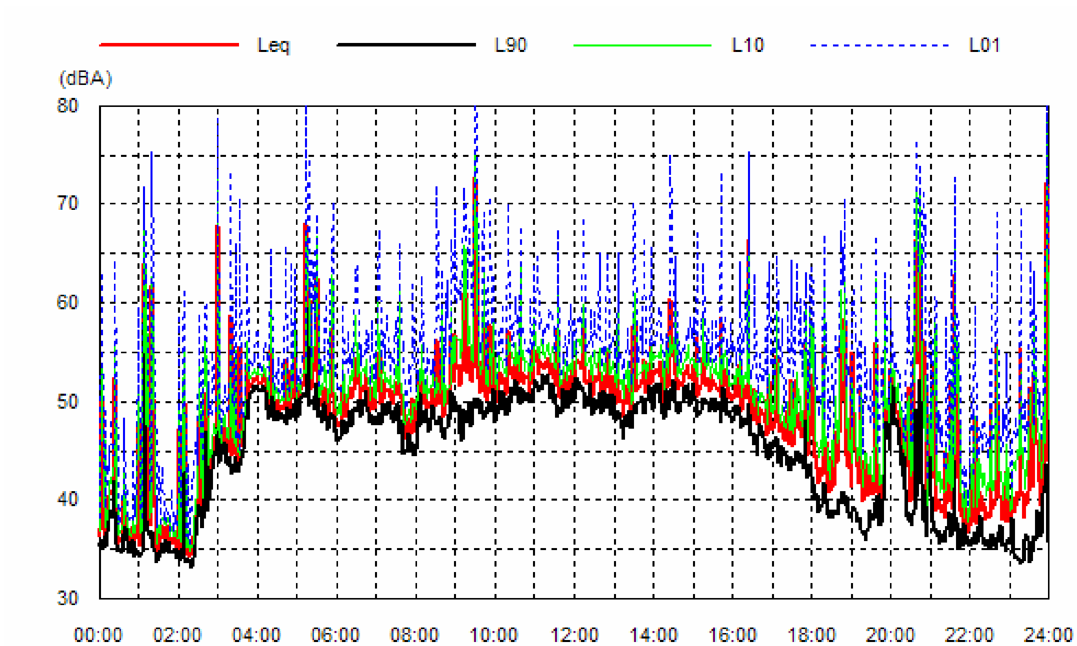
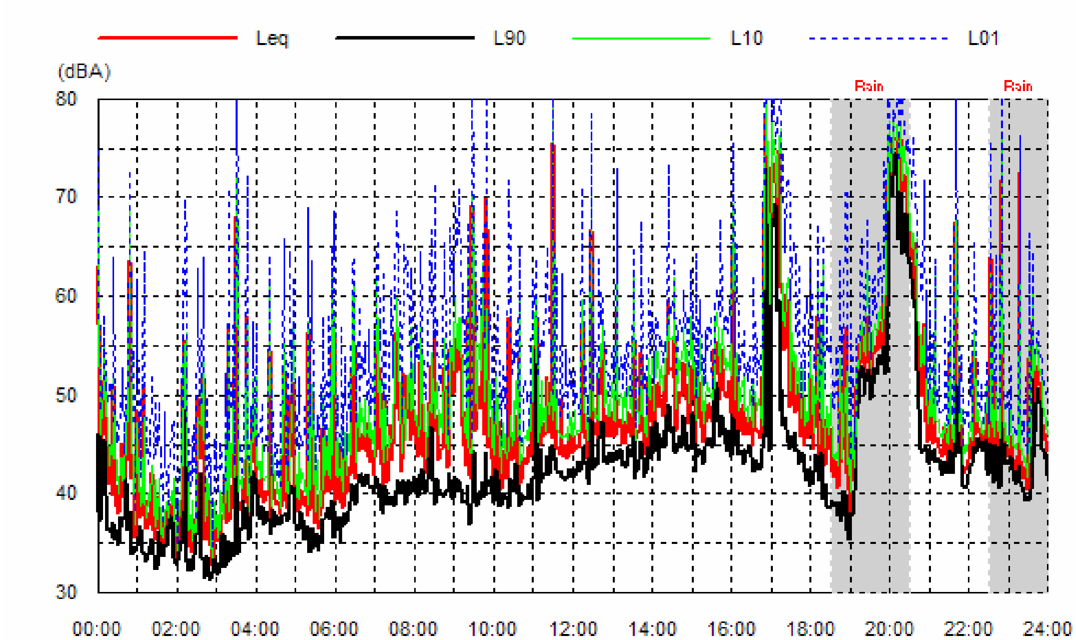


Location: 3. 119 Gladstone Avenue
Data shaded: Wind; Rain

Thu 20 Mar 08



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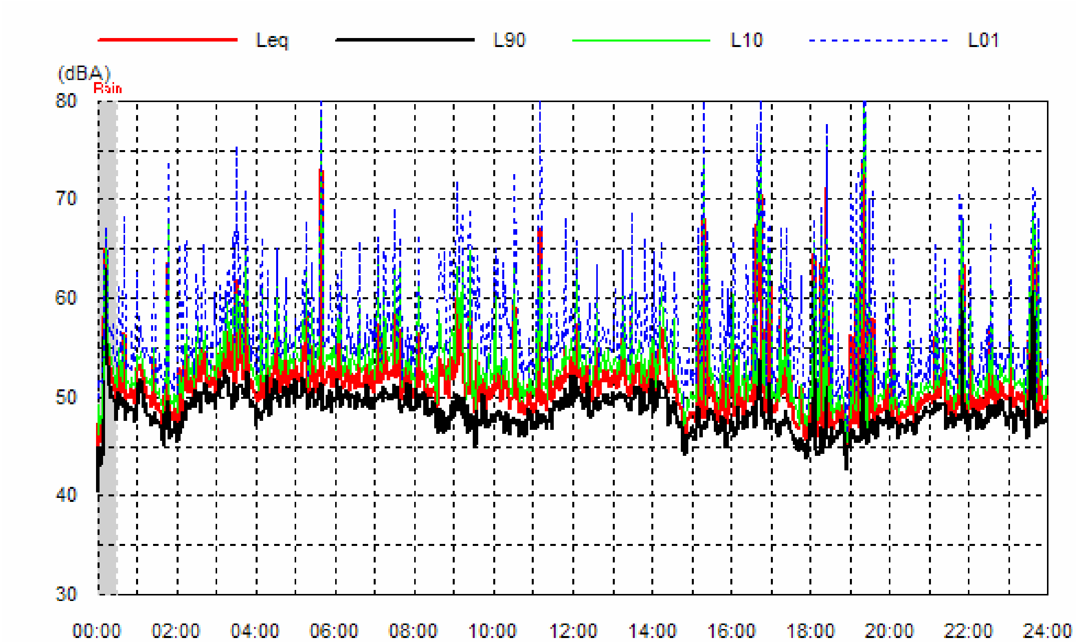
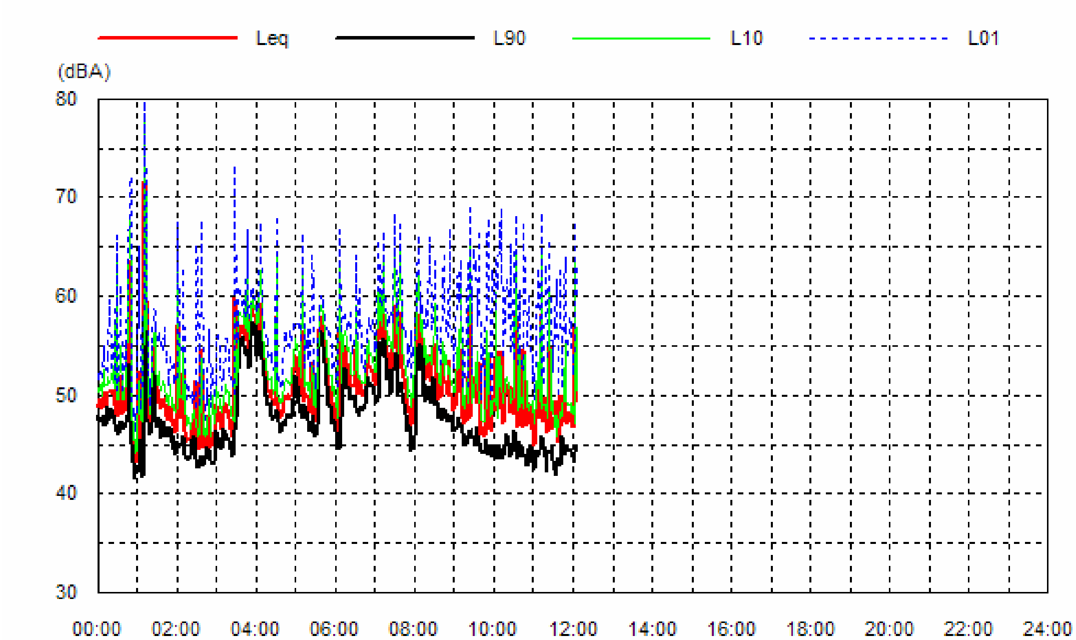


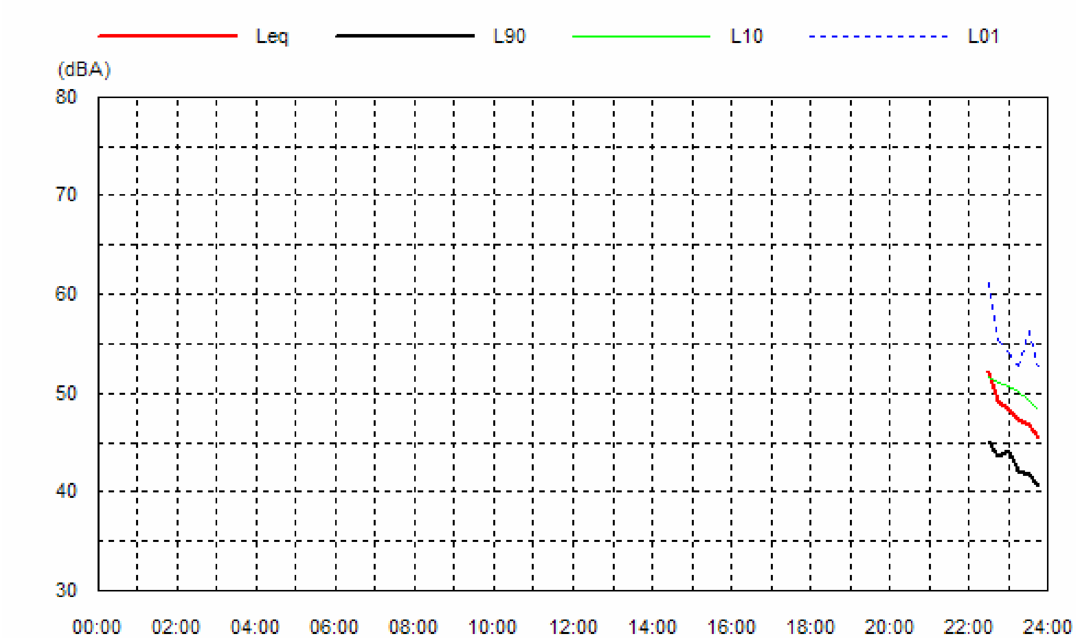
Location: 3. 119 Gladstone Avenue
Data shaded: Wind; Rain

Sat 22 Mar 08

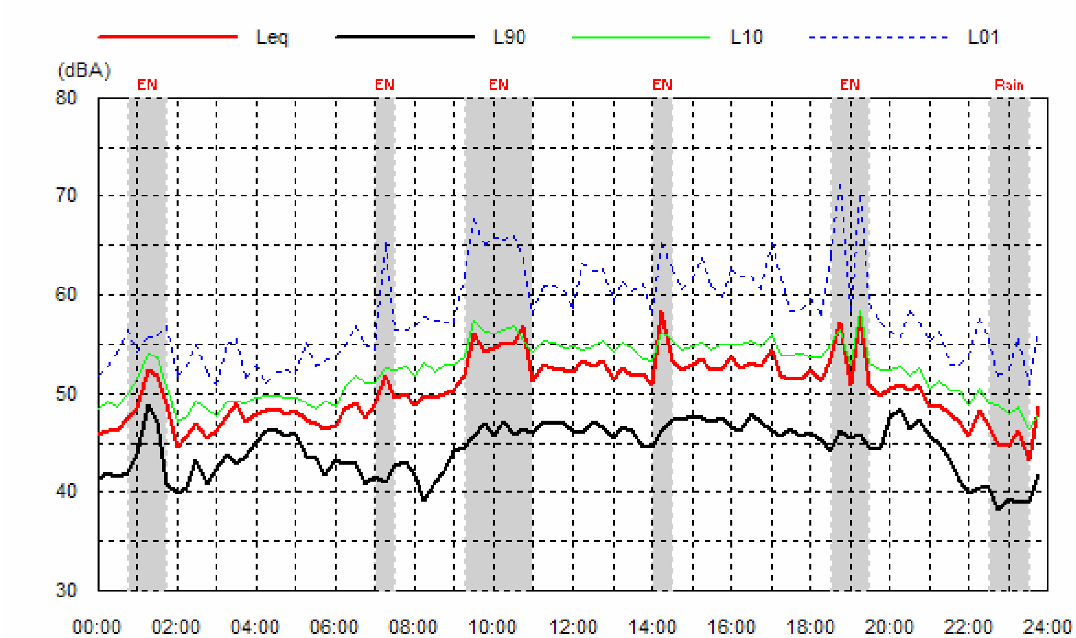


Location: 4. 13 Eager Street
Data shaded: EN; Battery Change; Wind; Rain

Sat 08 Mar 08

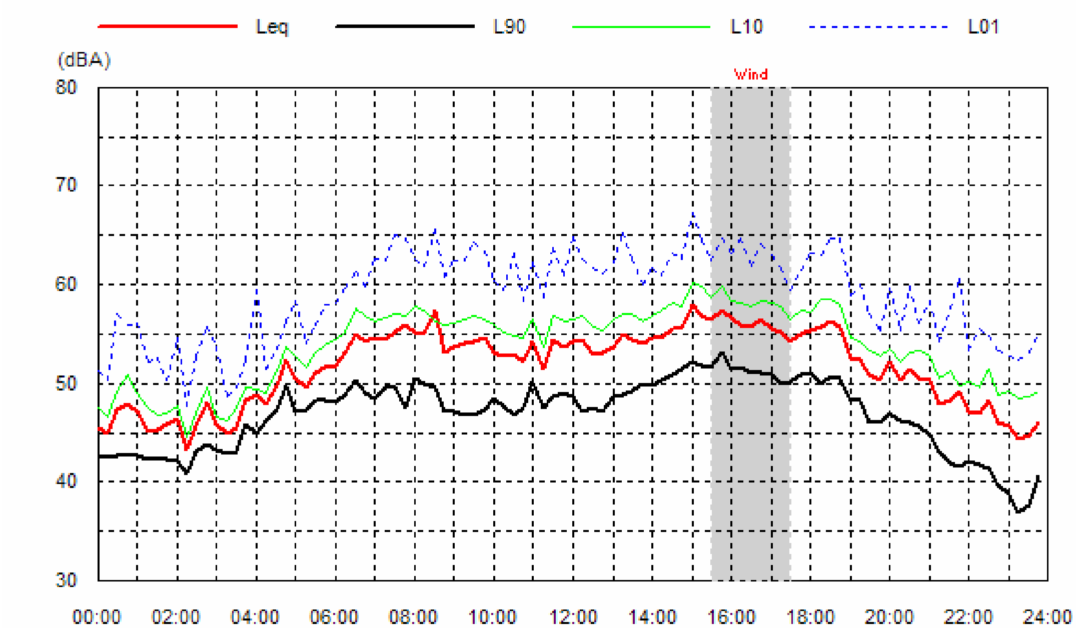


Sun 09 Mar 08

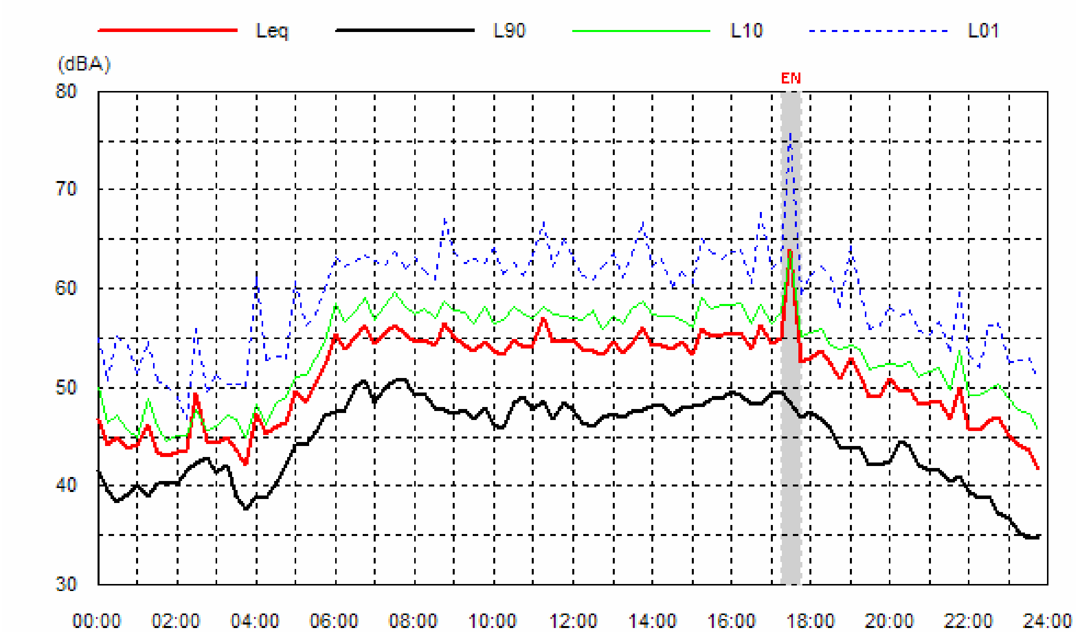


Location: 4. 13 Eager Street
Data shaded: EN; Battery Change; Wind; Rain

Mon 10 Mar 08

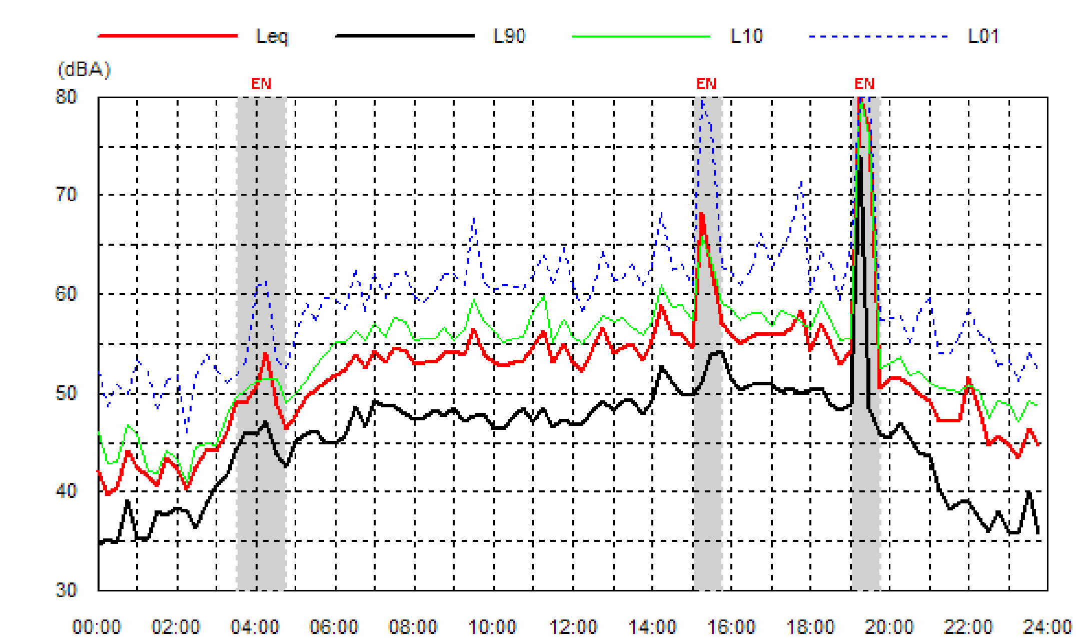


Tue 11 Mar 08



Location: 4. 13 Eager Street
Data shaded: EN; Battery Change; Wind; Rain

Wed 12 Mar 08



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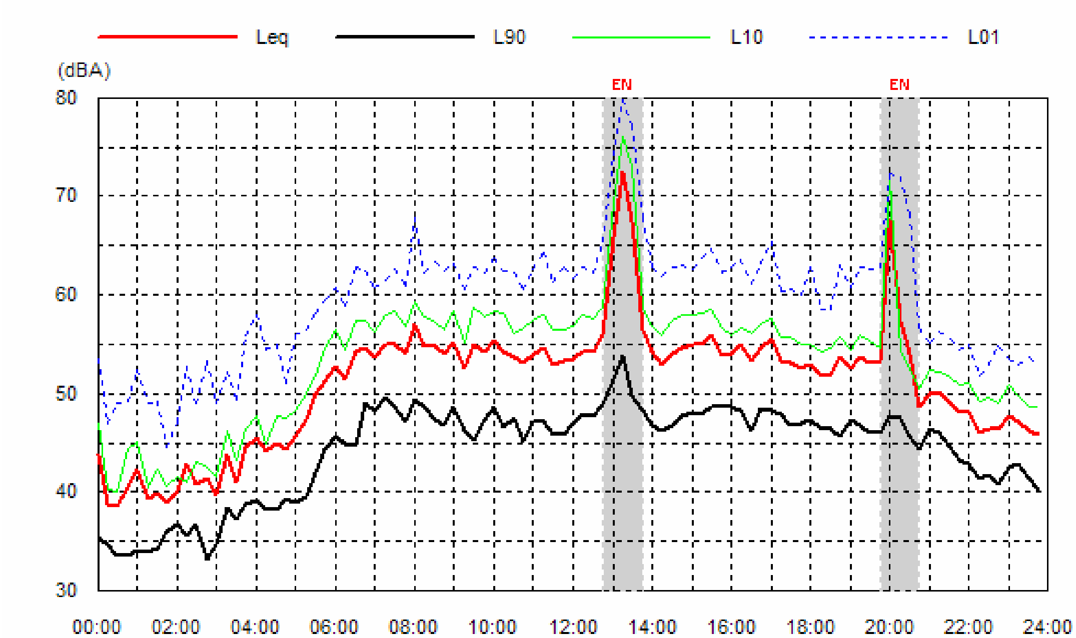
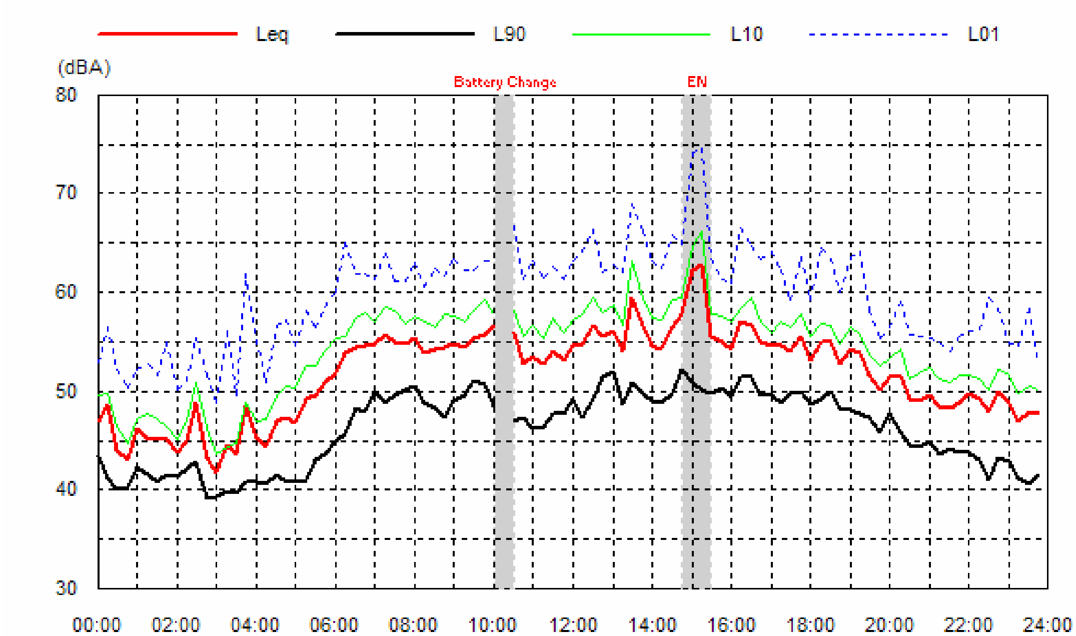


Location: 4. 13 Eager Street
Data shaded: EN; Battery Change; Wind; Rain

Fri 14 Mar 08



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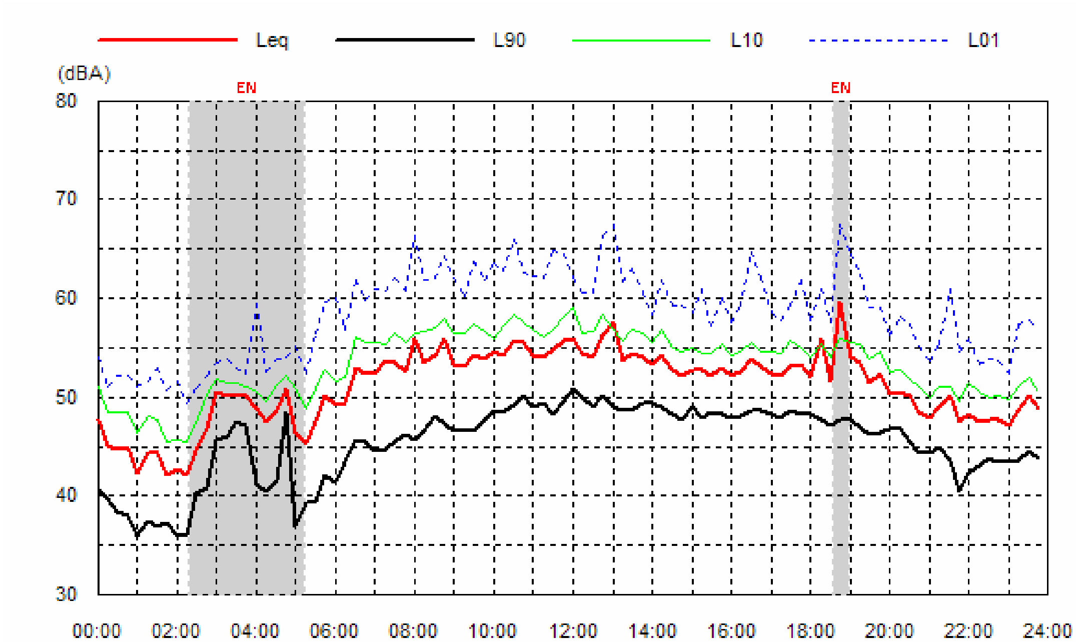
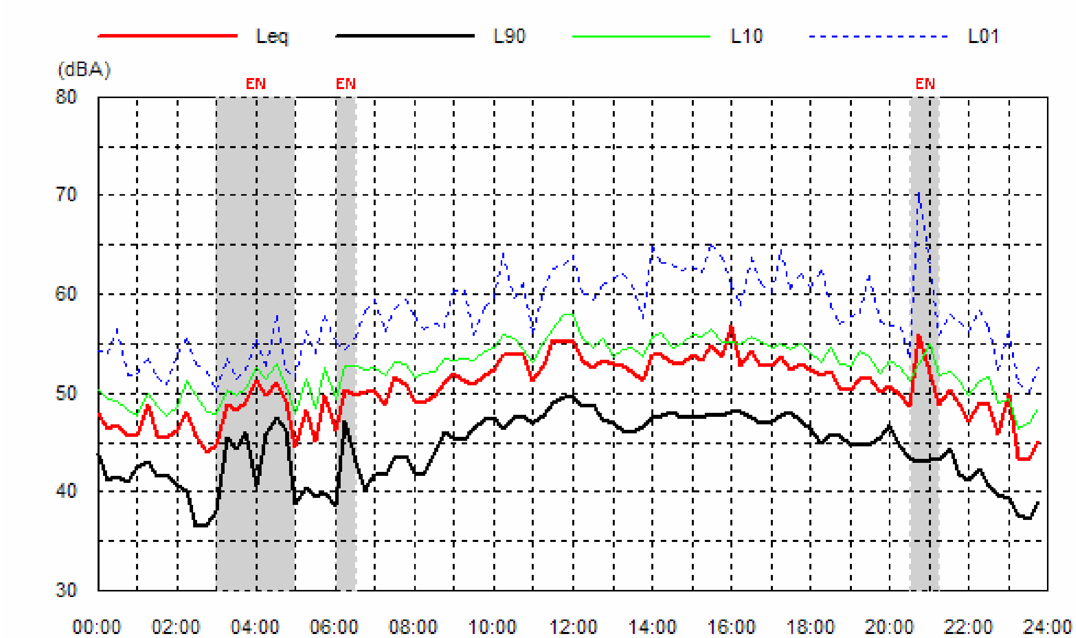
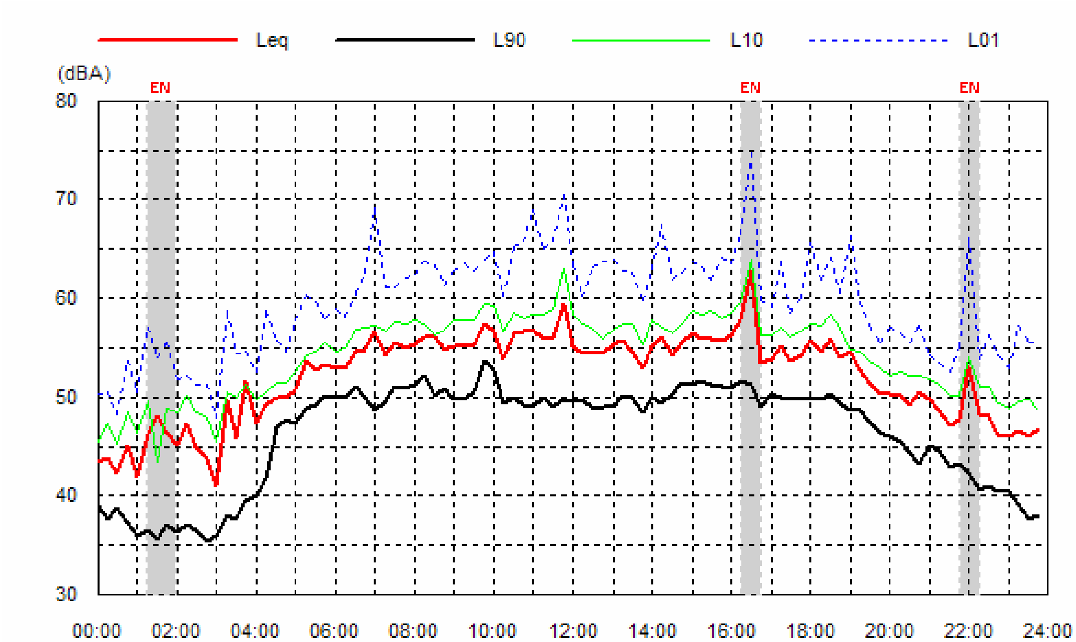


Location: 4. 13 Eager Street
Data shaded: EN; Battery Change; Wind; Rain

Sun 16 Mar 08

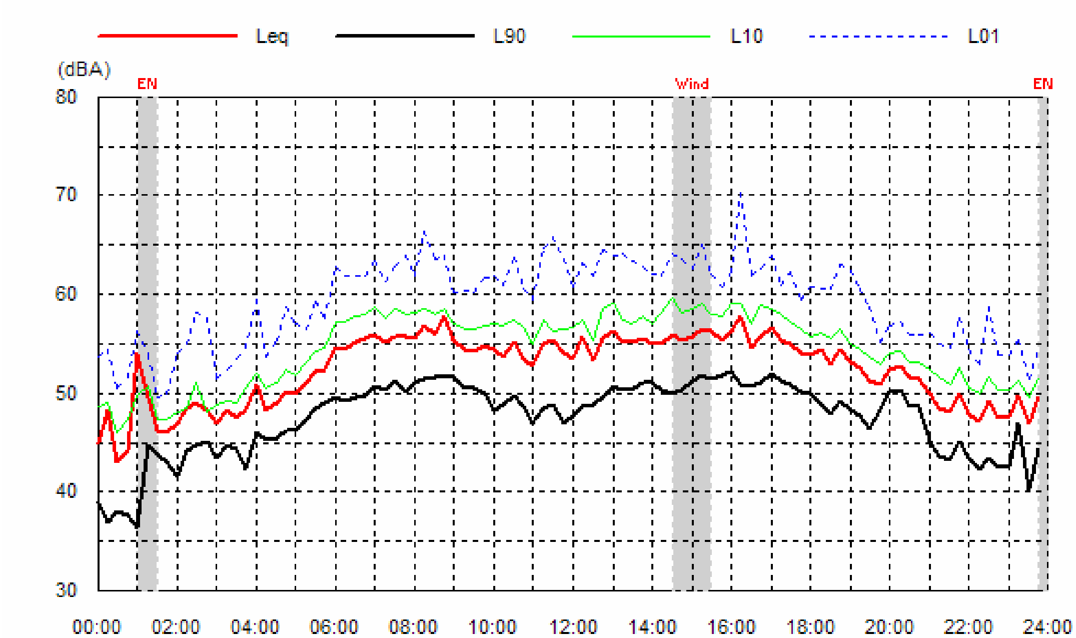


Mon 17 Mar 08



Location: 4. 13 Eager Street
Data shaded: EN; Battery Change; Wind; Rain

Tue 18 Mar 08



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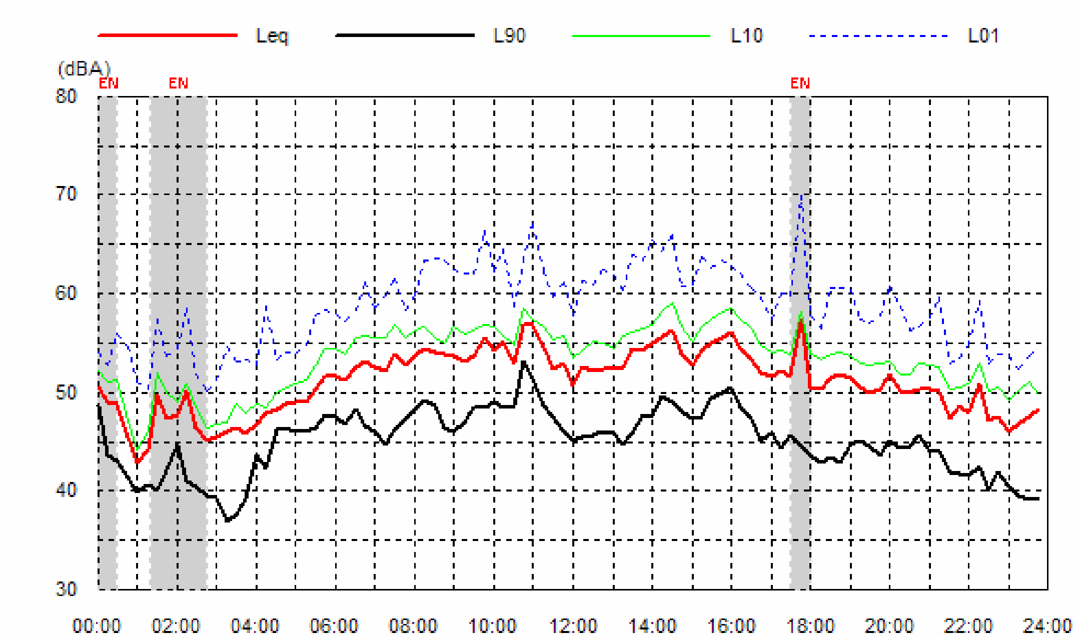
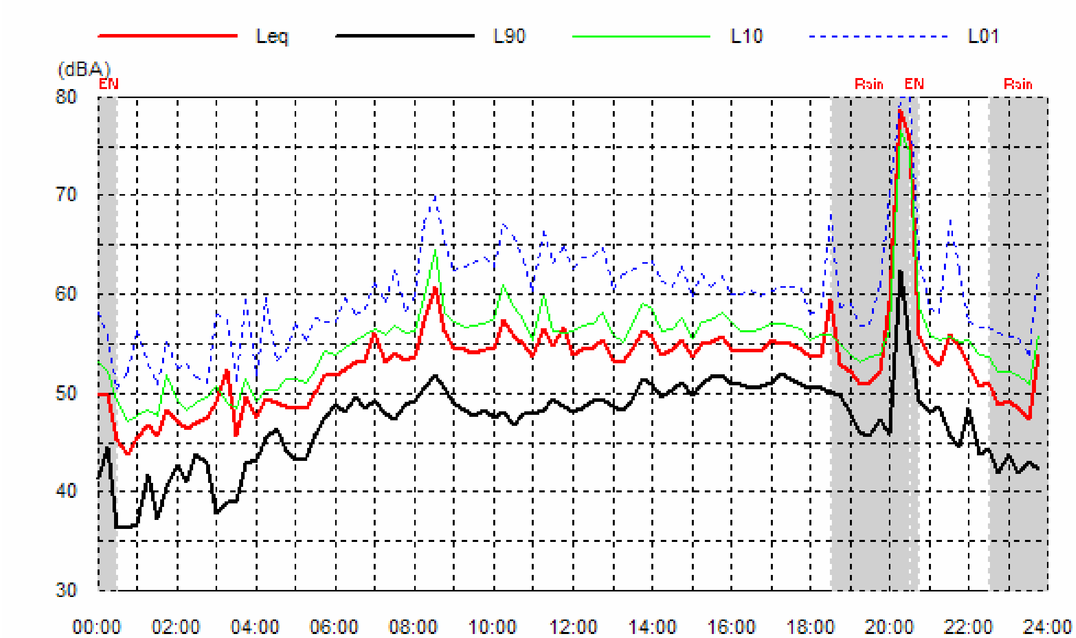


Location: 4. 13 Eager Street
Data shaded: EN; Battery Change; Wind; Rain

Thu 20 Mar 08



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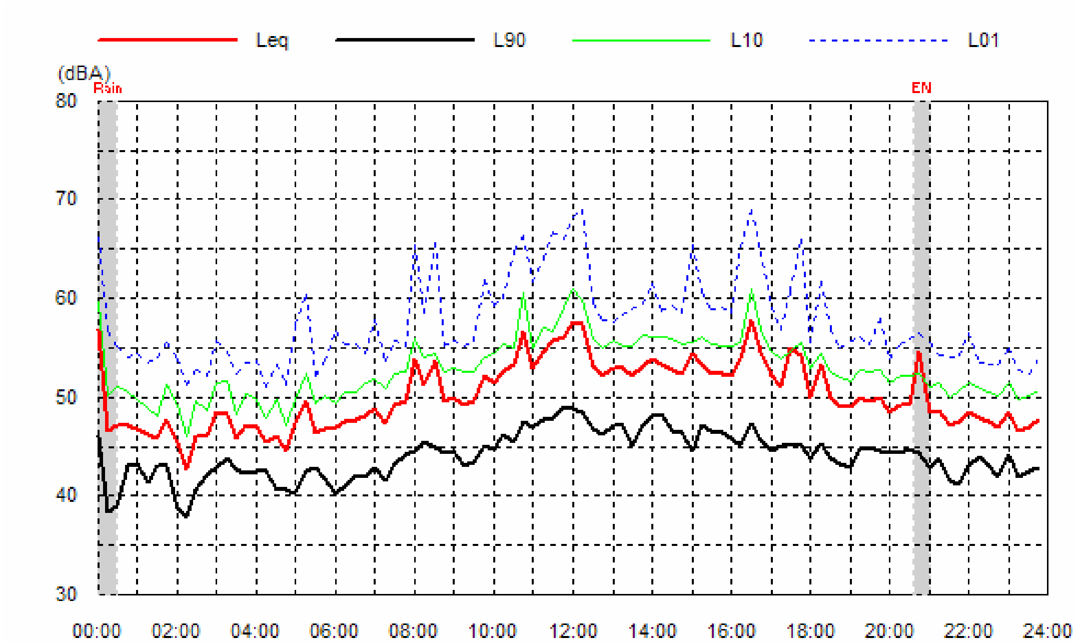
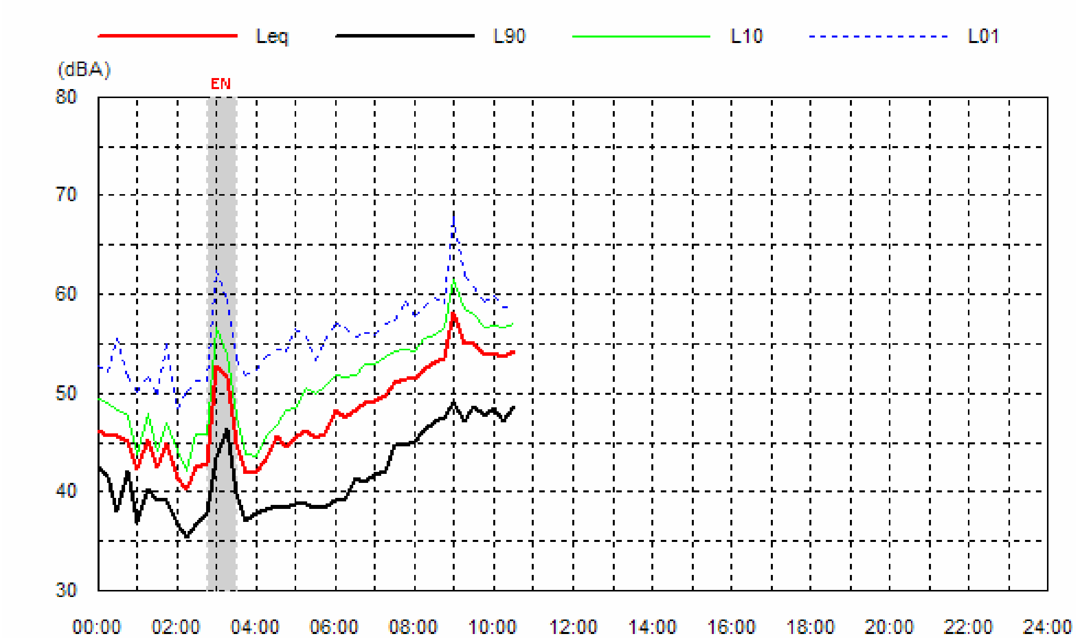


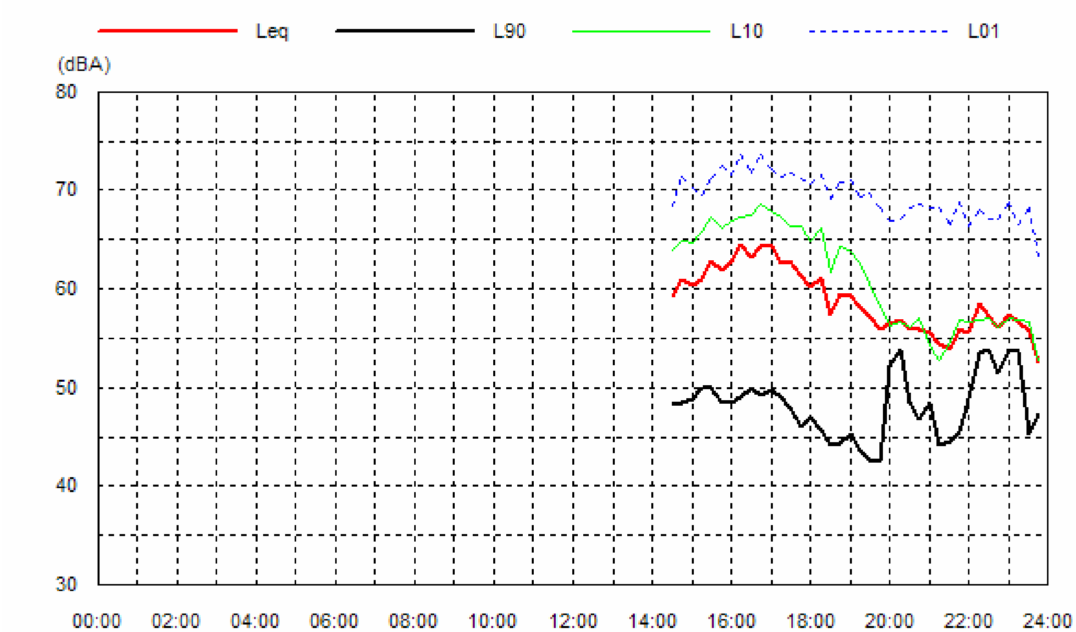
Location: 4. 13 Eager Street
Data shaded: EN; Battery Change; Wind; Rain

Sat 22 Mar 08



Location: 5. 7 Albert Street
Data shaded: EN; Wind; Rain

Fri 14 Mar 08



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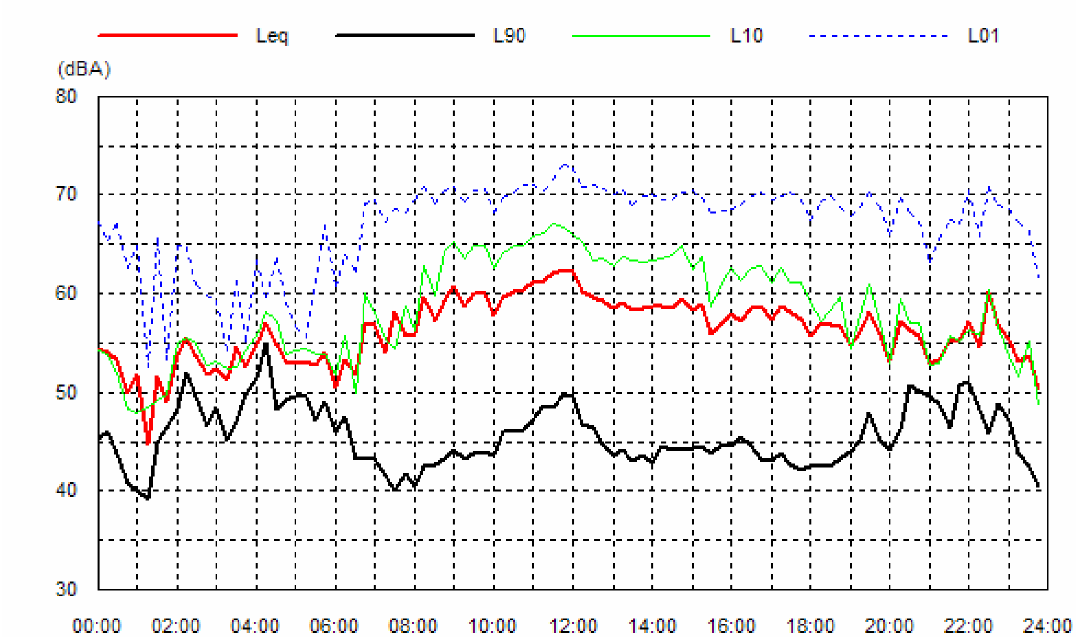
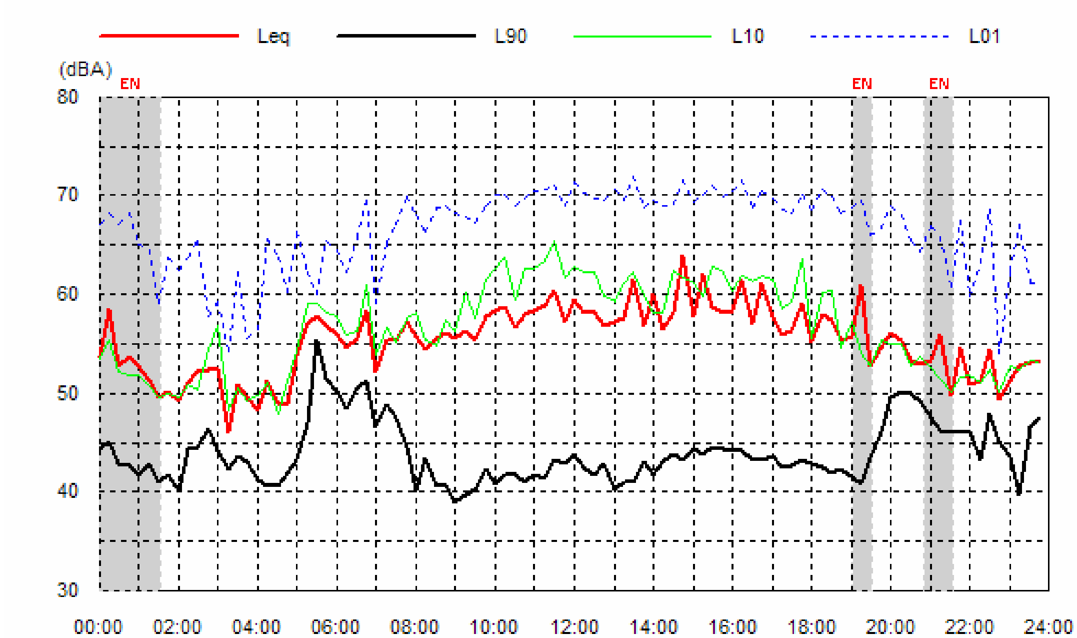
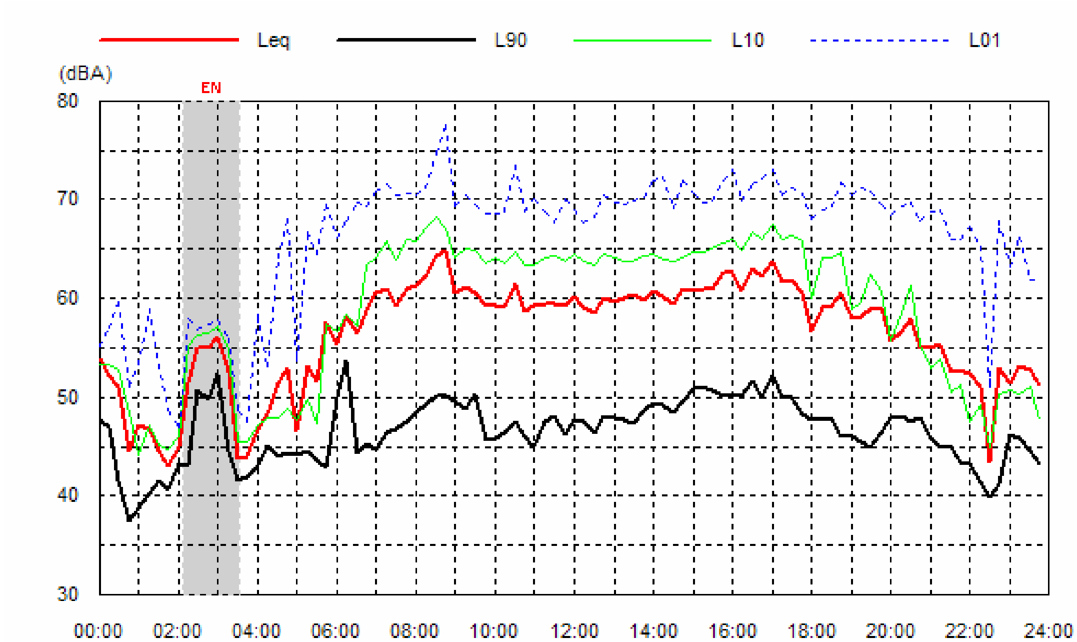


Location: 5. 7 Albert Street
Data shaded: EN; Wind; Rain

Sun 16 Mar 08



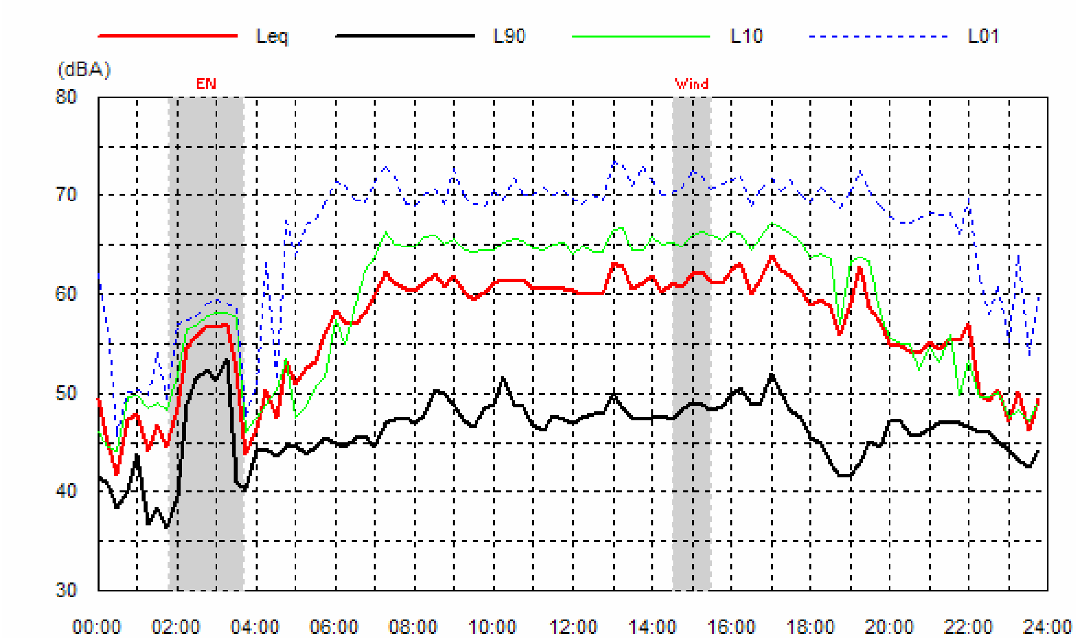
Mon 17 Mar 08



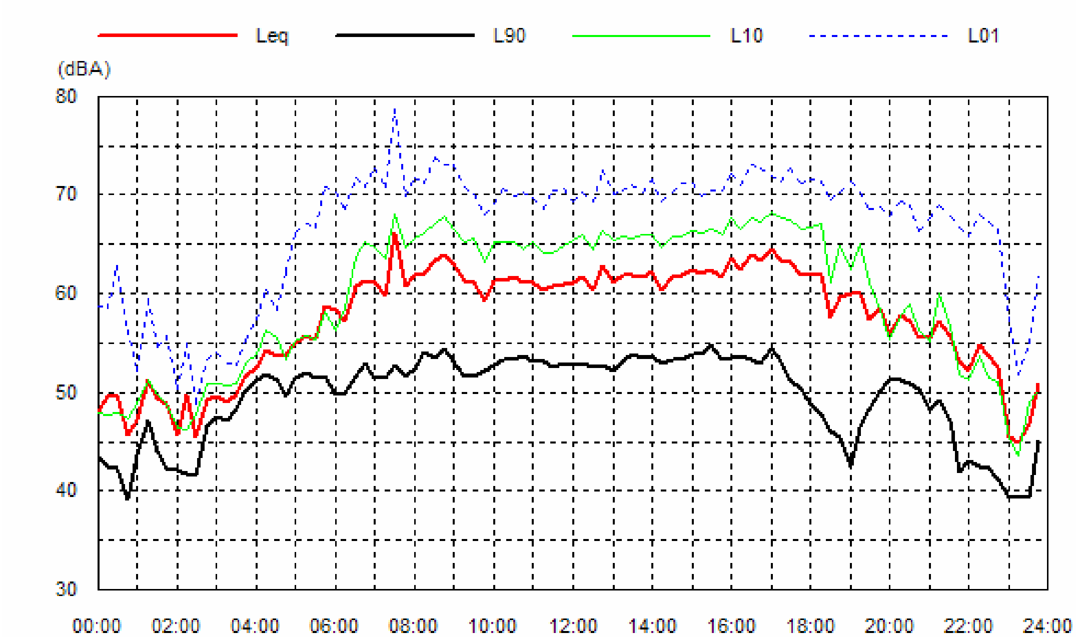
Location: 5. 7 Albert Street

Data shaded: EN; Wind; Rain

Tue 18 Mar 08

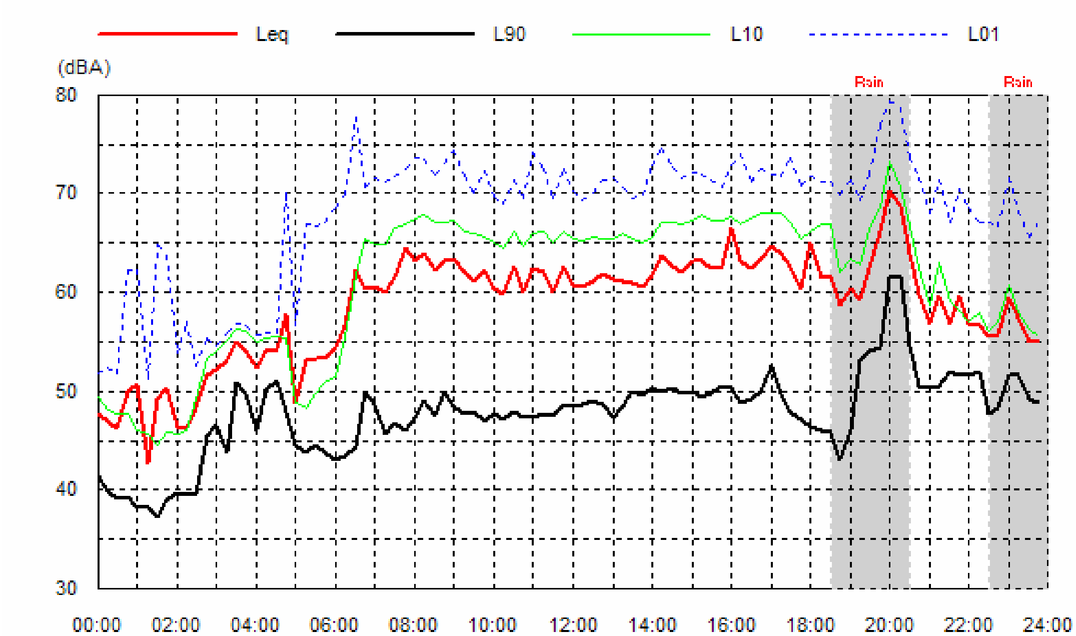


Wed 19 Mar 08



Location: 5. 7 Albert Street
Data shaded: EN; Wind; Rain

Thu 20 Mar 08



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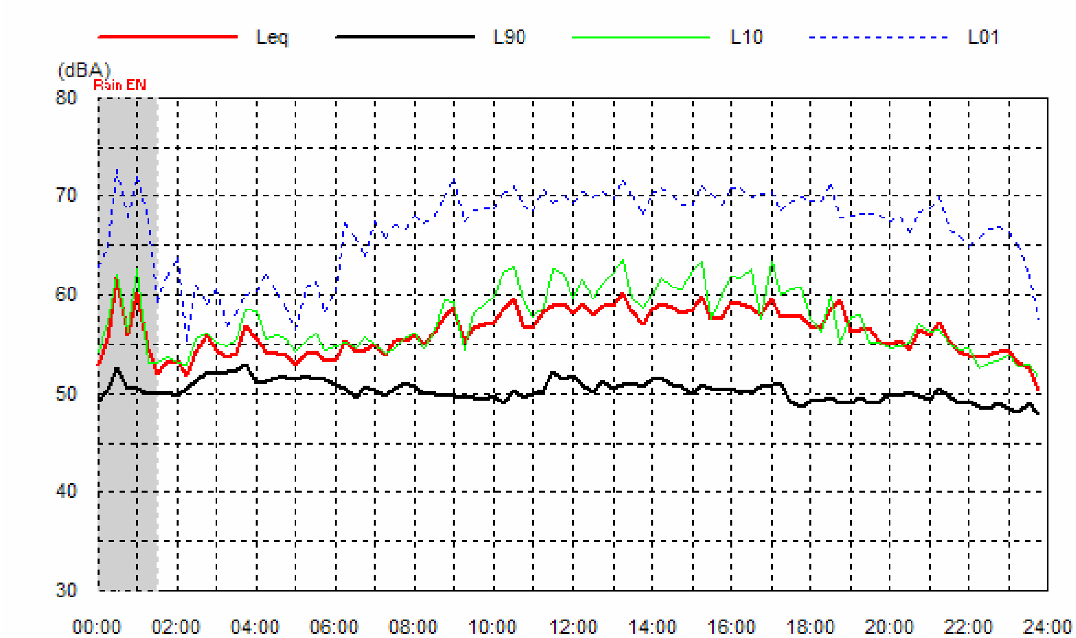
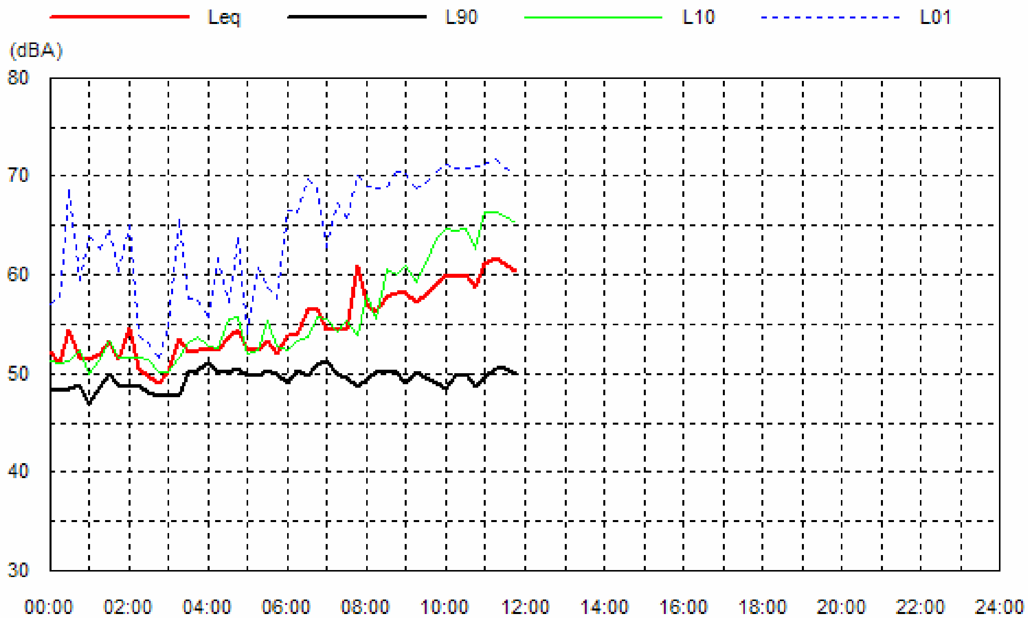


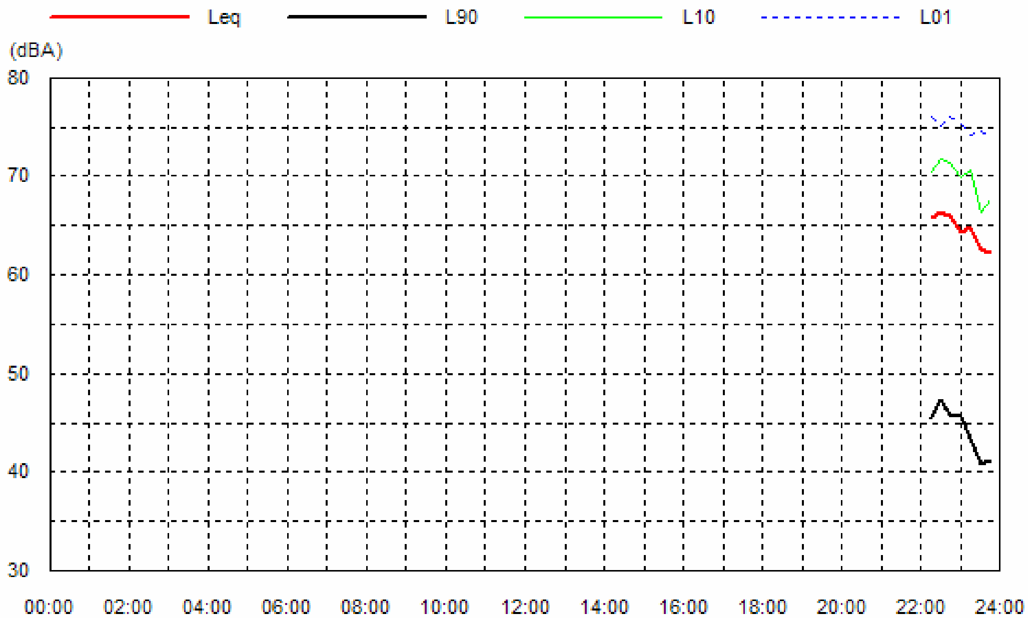
Location: 5. 7 Albert Street
Data shaded: EN; Wind; Rain

Sat 22 Mar 08



Location: 6. 77 Bellambi Lane
Data shaded: Battery Change; EN; Wind; Rain

Sat 08 Mar 08



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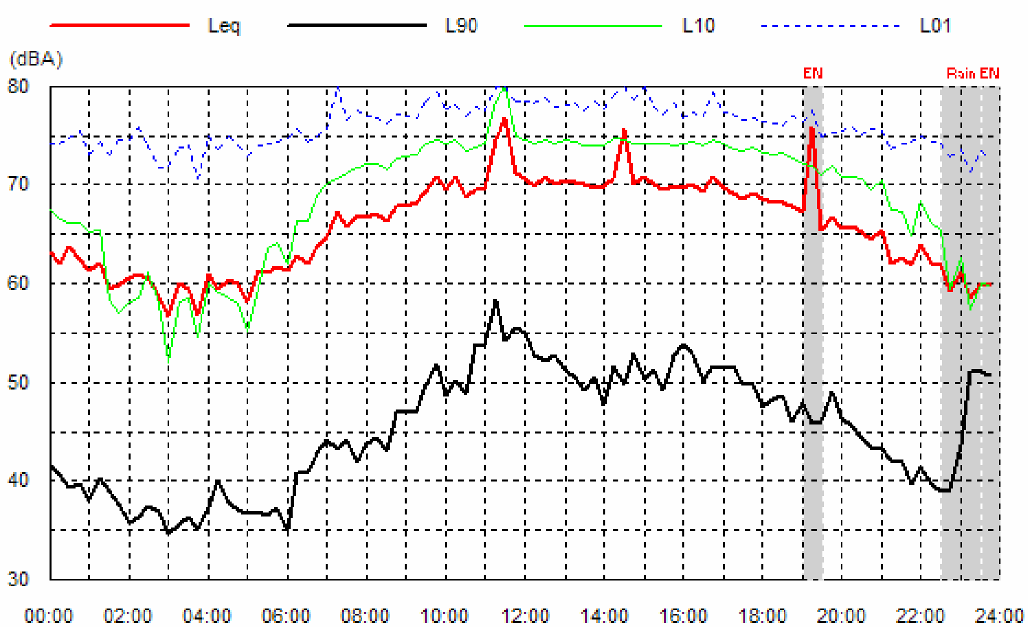
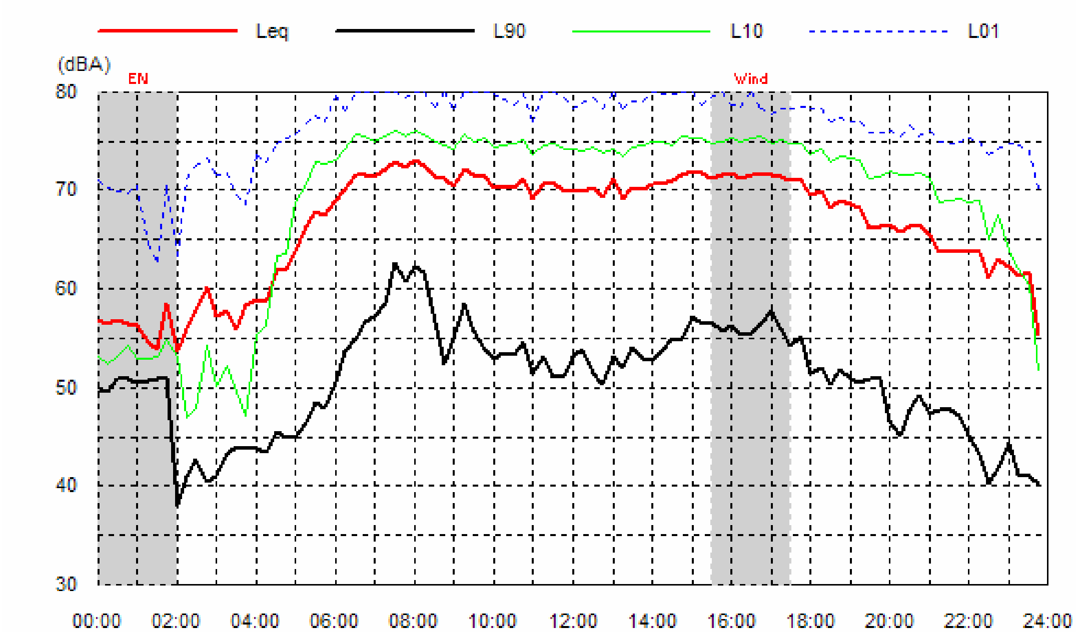
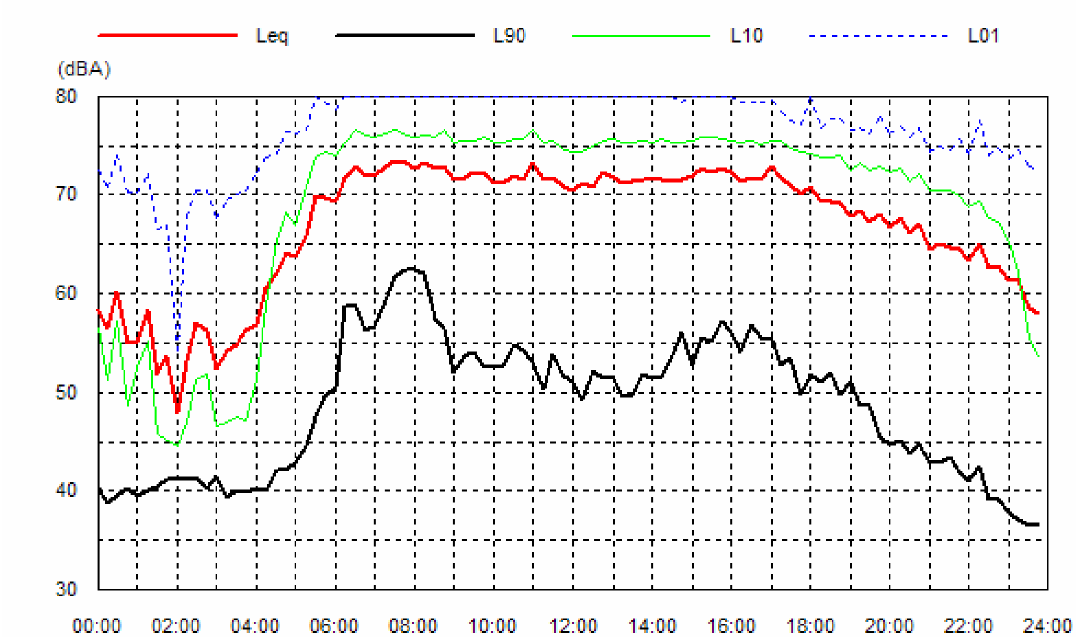


Location: 6. 77 Bellambi Lane
Data shaded: Battery Change; EN; Wind; Rain

Mon 10 Mar 08

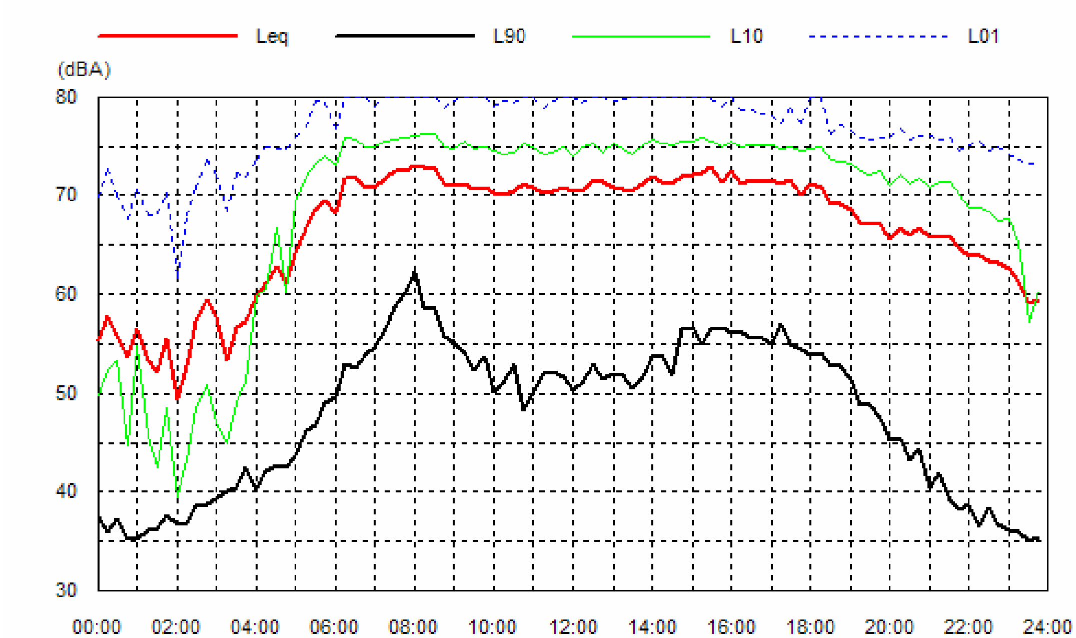


Tue 11 Mar 08

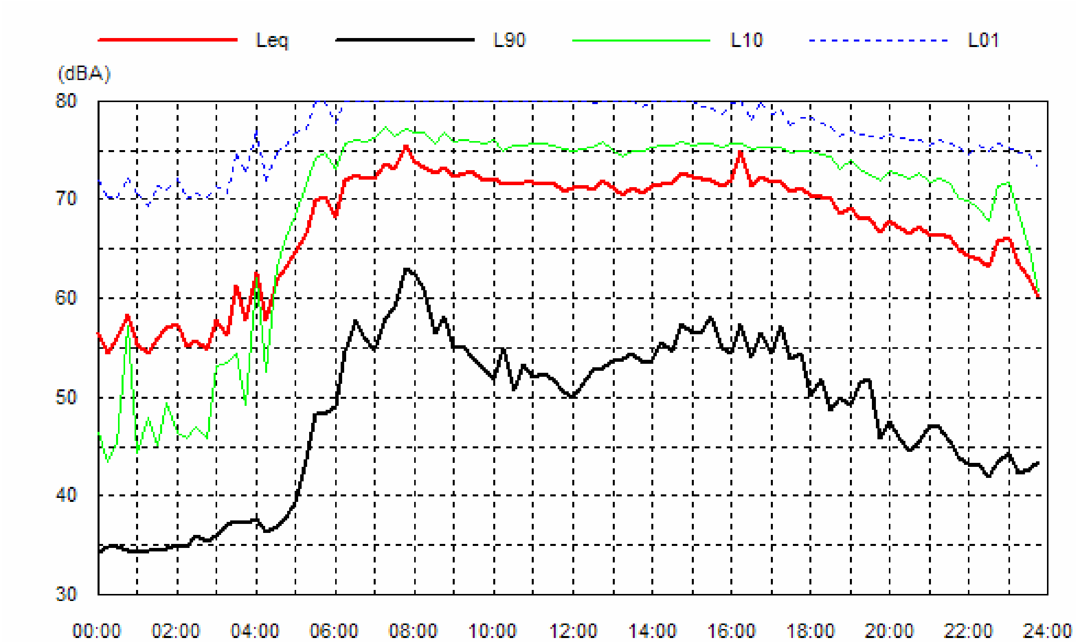


Location: 6. 77 Bellambi Lane
Data shaded: Battery Change; EN; Wind; Rain

Wed 12 Mar 08

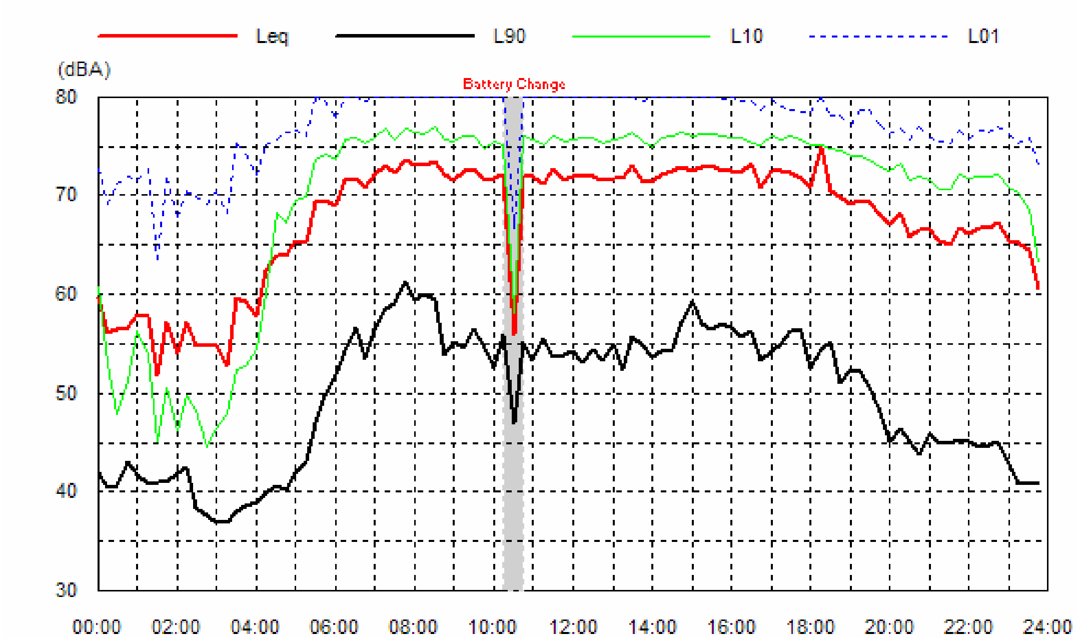


Thu 13 Mar 08

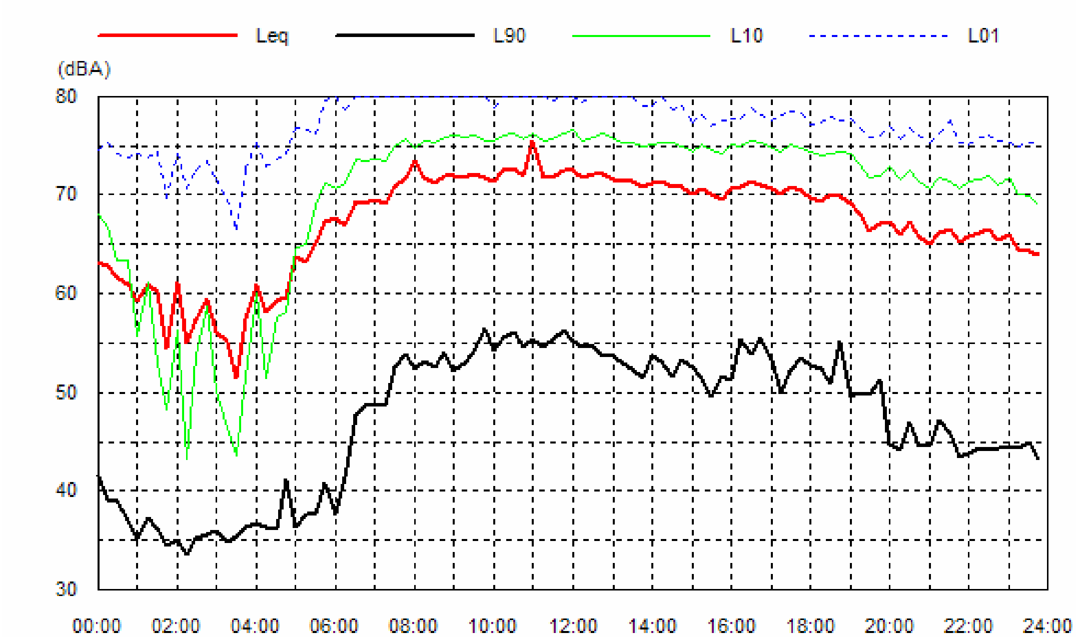


Location: 6. 77 Bellambi Lane
Data shaded: Battery Change; EN; Wind; Rain

Fri 14 Mar 08



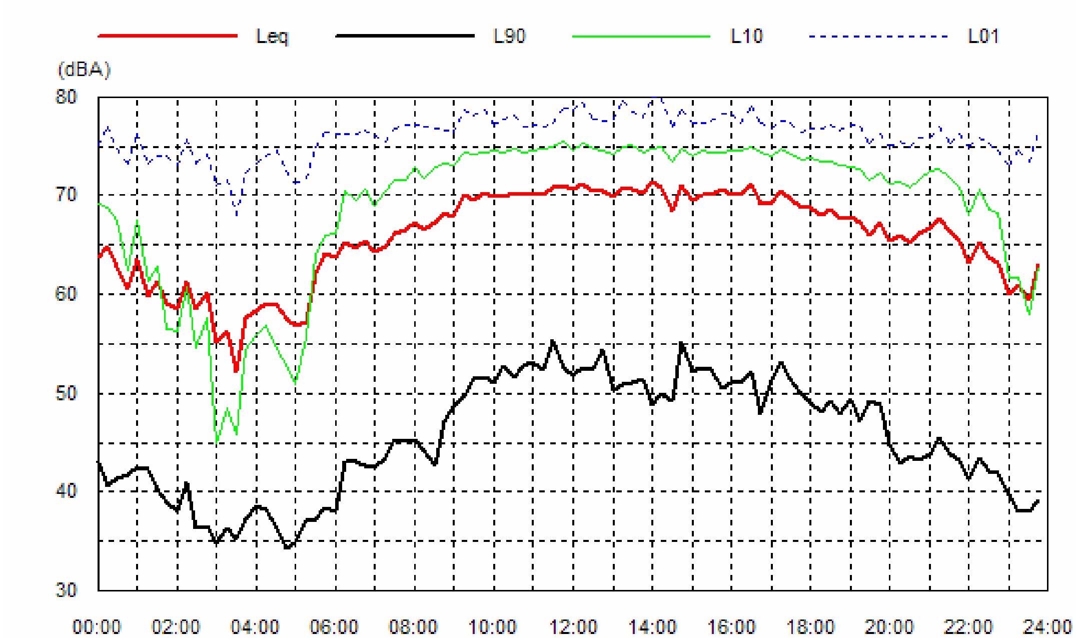
Sat 15 Mar 08



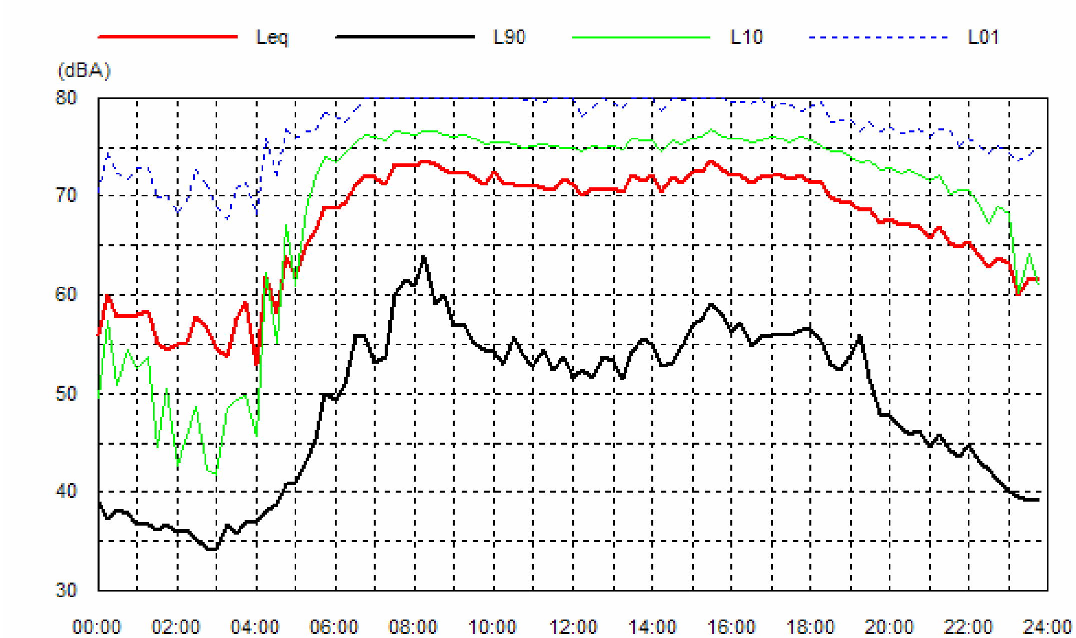
Location: 6. 77 Bellambi Lane

Data shaded: Battery Change; EN; Wind; Rain

Sun 16 Mar 08

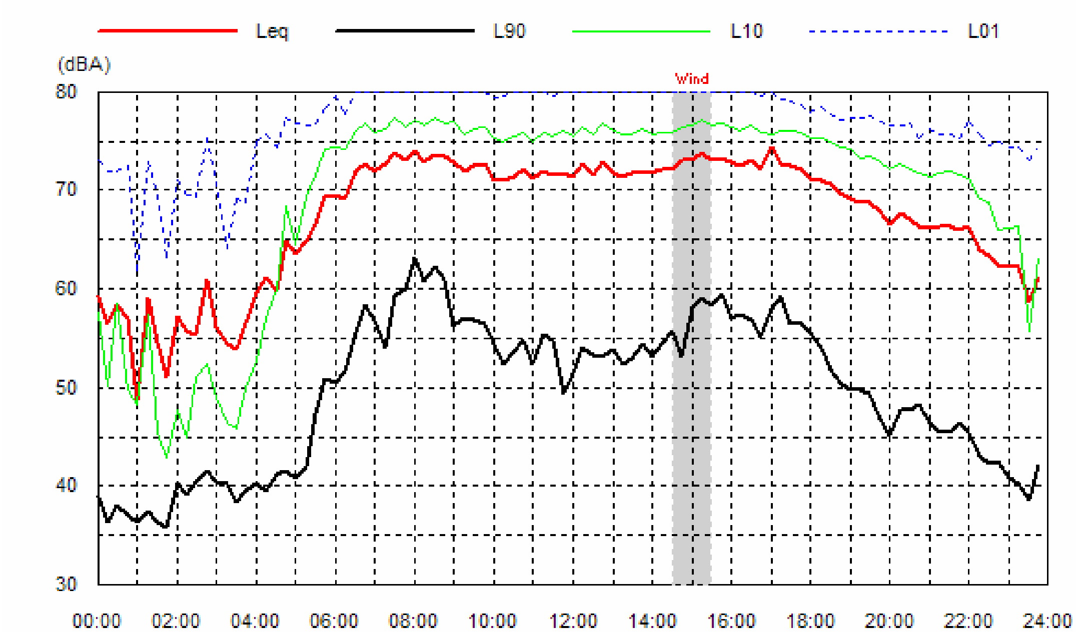


Mon 17 Mar 08

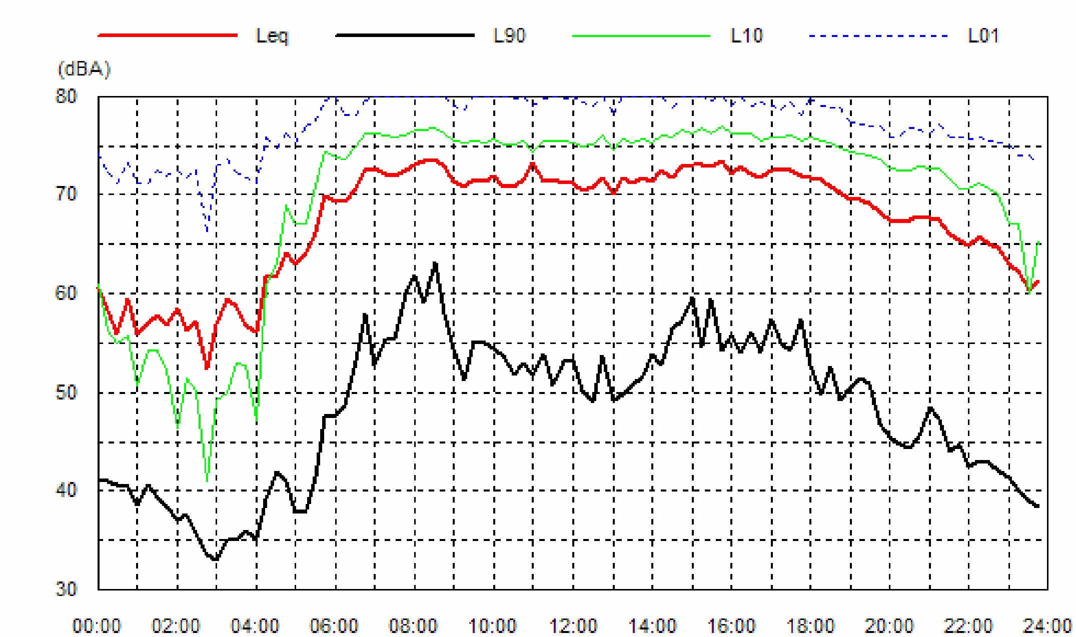


Location: 6. 77 Bellambi Lane
Data shaded: Battery Change; EN; Wind; Rain

Tue 18 Mar 08



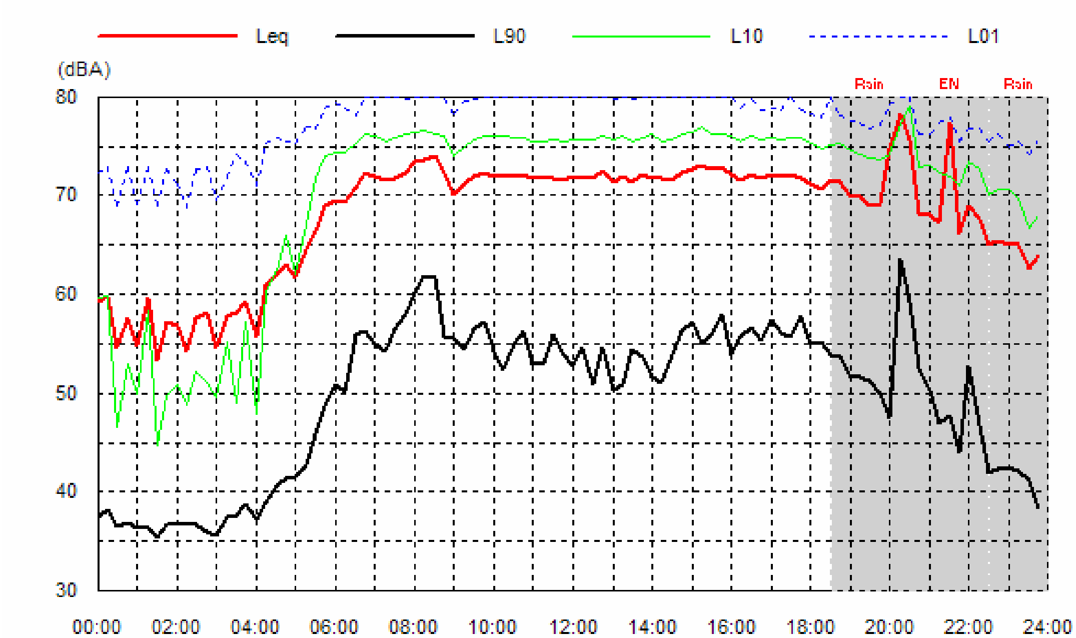
Wed 19 Mar 08



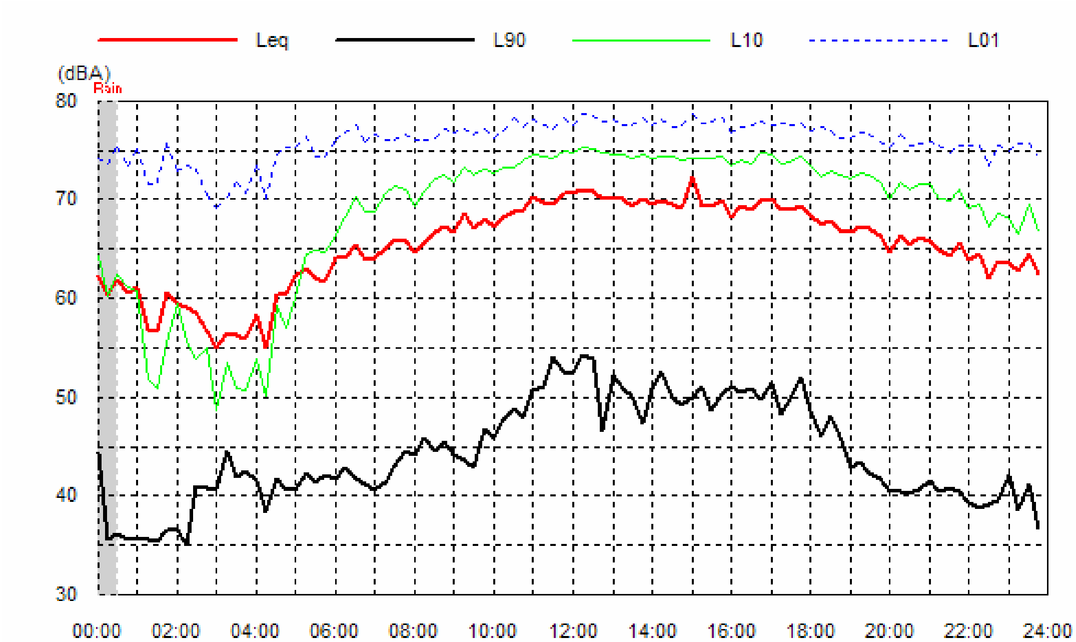
Location: 6. 77 Bellambi Lane

Data shaded: Battery Change; EN; Wind; Rain

Thu 20 Mar 08

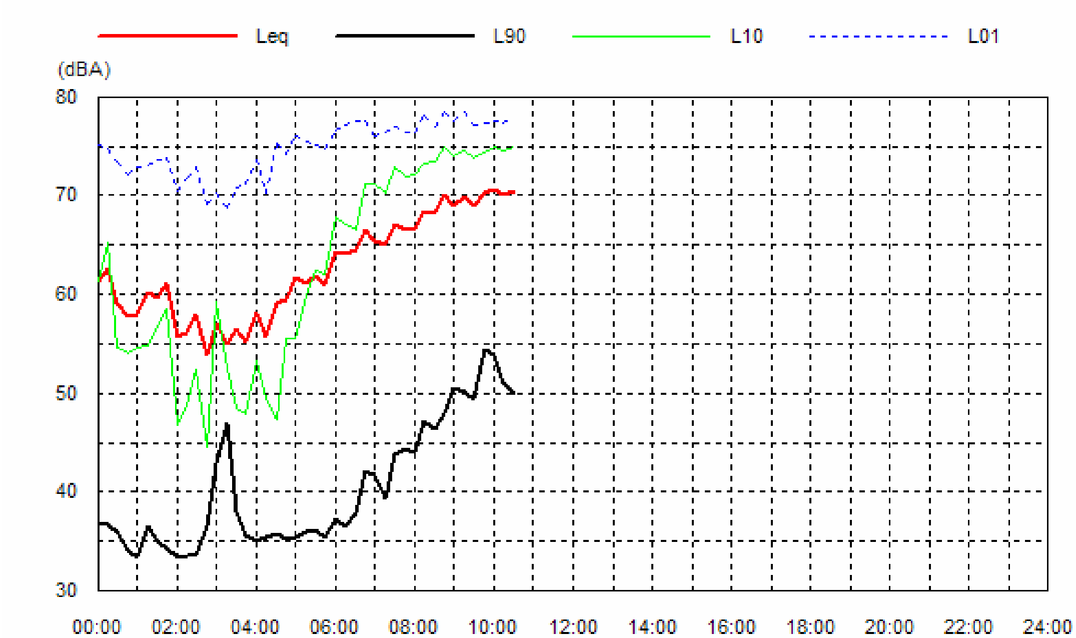


Fri 21 Mar 08



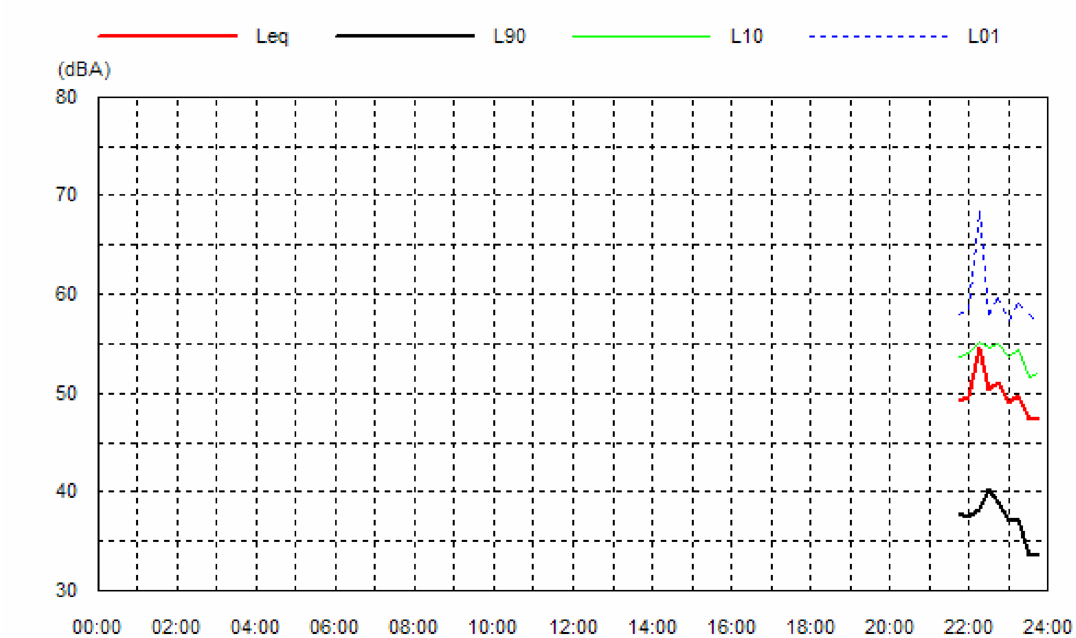
Location: 6. 77 Bellambi Lane
Data shaded: Battery Change; EN; Wind; Rain

Sat 22 Mar 08

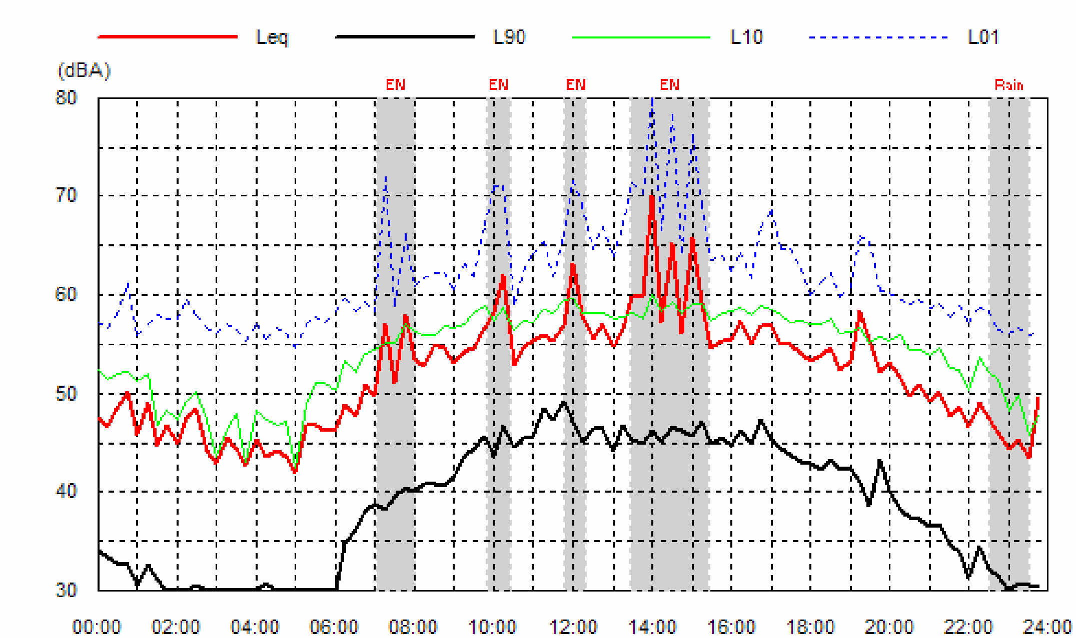


Location: 7. 91 Keerong Avenue
Data shaded: EN; Wind; Rain

Sat 08 Mar 08

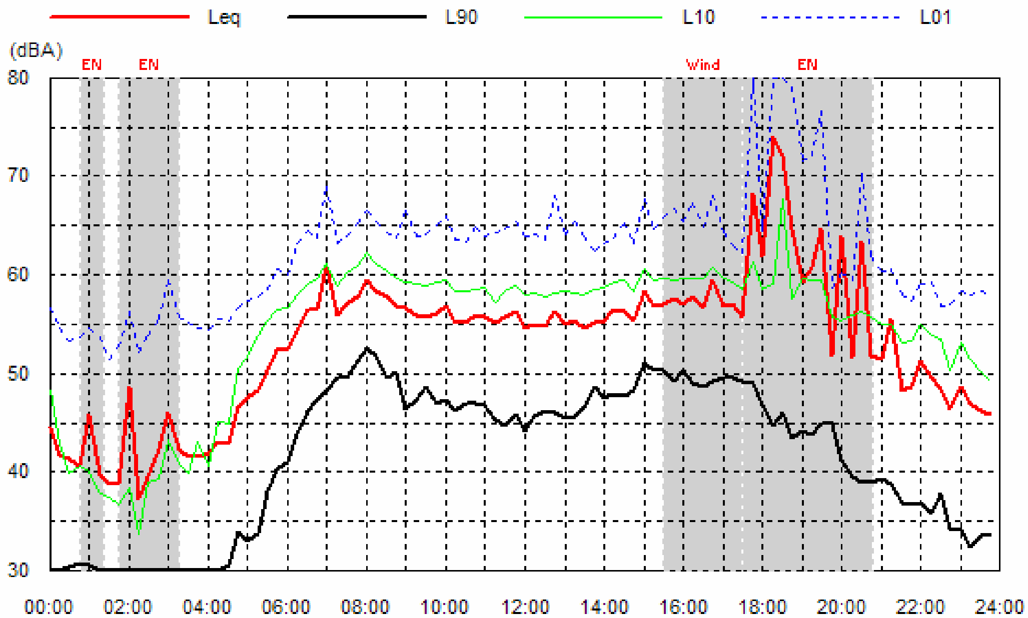


Sun 09 Mar 08

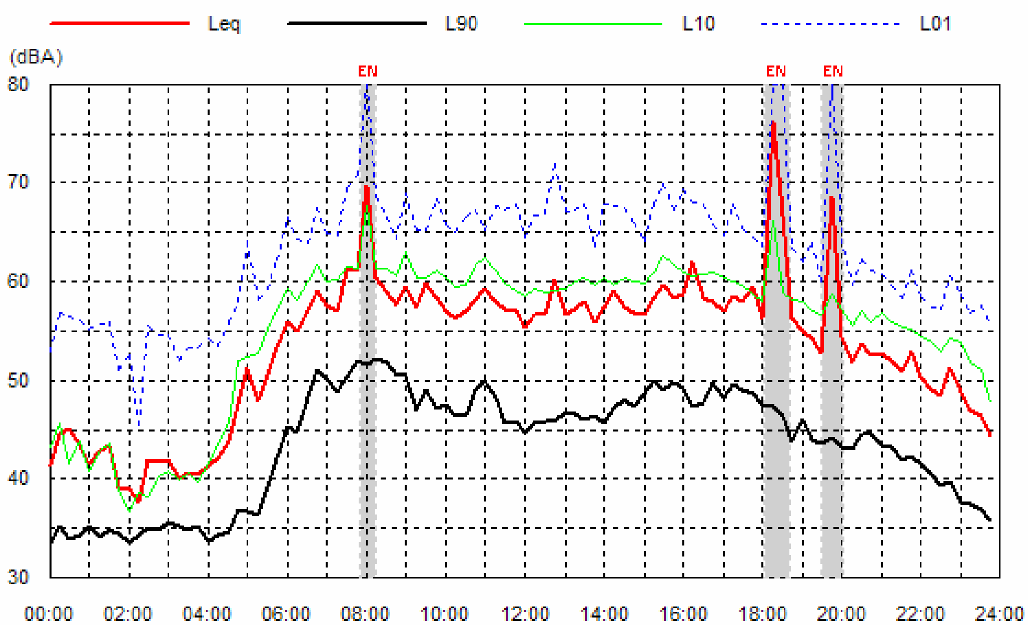


Location: 7. 91 Keerong Avenue
Data shaded: EN; Wind; Rain

Mon 10 Mar 08

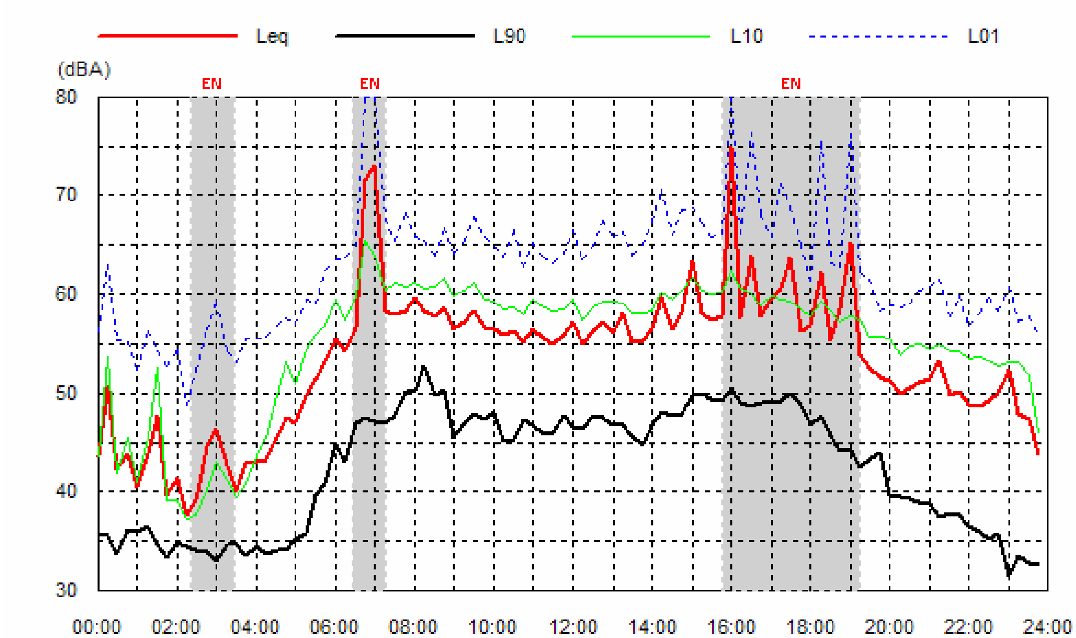


Tue 11 Mar 08

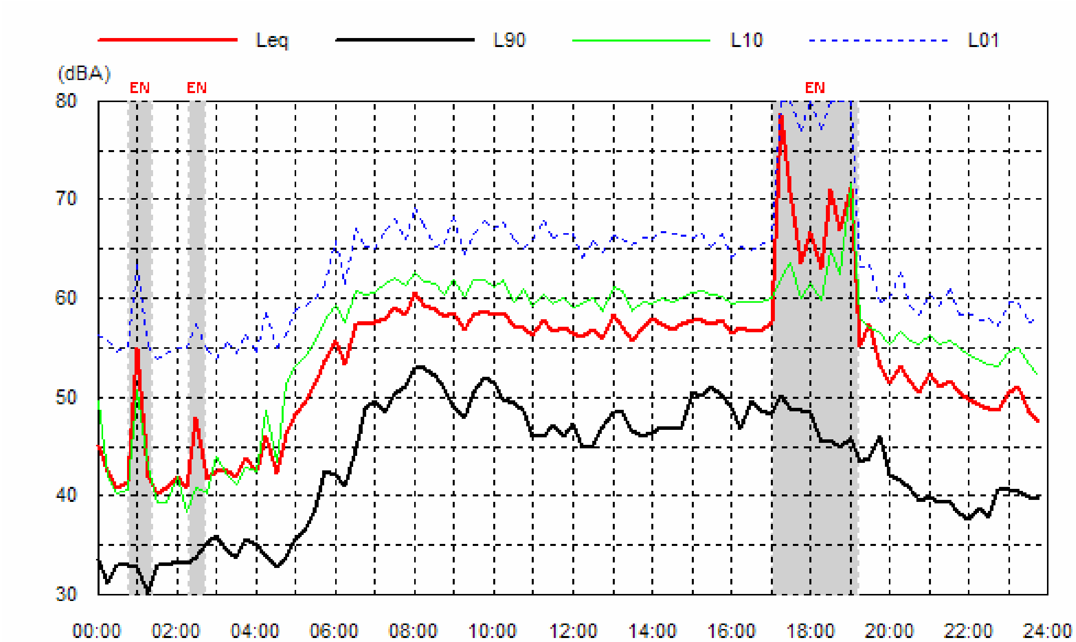


Location: 7. 91 Keerong Avenue
Data shaded: EN; Wind; Rain

Wed 12 Mar 08

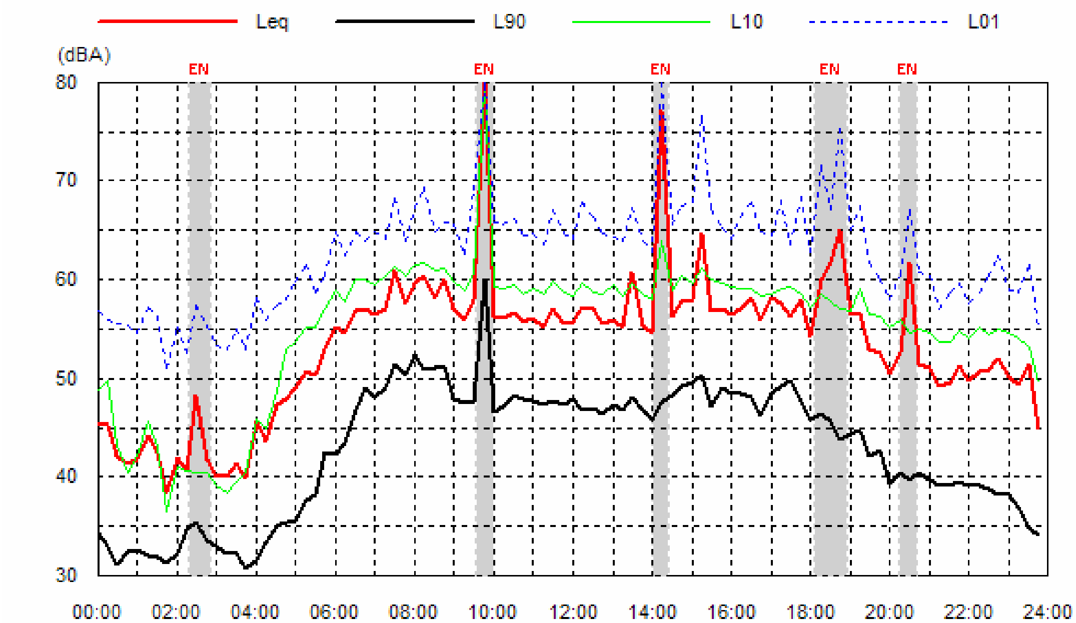


Thu 13 Mar 08

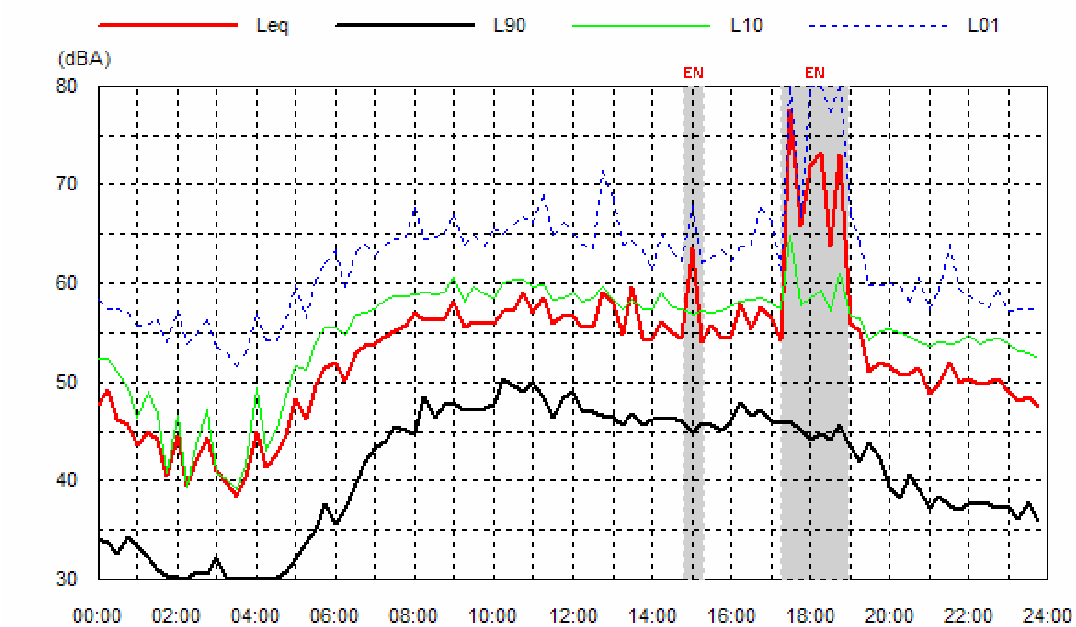


Location: 7. 91 Keerong Avenue
Data shaded: EN; Wind; Rain

Fri 14 Mar 08



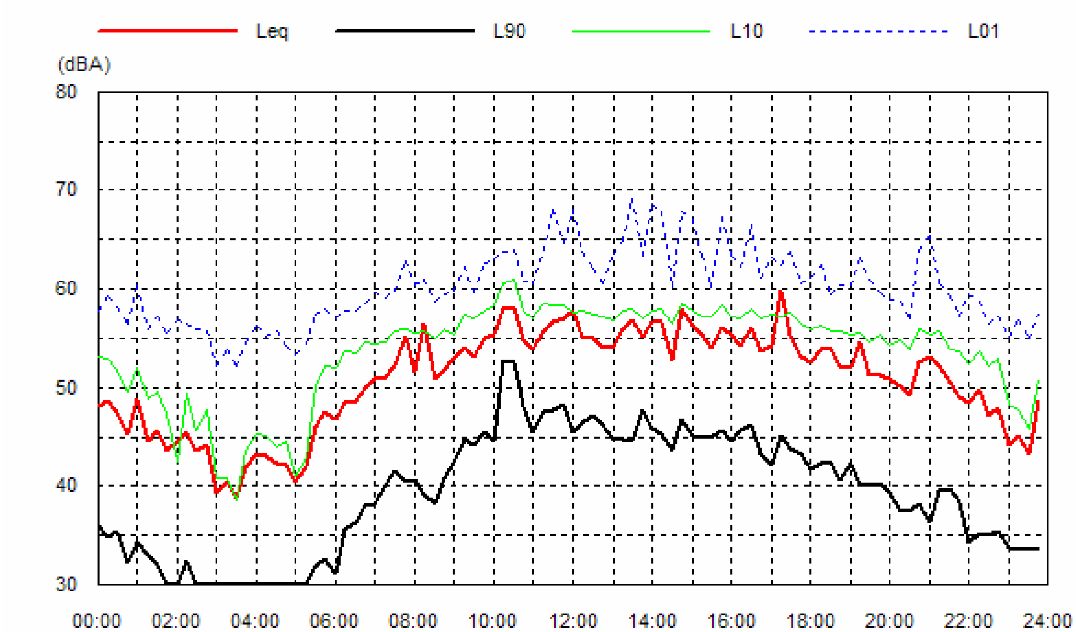
Sat 15 Mar 08



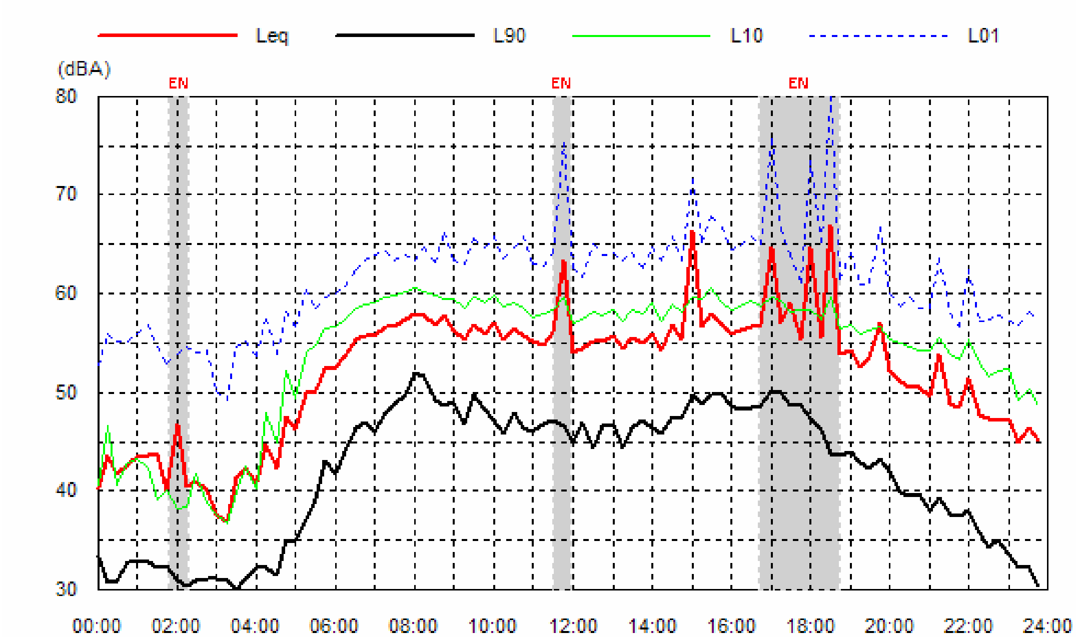
Location: 7. 91 Keerong Avenue

Data shaded: EN; Wind; Rain

Sun 16 Mar 08

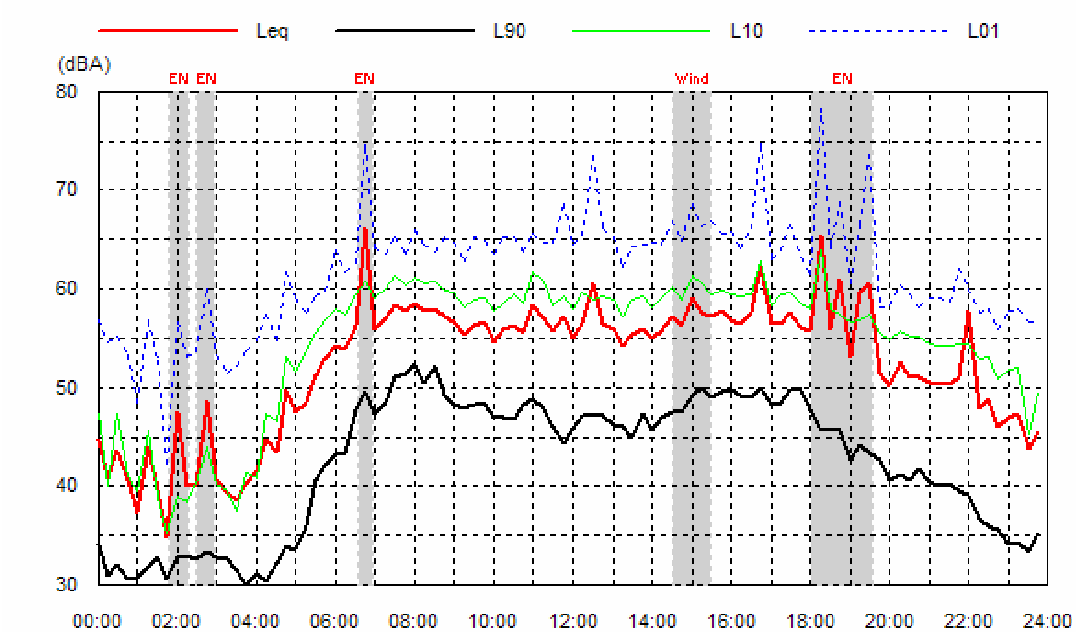


Mon 17 Mar 08

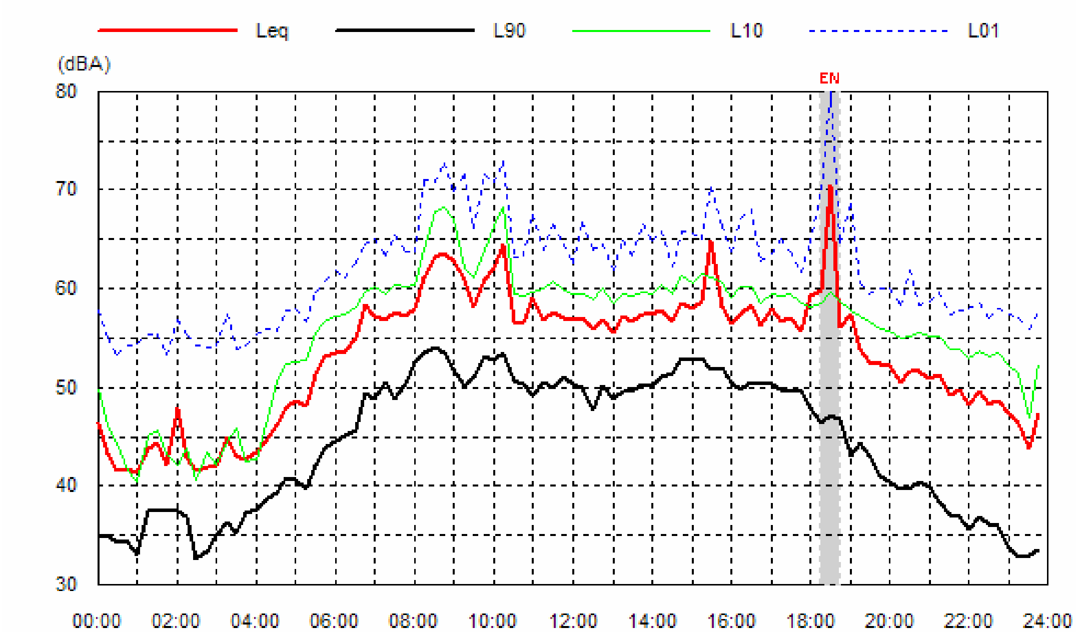


Location: 7. 91 Keerong Avenue
Data shaded: EN; Wind; Rain

Tue 18 Mar 08

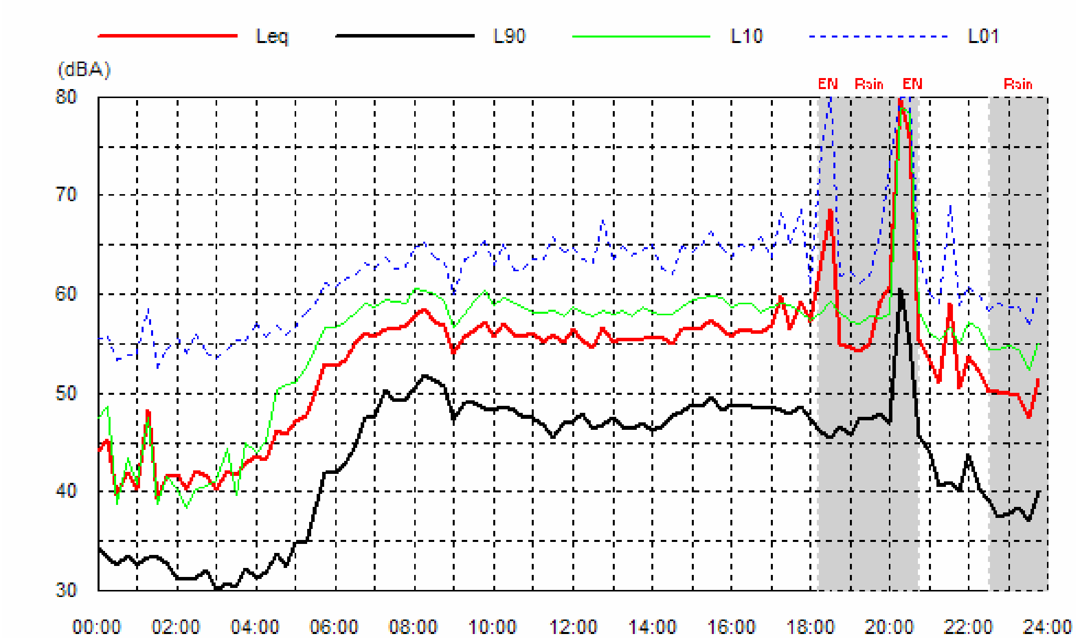


Wed 19 Mar 08

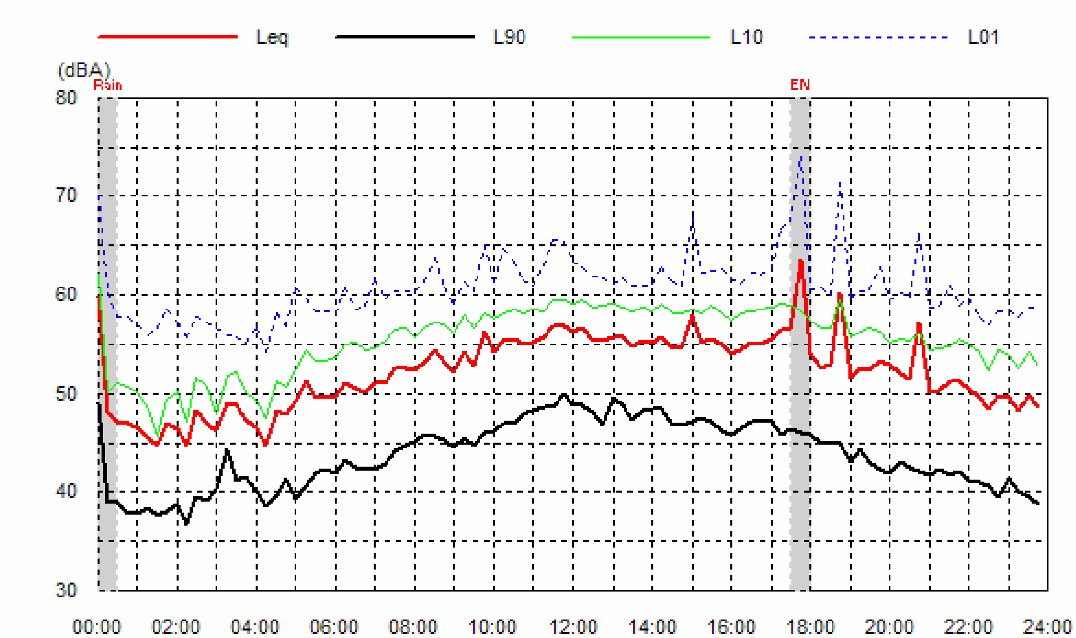


Location: 7. 91 Keerong Avenue
Data shaded: EN; Wind; Rain

Thu 20 Mar 08

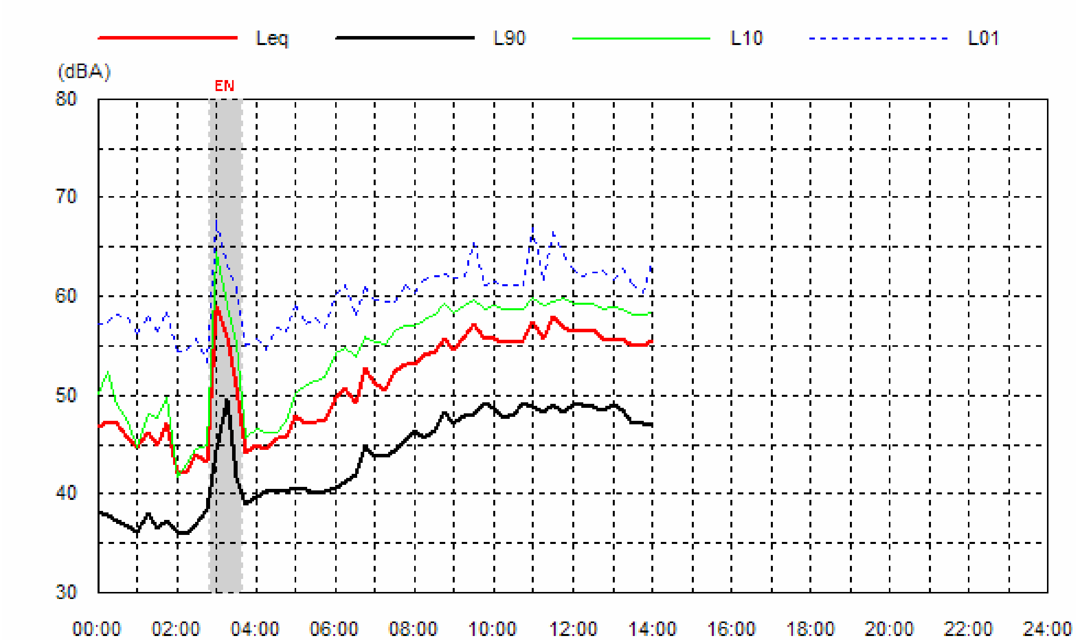


Fri 21 Mar 08



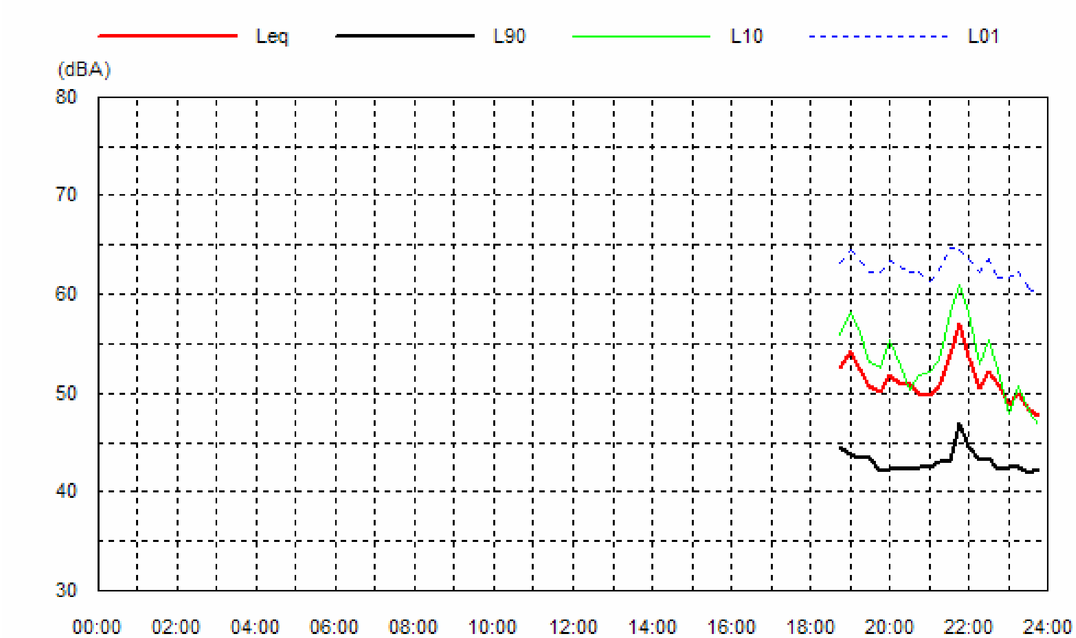
Location: 7. 91 Keerong Avenue
Data shaded: EN; Wind; Rain

Sat 22 Mar 08

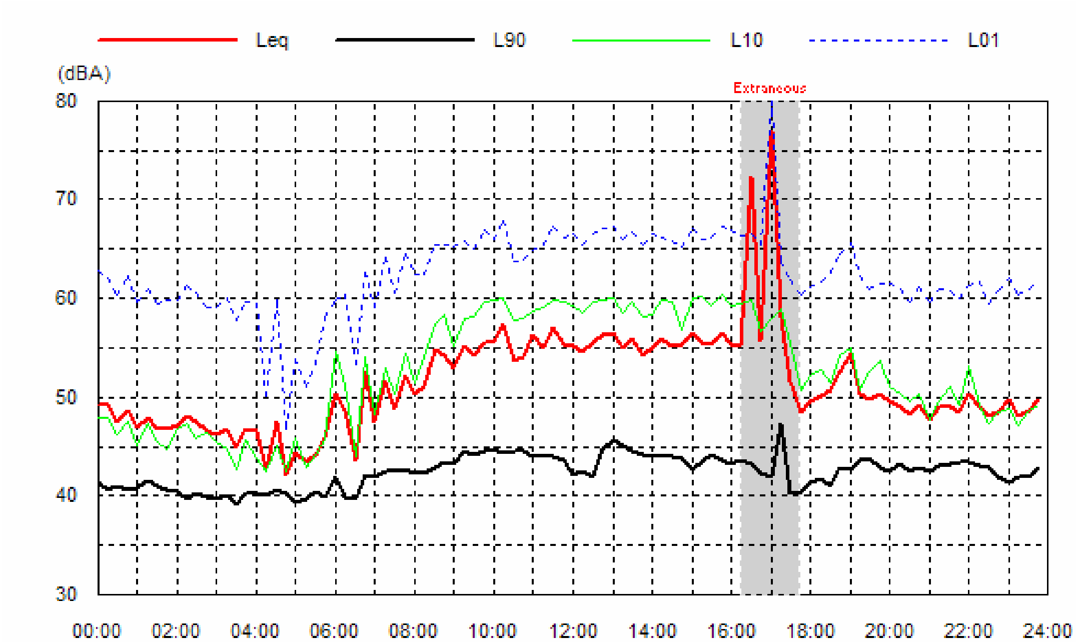


Location: Side Yard Kembla Street
Data shaded: Extraneous

Fri 02 May 08



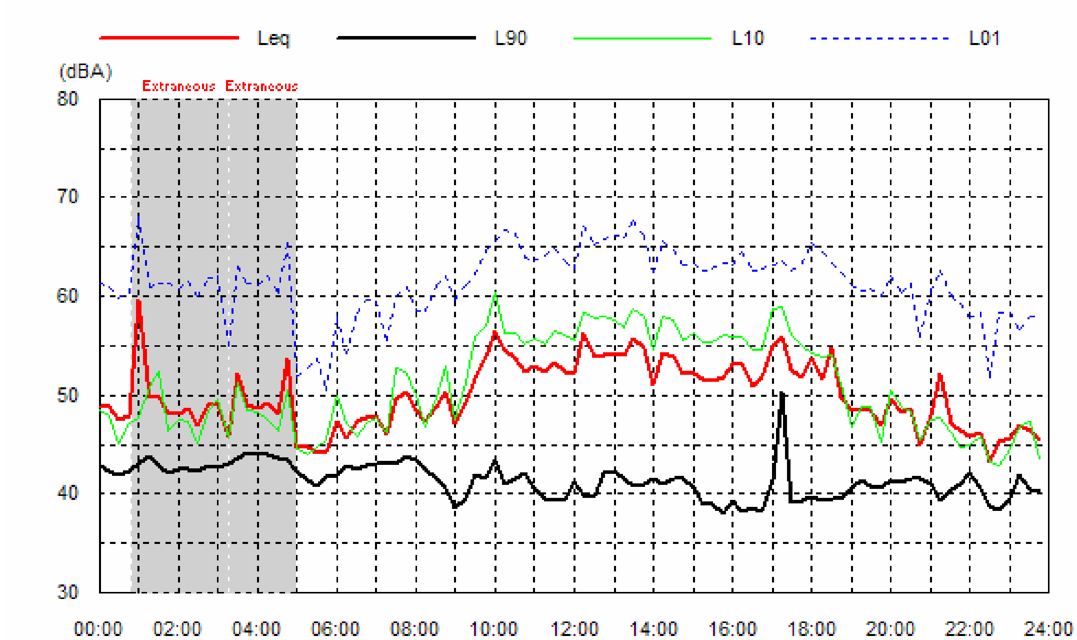
Sat 03 May 08



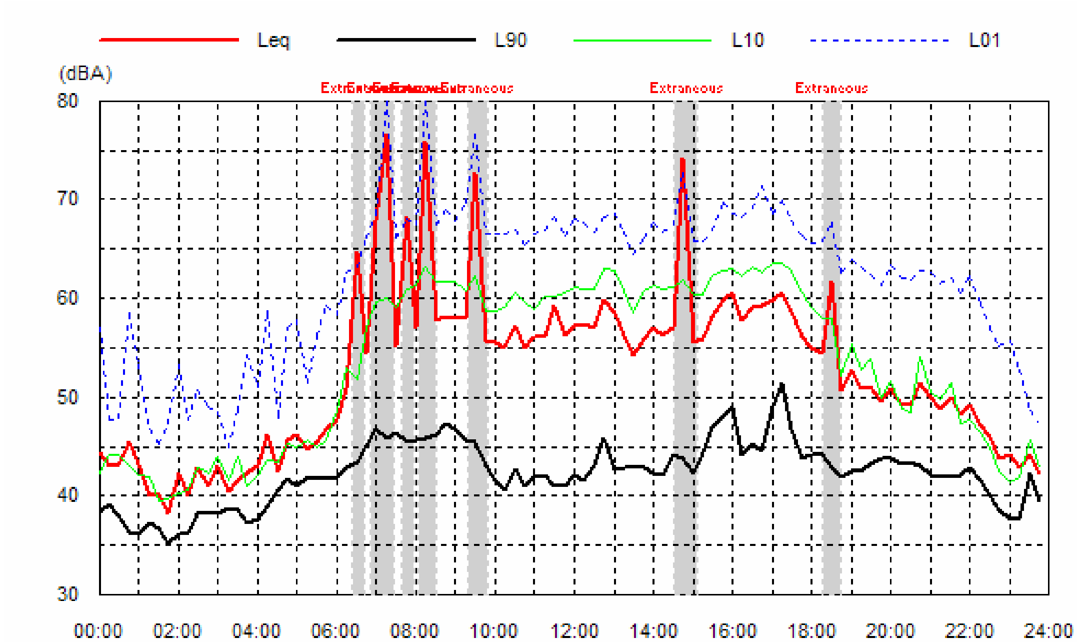
Location: Side Yard Kembla Street

Data shaded: Extraneous

Sun 04 May 08

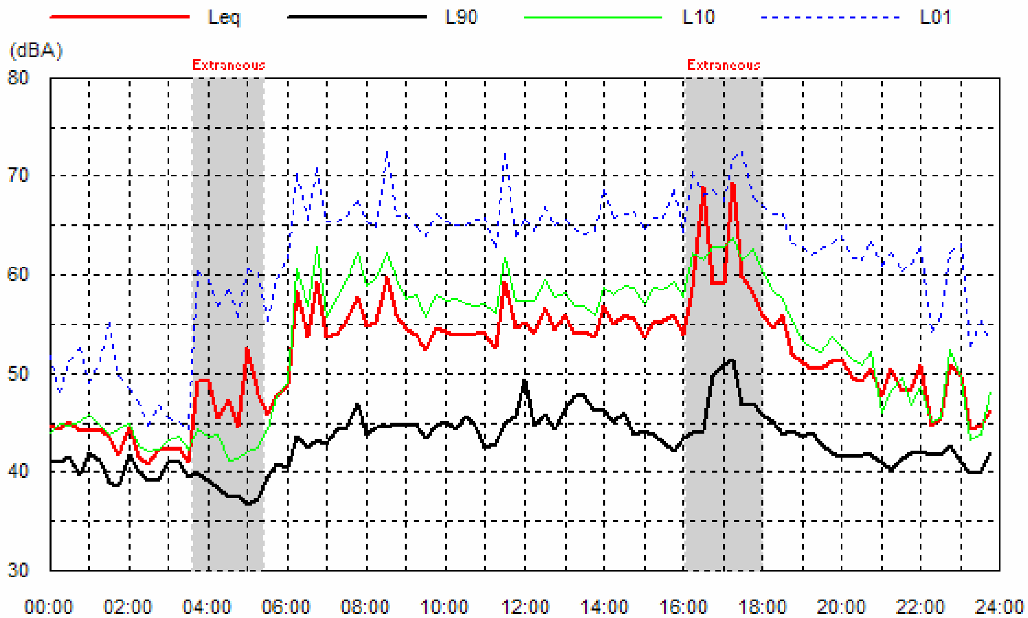


Mon 05 May 08

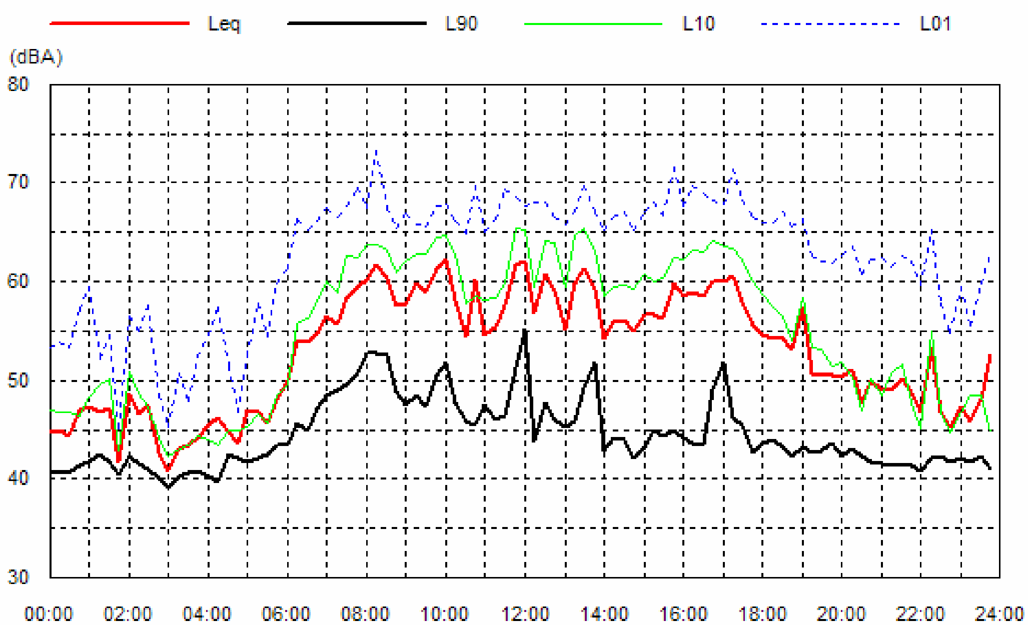


Location: Side Yard Kembla Street
Data shaded: Extraneous

Tue 06 May 08

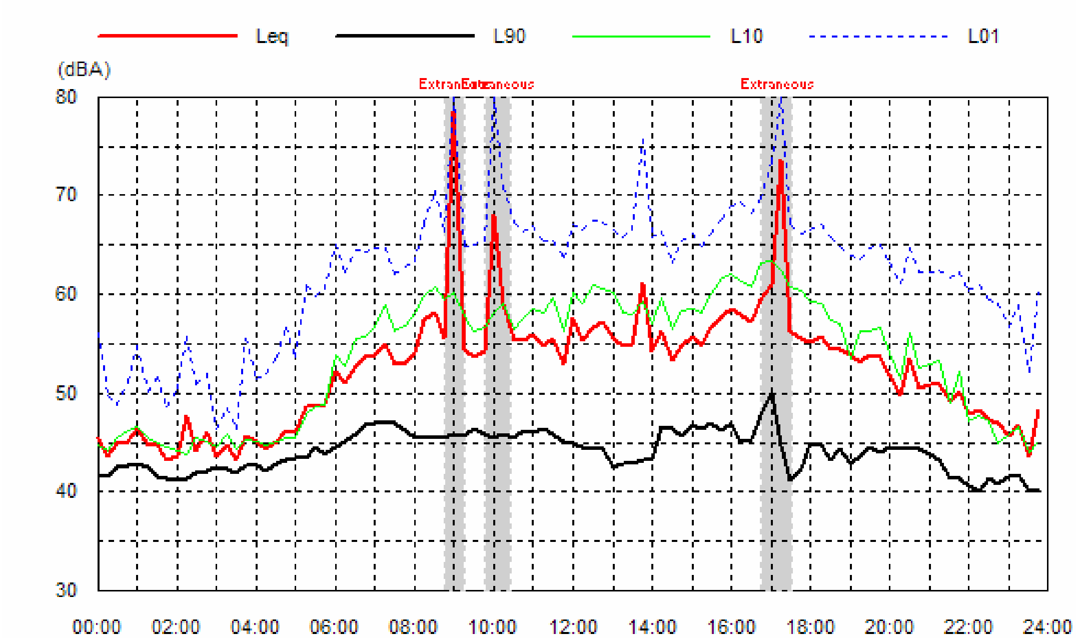


Wed 07 May 08

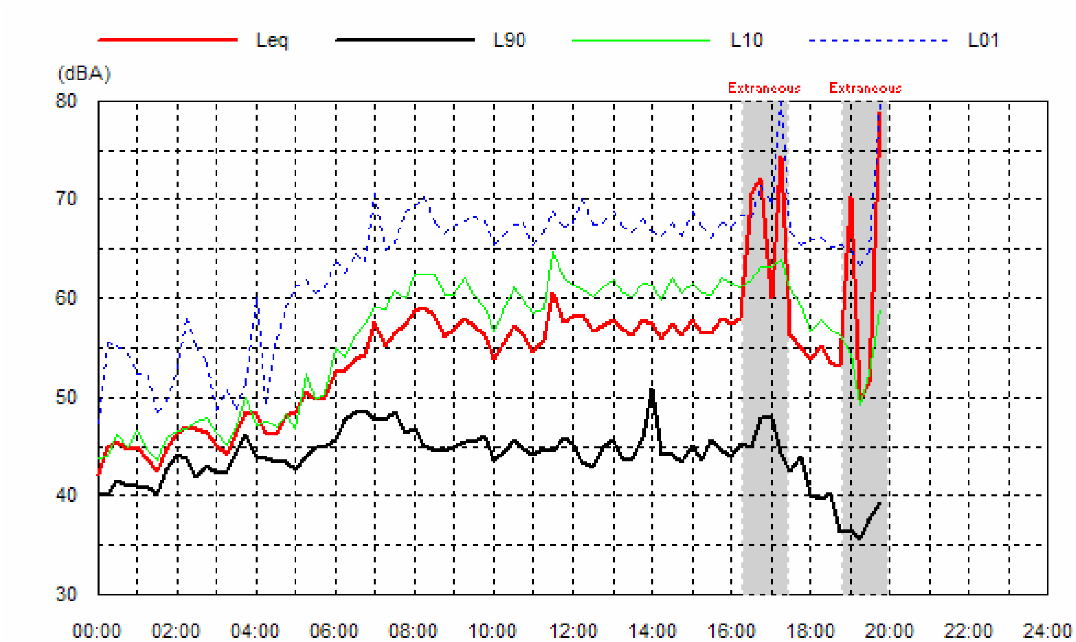


Location: Side Yard Kembla Street
Data shaded: Extraneous

Thu 08 May 08

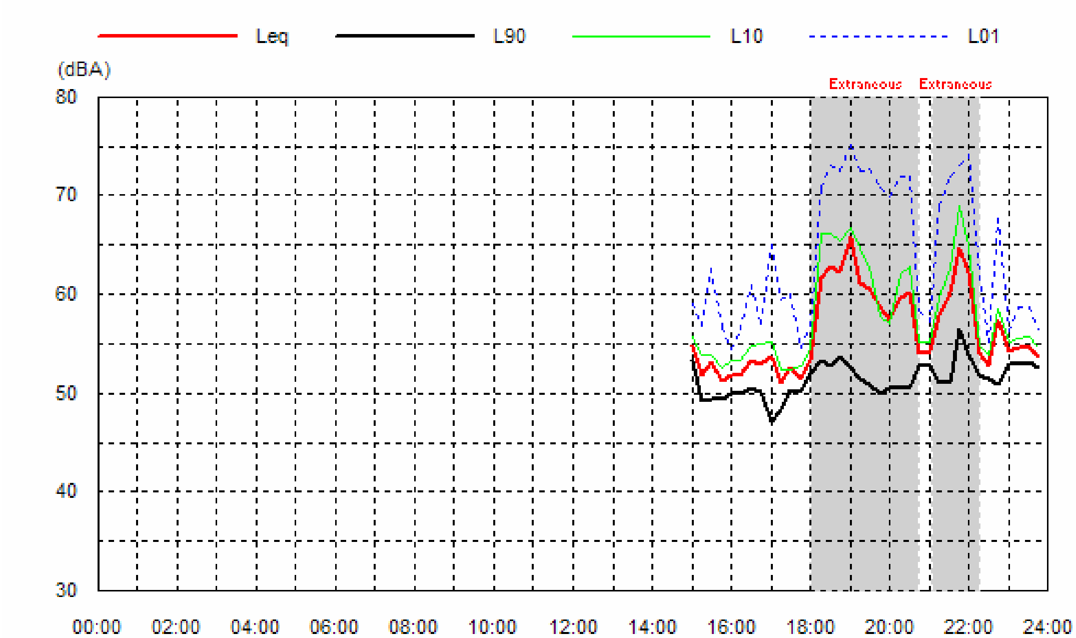


Fri 09 May 08

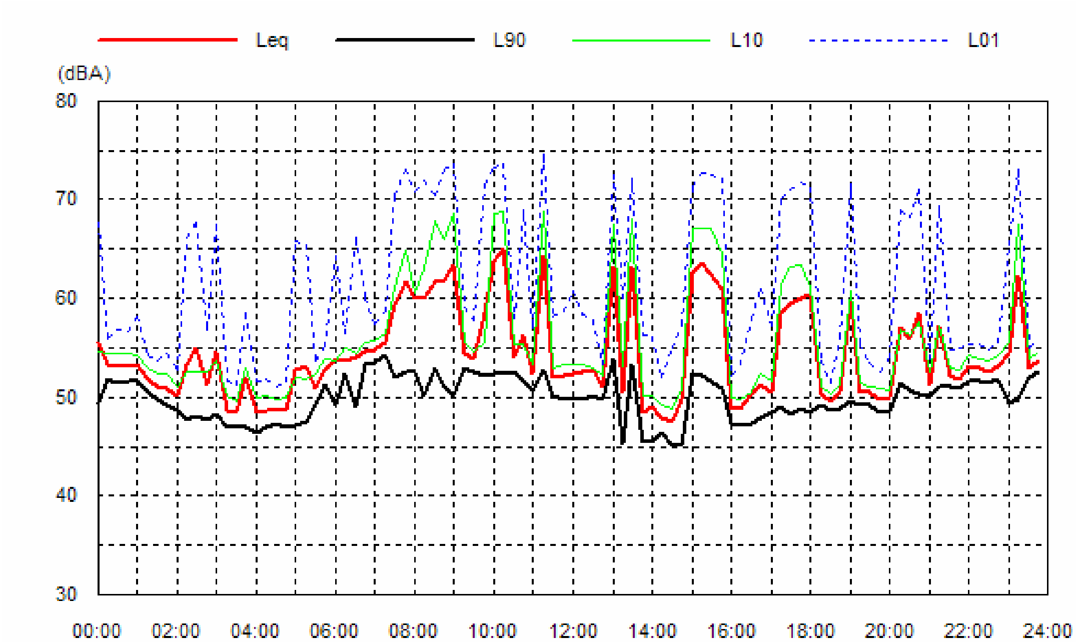


Location: Front Yard Swan Street
Data shaded: Extraneous

Fri 02 May 08



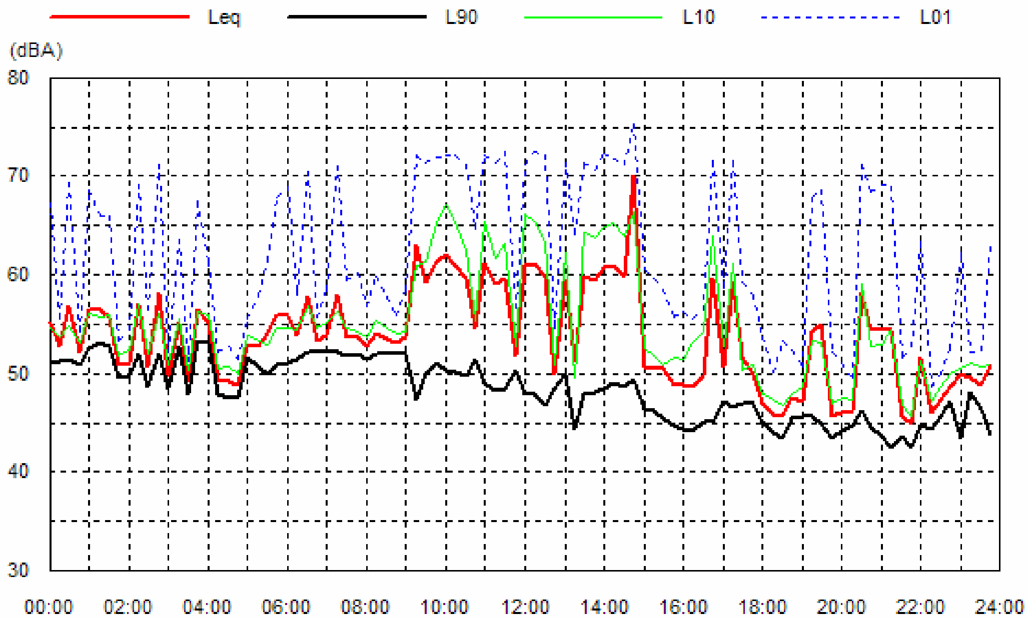
Sat 03 May 08



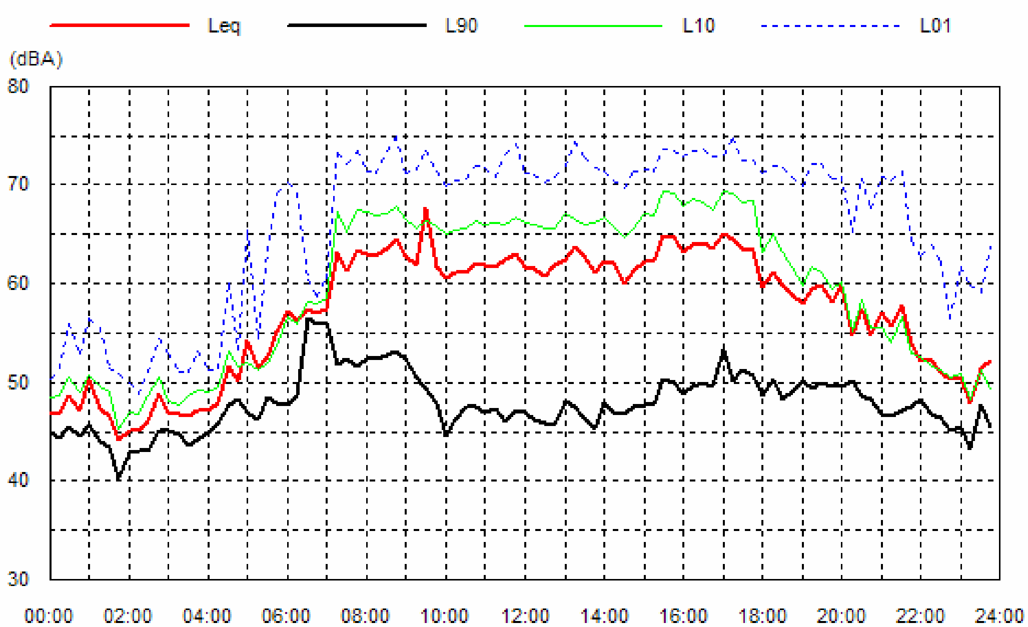
Location: Front Yard Swan Street

Data shaded: Extraneous

Sun 04 May 08

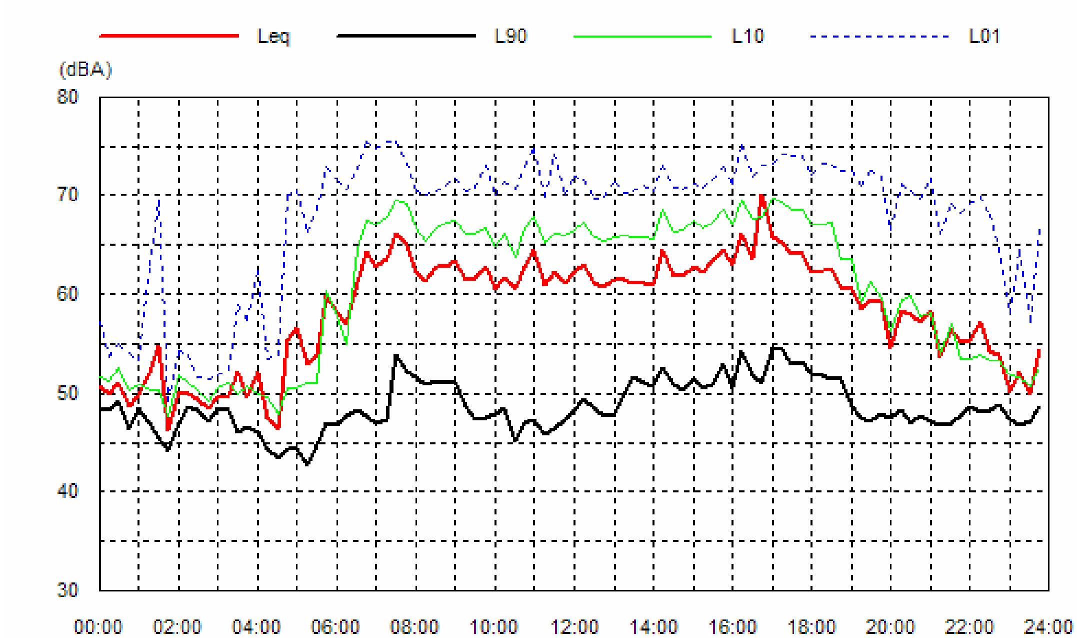


Mon 05 May 08

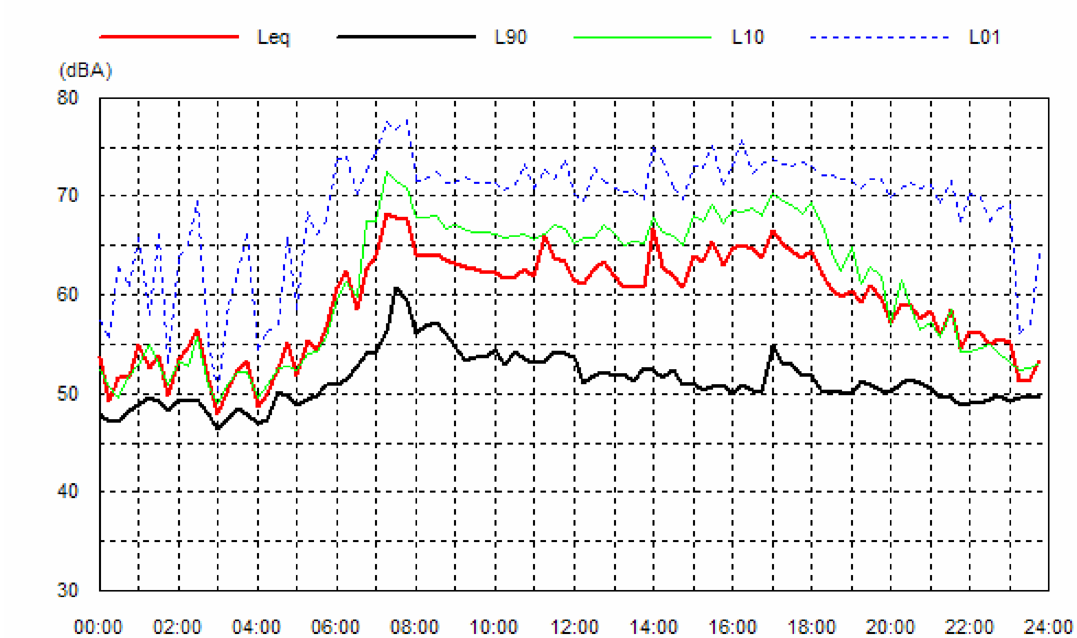


Location: Front Yard Swan Street
Data shaded: Extraneous

Tue 06 May 08

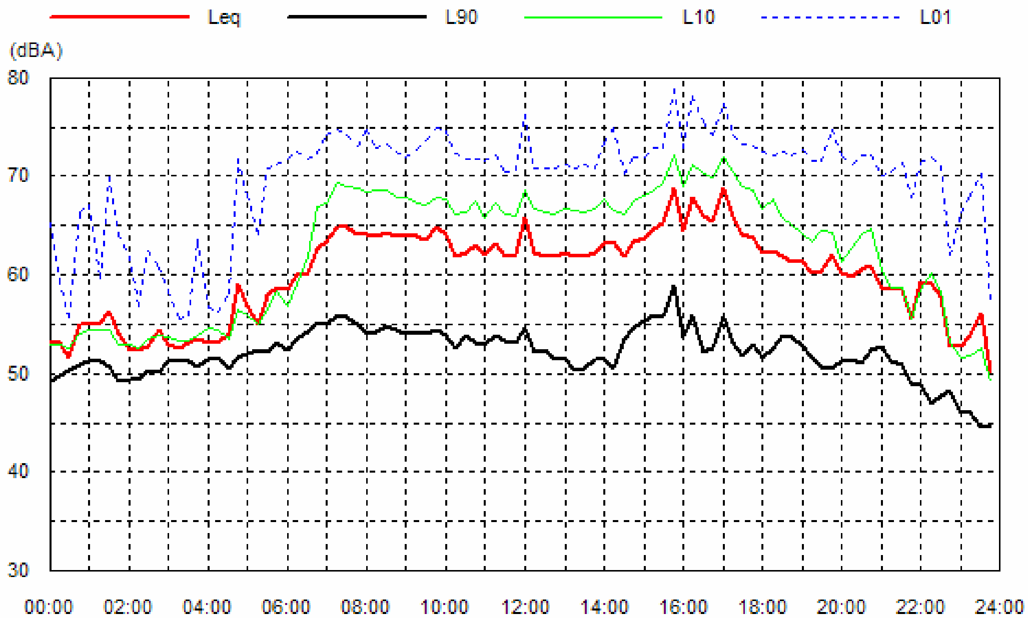


Wed 07 May 08

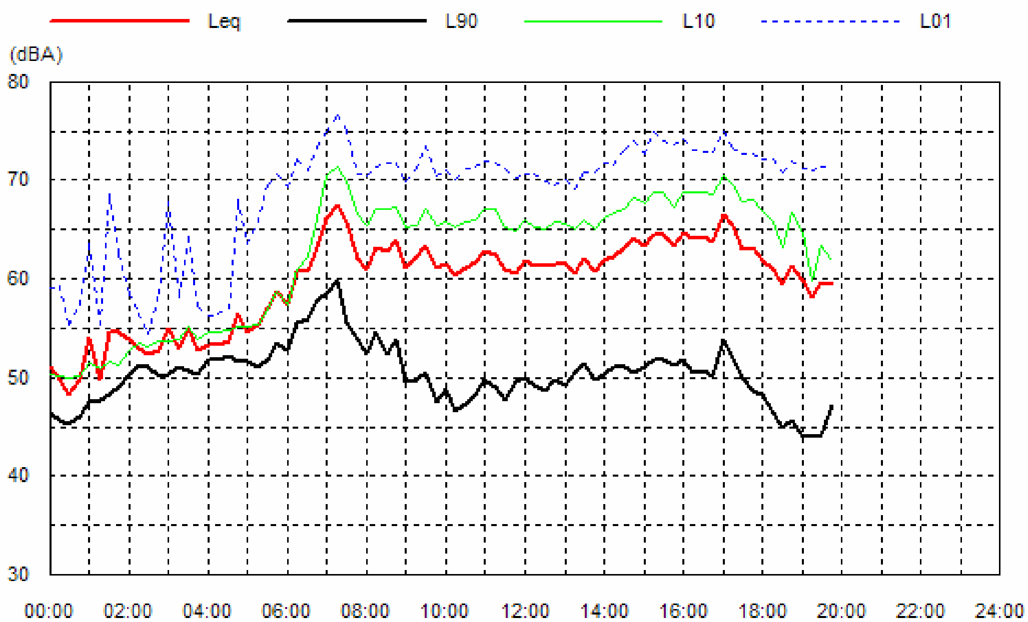


Location: Front Yard Swan Street
Data shaded: Extraneous

Thu 08 May 08



Fri 09 May 08



APPENDIX C

METEOROLOGICAL DATA USED FOR NOISE MODELLING

Day Meteorological Conditions used for ENM					
Met No	Temp	Rel Hum	Wind Speed	Wind Dir	Inv Strength
1	18.9	63.7	0	0	0
2	18.9	63.7	0.75	0	0
3	18.9	63.7	0.75	45	0
4	18.9	63.7	0.75	90	0
5	18.9	63.7	0.75	135	0
6	18.9	63.7	0.75	180	0
7	18.9	63.7	0.75	225	0
8	18.9	63.7	0.75	270	0
9	18.9	63.7	0.75	315	0
10	18.9	63.7	1.25	0	0
11	18.9	63.7	1.25	45	0
12	18.9	63.7	1.25	90	0
13	18.9	63.7	1.25	135	0
14	18.9	63.7	1.25	180	0
15	18.9	63.7	1.25	225	0
16	18.9	63.7	1.25	270	0
17	18.9	63.7	1.25	315	0
18	18.9	63.7	1.75	0	0
19	18.9	63.7	1.75	45	0
20	18.9	63.7	1.75	90	0
21	18.9	63.7	1.75	135	0
22	18.9	63.7	1.75	180	0
23	18.9	63.7	1.75	225	0
24	18.9	63.7	1.75	270	0
25	18.9	63.7	1.75	315	0
26	18.9	63.7	2.25	0	0
27	18.9	63.7	2.25	45	0
28	18.9	63.7	2.25	90	0
29	18.9	63.7	2.25	135	0
30	18.9	63.7	2.25	180	0
31	18.9	63.7	2.25	225	0
32	18.9	63.7	2.25	270	0
33	18.9	63.7	2.25	315	0
34	18.9	63.7	2.75	0	0
35	18.9	63.7	2.75	45	0
36	18.9	63.7	2.75	90	0
37	18.9	63.7	2.75	135	0
38	18.9	63.7	2.75	180	0
39	18.9	63.7	2.75	225	0
40	18.9	63.7	2.75	270	0
41	18.9	63.7	2.75	315	0
42	18.9	63.7	0	0	3
43	18.9	63.7	0.75	270	3
44	18.9	63.7	0.75	315	3
45	18.9	63.7	1.25	315	3
46	18.9	63.7	1.75	180	3
47	18.9	63.7	0.75	0	3
48	18.9	63.7	0.75	135	3
49	18.9	63.7	1.25	90	3
50	18.9	63.7	1.25	135	3
51	18.9	63.7	1.25	225	3
52	18.9	63.7	1.25	270	3
53	18.9	63.7	1.75	225	3
54	18.9	63.7	1.75	270	3
55	18.9	63.7	1.75	315	3

Evening Meteorological Conditions used for ENM					
Met No	**Temp**	**Rel Hum**	**Wind Speed**	**Wind Dir**	**Inv Strength**
1	18	74.6	0	0	0
2	18	74.6	1.25	180	0
3	18	74.6	1.75	0	0
4	18	74.6	1.75	90	0
5	18	74.6	1.75	135	0
6	18	74.6	1.75	180	0
7	18	74.6	1.75	225	0
8	18	74.6	1.75	270	0
9	18	74.6	1.75	315	0
10	18	74.6	2.25	0	0
11	18	74.6	2.25	45	0
12	18	74.6	2.25	90	0
13	18	74.6	2.25	135	0
14	18	74.6	2.25	180	0
15	18	74.6	2.25	225	0
16	18	74.6	2.25	270	0
17	18	74.6	2.25	315	0
18	18	74.6	2.75	0	0
19	18	74.6	2.75	45	0
20	18	74.6	2.75	90	0
21	18	74.6	2.75	135	0
22	18	74.6	2.75	180	0
23	18	74.6	2.75	225	0
24	18	74.6	2.75	270	0
25	18	74.6	2.75	315	0
26	18	74.6	0	0	3
27	18	74.6	0.75	0	3
28	18	74.6	0.75	90	3
29	18	74.6	0.75	135	3
30	18	74.6	0.75	180	3
31	18	74.6	0.75	225	3
32	18	74.6	0.75	270	3
33	18	74.6	0.75	315	3
34	18	74.6	1.25	0	3
35	18	74.6	1.25	45	3
36	18	74.6	1.25	90	3
37	18	74.6	1.25	135	3
38	18	74.6	1.25	180	3
39	18	74.6	1.25	225	3
40	18	74.6	1.25	270	3
41	18	74.6	1.25	315	3
42	18	74.6	1.75	0	3
43	18	74.6	1.75	45	3
44	18	74.6	1.75	90	3
45	18	74.6	1.75	180	3
46	18	74.6	1.75	225	3
47	18	74.6	1.75	270	3
48	18	74.6	1.75	315	3
49	18	74.6	0.75	90	0
50	18	74.6	0.75	225	0
51	18	74.6	1.25	0	0
52	18	74.6	1.25	135	0
53	18	74.6	1.75	45	0
54	18	74.6	0.75	45	3
55	18	74.6	1.75	135	3
56	18	74.6	0.75	0	0

Evening Meteorological Conditions used for ENM					
Met No	**Temp**	**Rel Hum**	**Wind Speed**	**Wind Dir**	**Inv Strength**
57	18	74.6	1.25	90	0
58	18	74.6	1.25	270	0
59	18	74.6	1.25	225	0
60	18	74.6	1.25	315	0

Night Meteorological Conditions used for ENM					
Met No	Temp	Rel Hum	Wind Speed	Wind Dir	Inv Strength
1	17.2	78.5	0	0	0
2	17.2	78.5	0.75	180	0
3	17.2	78.5	0.75	225	0
4	17.2	78.5	0.75	270	0
5	17.2	78.5	0.75	315	0
6	17.2	78.5	1.25	0	0
7	17.2	78.5	1.25	45	0
8	17.2	78.5	1.25	135	0
9	17.2	78.5	1.25	180	0
10	17.2	78.5	1.25	225	0
11	17.2	78.5	1.25	270	0
12	17.2	78.5	1.25	315	0
13	17.2	78.5	1.75	0	0
14	17.2	78.5	1.75	45	0
15	17.2	78.5	1.75	180	0
16	17.2	78.5	1.75	225	0
17	17.2	78.5	1.75	270	0
18	17.2	78.5	1.75	315	0
19	17.2	78.5	2.25	0	0
20	17.2	78.5	2.25	45	0
21	17.2	78.5	2.25	90	0
22	17.2	78.5	2.25	135	0
23	17.2	78.5	2.25	180	0
24	17.2	78.5	2.25	225	0
25	17.2	78.5	2.25	270	0
26	17.2	78.5	2.25	315	0
27	17.2	78.5	2.75	0	0
28	17.2	78.5	2.75	90	0
29	17.2	78.5	2.75	135	0
30	17.2	78.5	2.75	180	0
31	17.2	78.5	2.75	225	0
32	17.2	78.5	2.75	270	0
33	17.2	78.5	2.75	315	0
34	17.2	78.5	0	0	3
35	17.2	78.5	0.75	0	3
36	17.2	78.5	0.75	45	3
37	17.2	78.5	0.75	90	3
38	17.2	78.5	0.75	135	3
39	17.2	78.5	0.75	180	3
40	17.2	78.5	0.75	225	3
41	17.2	78.5	0.75	270	3
42	17.2	78.5	0.75	315	3
43	17.2	78.5	1.25	0	3
44	17.2	78.5	1.25	45	3
45	17.2	78.5	1.25	90	3
46	17.2	78.5	1.25	135	3

Night Meteorological Conditions used for ENM					
Met No	Temp	Rel Hum	Wind Speed	Wind Dir	Inv Strength
47	17.2	78.5	1.25	180	3
48	17.2	78.5	1.25	225	3
49	17.2	78.5	1.25	270	3
50	17.2	78.5	1.25	315	3
51	17.2	78.5	1.75	0	3
52	17.2	78.5	1.75	90	3
53	17.2	78.5	1.75	135	3
54	17.2	78.5	1.75	180	3
55	17.2	78.5	1.75	225	3
56	17.2	78.5	1.75	270	3
57	17.2	78.5	1.75	315	3
58	17.2	78.5	0.75	0	0
59	17.2	78.5	0.75	135	0
60	17.2	78.5	1.75	90	0
61	17.2	78.5	1.75	135	0
62	17.2	78.5	0.75	45	0
63	17.2	78.5	0.75	90	0
64	17.2	78.5	1.25	90	0
65	17.2	78.5	2.75	45	0
66	17.2	78.5	1.75	45	3

Season	Wind Dir	Wind Speed	Inv Strength	Weighting (%)
		Day Meteorological Probabilities used for ENM		
Autumn	0	0	0	16.22
	0	0.75	0	0.14
	45	0.75	0	0.14
	90	0.75	0	0.11
	135	0.75	0	0.11
	180	0.75	0	0.11
	225	0.75	0	0.26
	270	0.75	0	0.26
	315	0.75	0	0.09
	0	1.25	0	0.17
	45	1.25	0	0.09
	90	1.25	0	0.06
	135	1.25	0	0.17
	180	1.25	0	0.11
	225	1.25	0	0.57
	270	1.25	0	0.20
	315	1.25	0	0.20
	0	1.75	0	0.31
	45	1.75	0	0.17
	90	1.75	0	0.23
	135	1.75	0	0.26
	180	1.75	0	0.34
	225	1.75	0	0.77
	270	1.75	0	0.14
	315	1.75	0	0.43
	0	2.25	0	0.26
	45	2.25	0	0.26
	90	2.25	0	0.31
	135	2.25	0	0.37
	180	2.25	0	0.29
	225	2.25	0	0.71
	270	2.25	0	0.17
	315	2.25	0	0.23
	0	2.75	0	0.14
	45	2.75	0	0.37
	90	2.75	0	0.51
	135	2.75	0	0.40
	180	2.75	0	0.43
	225	2.75	0	0.46
	270	2.75	0	0.37
	315	2.75	0	0.20
	0	0	3	0.03
	270	0.75	3	0.03
	315	0.75	3	0.03
	315	1.25	3	0.03
	180	1.75	3	0.03
Spring	0	0	0	10.32
	0	0.75	0	0.17
	45	0.75	0	0.06
	90	0.75	0	0.06
	135	0.75	0	0.06
	180	0.75	0	0.06

Season	Wind Dir	Wind Speed	Inv Strength	Weighting (%)
		Day Meteorological Probabilities used for ENM		
	225	0.75	0	0.09
	270	0.75	0	0.11
	315	0.75	0	0.11
	0	1.25	0	0.14
	45	1.25	0	0.14
	90	1.25	0	0.03
	135	1.25	0	0.11
	180	1.25	0	0.17
	225	1.25	0	0.20
	270	1.25	0	0.23
	315	1.25	0	0.20
	0	1.75	0	0.09
	45	1.75	0	0.06
	90	1.75	0	0.14
	135	1.75	0	0.17
	180	1.75	0	0.17
	225	1.75	0	0.31
	270	1.75	0	0.11
	315	1.75	0	0.20
	0	2.25	0	0.14
	45	2.25	0	0.09
	90	2.25	0	0.23
	135	2.25	0	0.26
	180	2.25	0	0.34
	225	2.25	0	0.17
	270	2.25	0	0.29
	315	2.25	0	0.06
	0	2.75	0	0.09
	45	2.75	0	0.23
	90	2.75	0	0.20
	135	2.75	0	0.43
	180	2.75	0	0.29
	225	2.75	0	0.03
	270	2.75	0	0.11
	315	2.75	0	0.06
Summer	0	0	0	20.67
	0	0.75	0	0.06
	45	0.75	0	0.14
	90	0.75	0	0.14
	135	0.75	0	0.03
	180	0.75	0	0.23
	225	0.75	0	0.20
	270	0.75	0	0.11
	315	0.75	0	0.06
	0	1.25	0	0.09
	45	1.25	0	0.17
	90	1.25	0	0.11
	135	1.25	0	0.14
	180	1.25	0	0.20
	225	1.25	0	0.17
	270	1.25	0	0.09
	315	1.25	0	0.09
	0	1.75	0	0.03

Day Meteorological Probabilities used for ENM				
Season	Wind Dir	Wind Speed	Inv Strength	Weighting (%)
	45	1.75	0	0.06
	90	1.75	0	0.23
	135	1.75	0	0.17
	180	1.75	0	0.23
	225	1.75	0	0.31
	315	1.75	0	0.14
	0	2.25	0	0.29
	45	2.25	0	0.34
	90	2.25	0	0.37
	135	2.25	0	0.31
	180	2.25	0	0.43
	225	2.25	0	0.11
	270	2.25	0	0.11
	315	2.25	0	0.06
	0	2.75	0	0.06
	45	2.75	0	0.26
	90	2.75	0	0.40
	135	2.75	0	0.48
	180	2.75	0	0.14
	225	2.75	0	0.09
	270	2.75	0	0.09
	315	2.75	0	0.06
Winter	0	0	0	15.14
	0	0.75	0	0.11
	45	0.75	0	0.11
	90	0.75	0	0.09
	135	0.75	0	0.14
	180	0.75	0	0.11
	225	0.75	0	0.34
	270	0.75	0	0.43
	315	0.75	0	0.14
	0	1.25	0	0.20
	45	1.25	0	0.23
	90	1.25	0	0.14
	135	1.25	0	0.09
	180	1.25	0	0.17
	225	1.25	0	0.37
	270	1.25	0	0.48
	315	1.25	0	0.54
	0	1.75	0	0.14
	45	1.75	0	0.14
	90	1.75	0	0.11
	135	1.75	0	0.29
	180	1.75	0	0.37
	225	1.75	0	0.46
	270	1.75	0	0.57
	315	1.75	0	0.34
	0	2.25	0	0.20
	45	2.25	0	0.23
	90	2.25	0	0.11
	135	2.25	0	0.31
	180	2.25	0	0.34
	225	2.25	0	0.74

Season	Day Meteorological Probabilities used for ENM Wind Dir	Wind Speed	Inv Strength	Weighting (%)
	270	2.25	0	0.71
	315	2.25	0	0.74
	0	2.75	0	0.23
	45	2.75	0	0.17
	90	2.75	0	0.23
	135	2.75	0	0.63
	180	2.75	0	0.34
	225	2.75	0	0.83
	270	2.75	0	0.63
	315	2.75	0	0.63
	0	0	3	0.03
	0	0.75	3	0.06
	135	0.75	3	0.03
	90	1.25	3	0.03
	135	1.25	3	0.03
	225	1.25	3	0.03
	270	1.25	3	0.03
	315	1.25	3	0.03
	225	1.75	3	0.03
	270	1.75	3	0.06
	315	1.75	3	0.09

Evening Meteorological Probabilities used for ENM				
Season	Wind Dir	Wind Speed	Inv Strength	Weighting (%)
Autumn	0	0	0	9.15
	180	1.25	0	0.16
	0	1.75	0	0.39
	90	1.75	0	0.31
	135	1.75	0	0.08
	180	1.75	0	0.08
	225	1.75	0	0.94
	270	1.75	0	0.08
	315	1.75	0	0.23
	0	2.25	0	0.39
	45	2.25	0	0.39
	90	2.25	0	0.55
	135	2.25	0	0.08
	180	2.25	0	0.23
	225	2.25	0	0.63
	270	2.25	0	0.23
	315	2.25	0	0.47
	0	2.75	0	0.31
	45	2.75	0	0.23
	90	2.75	0	0.55
	135	2.75	0	0.70
	180	2.75	0	0.31
	225	2.75	0	0.94
	270	2.75	0	0.78
	315	2.75	0	0.31
	0	0	3	1.25
	0	0.75	3	0.39
	90	0.75	3	0.16
	135	0.75	3	0.31
	180	0.75	3	0.23
	225	0.75	3	0.47
	270	0.75	3	0.31
	315	0.75	3	0.31
	0	1.25	3	0.47
	45	1.25	3	0.23
	90	1.25	3	0.16
	135	1.25	3	0.23
	180	1.25	3	0.08
	225	1.25	3	0.31
	270	1.25	3	0.08
	315	1.25	3	0.63
	0	1.75	3	0.47
	45	1.75	3	0.39
	90	1.75	3	0.08
	180	1.75	3	0.08
	225	1.75	3	0.70
	270	1.75	3	0.55
	315	1.75	3	0.47
Spring	0	0	0	5.63
	90	0.75	0	0.08
	225	0.75	0	0.08
	0	1.25	0	0.08

Evening Meteorological Probabilities used for ENM				
Season	Wind Dir	Wind Speed	Inv Strength	Weighting (%)
	135	1.25	0	0.08
	45	1.75	0	0.08
	90	1.75	0	0.31
	135	1.75	0	0.16
	180	1.75	0	0.08
	225	1.75	0	0.16
	270	1.75	0	0.16
	315	1.75	0	0.16
	0	2.25	0	0.31
	90	2.25	0	0.16
	135	2.25	0	0.16
	180	2.25	0	0.70
	225	2.25	0	0.16
	270	2.25	0	0.47
	315	2.25	0	0.47
	0	2.75	0	0.16
	45	2.75	0	0.08
	90	2.75	0	0.23
	135	2.75	0	0.23
	180	2.75	0	0.94
	225	2.75	0	0.63
	270	2.75	0	0.55
	315	2.75	0	0.47
	0	0	3	0.31
	0	0.75	3	0.08
	45	0.75	3	0.08
	90	0.75	3	0.16
	135	0.75	3	0.08
	180	0.75	3	0.08
	225	0.75	3	0.08
	270	0.75	3	0.23
	315	0.75	3	0.23
	0	1.25	3	0.16
	45	1.25	3	0.16
	180	1.25	3	0.16
	225	1.25	3	0.55
	270	1.25	3	0.16
	315	1.25	3	0.31
	135	1.75	3	0.08
	180	1.75	3	0.23
	225	1.75	3	0.16
	315	1.75	3	0.39
Summer	0	0	0	16.04
	0	0.75	0	0.08
	90	1.25	0	0.08
	180	1.25	0	0.08
	270	1.25	0	0.08
	0	1.75	0	0.16
	45	1.75	0	0.08
	90	1.75	0	0.16
	225	1.75	0	0.16
	0	2.25	0	0.08
	45	2.25	0	0.55

Evening Meteorological Probabilities used for ENM				
Season	Wind Dir	Wind Speed	Inv Strength	Weighting (%)
	90	2.25	0	0.70
	135	2.25	0	0.16
	180	2.25	0	0.63
	225	2.25	0	0.31
	270	2.25	0	0.08
	315	2.25	0	0.08
	0	2.75	0	0.31
	45	2.75	0	0.55
	90	2.75	0	0.39
	135	2.75	0	0.78
	180	2.75	0	0.86
	0	0	3	0.78
	0	0.75	3	0.08
	45	0.75	3	0.31
	90	0.75	3	0.16
	135	0.75	3	0.16
	180	0.75	3	0.39
	225	0.75	3	0.39
	270	0.75	3	0.16
	315	0.75	3	0.23
	0	1.25	3	0.08
	45	1.25	3	0.08
	90	1.25	3	0.08
	135	1.25	3	0.39
	180	1.25	3	0.08
	225	1.25	3	0.31
	270	1.25	3	0.08
	315	1.25	3	0.08
	0	1.75	3	0.23
	90	1.75	3	0.31
	135	1.75	3	0.23
	180	1.75	3	0.23
	225	1.75	3	0.47
	315	1.75	3	0.16
Winter	0	0	0	11.50
	225	1.25	0	0.70
	270	1.25	0	0.31
	315	1.25	0	0.08
	0	1.75	0	0.08
	180	1.75	0	0.08
	225	1.75	0	0.78
	270	1.75	0	1.10
	315	1.75	0	0.55
	45	2.25	0	0.08
	180	2.25	0	0.08
	225	2.25	0	1.72
	270	2.25	0	1.33
	315	2.25	0	1.33
	0	2.75	0	0.31
	45	2.75	0	0.08
	225	2.75	0	0.94
	270	2.75	0	1.72
	315	2.75	0	0.70

Evening Meteorological Probabilities used for ENM				
Season	Wind Dir	Wind Speed	Inv Strength	Weighting (%)
	0	0	3	0.39
	135	0.75	3	0.08
	180	0.75	3	0.08
	225	0.75	3	0.63
	270	0.75	3	0.55
	315	0.75	3	0.08
	0	1.25	3	0.08
	225	1.25	3	0.47
	270	1.25	3	0.31
	315	1.25	3	0.08
	0	1.75	3	0.16
	45	1.75	3	0.23
	135	1.75	3	0.08
	225	1.75	3	0.78
	270	1.75	3	0.63
	315	1.75	3	0.70

Night Meteorological Probabilities used for ENM				
Season	Wind Dir	Wind Speed	Inv Strength	Weighting (%)
Autumn	0	0	0	5.49
	180	0.75	0	0.04
	225	0.75	0	0.07
	270	0.75	0	0.18
	315	0.75	0	0.11
	0	1.25	0	0.04
	45	1.25	0	0.04
	135	1.25	0	0.04
	180	1.25	0	0.07
	225	1.25	0	0.84
	270	1.25	0	0.21
	315	1.25	0	0.11
	0	1.75	0	0.11
	45	1.75	0	0.04
	180	1.75	0	0.07
	225	1.75	0	1.86
	270	1.75	0	0.56
	315	1.75	0	0.63
	0	2.25	0	0.63
	45	2.25	0	0.04
	90	2.25	0	0.04
	135	2.25	0	0.21
	180	2.25	0	0.07
	225	2.25	0	2.29
	270	2.25	0	0.60
	315	2.25	0	1.16
	0	2.75	0	0.07
	90	2.75	0	0.07
	135	2.75	0	0.11
	180	2.75	0	0.25
	225	2.75	0	1.37
	270	2.75	0	0.91
	315	2.75	0	0.35
	0	0	3	0.60
	0	0.75	3	0.18
	45	0.75	3	0.11
	90	0.75	3	0.04
	135	0.75	3	0.07
	180	0.75	3	0.11
	225	0.75	3	0.60
	270	0.75	3	0.63
	315	0.75	3	0.42
	0	1.25	3	0.25
	45	1.25	3	0.11
	90	1.25	3	0.04
	135	1.25	3	0.07
	180	1.25	3	0.25
	225	1.25	3	0.98
	270	1.25	3	0.53
	315	1.25	3	0.56
	0	1.75	3	0.11
	90	1.75	3	0.14

Night Meteorological Probabilities used for ENM

Season	Wind Dir	Wind Speed	Inv Strength	Weighting (%)
	135	1.75	3	0.14
	180	1.75	3	0.14
	225	1.75	3	0.70
	270	1.75	3	0.46
	315	1.75	3	0.81
Spring	0	0	0	4.40
	0	0.75	0	0.14
	135	0.75	0	0.04
	180	0.75	0	0.07
	225	0.75	0	0.18
	270	0.75	0	0.11
	0	1.25	0	0.11
	45	1.25	0	0.04
	135	1.25	0	0.04
	180	1.25	0	0.07
	225	1.25	0	0.32
	270	1.25	0	0.46
	315	1.25	0	0.18
	45	1.75	0	0.04
	90	1.75	0	0.11
	135	1.75	0	0.04
	180	1.75	0	0.07
	225	1.75	0	0.53
	270	1.75	0	0.39
	315	1.75	0	0.25
	0	2.25	0	0.18
	90	2.25	0	0.18
	135	2.25	0	0.11
	180	2.25	0	0.67
	225	2.25	0	0.77
	270	2.25	0	0.67
	315	2.25	0	0.56
	0	2.75	0	0.14
	90	2.75	0	0.11
	135	2.75	0	0.14
	180	2.75	0	0.14
	225	2.75	0	0.53
	270	2.75	0	0.42
	315	2.75	0	0.39
	0	0	3	0.74
	0	0.75	3	0.11
	45	0.75	3	0.04
	90	0.75	3	0.04
	135	0.75	3	0.04
	180	0.75	3	0.11
	225	0.75	3	0.35
	270	0.75	3	0.21
	315	0.75	3	0.11
	0	1.25	3	0.11
	45	1.25	3	0.07
	90	1.25	3	0.11
	135	1.25	3	0.07
	180	1.25	3	0.11

Night Meteorological Probabilities used for ENM

Season	Wind Dir	Wind Speed	Inv Strength	Weighting (%)
	225	1.25	3	0.18
	270	1.25	3	0.46
	315	1.25	3	0.21
	0	1.75	3	0.14
	90	1.75	3	0.04
	135	1.75	3	0.11
	180	1.75	3	0.11
	225	1.75	3	0.21
	270	1.75	3	0.32
	315	1.75	3	0.25
Summer	0	0	0	7.11
	0	0.75	0	0.04
	45	0.75	0	0.14
	90	0.75	0	0.14
	135	0.75	0	0.07
	180	0.75	0	0.18
	225	0.75	0	0.32
	270	0.75	0	0.18
	315	0.75	0	0.04
	0	1.25	0	0.11
	45	1.25	0	0.11
	90	1.25	0	0.04
	135	1.25	0	0.04
	180	1.25	0	0.18
	225	1.25	0	0.32
	270	1.25	0	0.18
	315	1.25	0	0.11
	0	1.75	0	0.11
	45	1.75	0	0.11
	135	1.75	0	0.11
	180	1.75	0	0.25
	225	1.75	0	0.49
	270	1.75	0	0.25
	315	1.75	0	0.35
	0	2.25	0	0.60
	45	2.25	0	0.25
	90	2.25	0	0.18
	135	2.25	0	0.32
	180	2.25	0	0.42
	225	2.25	0	1.16
	270	2.25	0	0.60
	315	2.25	0	0.32
	0	2.75	0	0.25
	45	2.75	0	0.04
	90	2.75	0	0.14
	135	2.75	0	0.39
	180	2.75	0	0.46
	225	2.75	0	0.95
	270	2.75	0	0.53
	315	2.75	0	0.49
	0	0	3	0.95
	0	0.75	3	0.21
	45	0.75	3	0.18

Night Meteorological Probabilities used for ENM				
Season	Wind Dir	Wind Speed	Inv Strength	Weighting (%)
	90	0.75	3	0.18
	135	0.75	3	0.07
	180	0.75	3	0.14
	225	0.75	3	0.67
	270	0.75	3	0.91
	315	0.75	3	0.49
	0	1.25	3	0.32
	45	1.25	3	0.07
	90	1.25	3	0.07
	135	1.25	3	0.35
	180	1.25	3	0.35
	225	1.25	3	1.16
	270	1.25	3	0.67
	315	1.25	3	0.70
	0	1.75	3	0.25
	45	1.75	3	0.04
	90	1.75	3	0.11
	135	1.75	3	0.11
	180	1.75	3	0.18
	225	1.75	3	0.74
	270	1.75	3	0.39
	315	1.75	3	0.32
Winter	0	0	0	11.78
	180	0.75	0	0.07
	225	0.75	0	0.25
	270	0.75	0	0.18
	315	0.75	0	0.04
	180	1.25	0	0.07
	225	1.25	0	0.28
	270	1.25	0	0.77
	315	1.25	0	0.18
	0	1.75	0	0.04
	45	1.75	0	0.04
	180	1.75	0	0.04
	225	1.75	0	0.42
	270	1.75	0	1.30
	315	1.75	0	0.49
	0	2.25	0	0.21
	45	2.25	0	0.04
	225	2.25	0	1.51
	270	2.25	0	1.20
	315	2.25	0	1.20
	0	2.75	0	0.11
	45	2.75	0	0.14
	180	2.75	0	0.07
	225	2.75	0	1.27
	270	2.75	0	1.62
	315	2.75	0	0.70
	0	0	3	0.81
	0	0.75	3	0.04
	45	0.75	3	0.04
	180	0.75	3	0.11
	225	0.75	3	0.49

Night Meteorological Probabilities used for ENM				
Season	Wind Dir	Wind Speed	Inv Strength	Weighting (%)
	270	0.75	3	0.70
	315	0.75	3	0.11
	0	1.25	3	0.28
	180	1.25	3	0.04
	225	1.25	3	0.28
	270	1.25	3	0.67
	315	1.25	3	0.53
	0	1.75	3	0.11
	225	1.75	3	0.07
	270	1.75	3	0.39
	315	1.75	3	0.42

GREEN HOUSE GAS EMISSIONS FROM PORT KEMBLA COAL TERMINAL SITE

1 METHODOLOGY

All methodology used in this assessment for the estimation of GHG emissions has been in accord with the NGA Factors document in the first instance and/or in accord with sound scientific and engineering principles where NGA Factors has proved inadequate for the required calculations. The specific methodologies used in each calculation are given in the following sections.

There are several recognised greenhouse gases and the contribution of greenhouse gas emissions to global warming varies for each different greenhouse gas. The more common ones are carbon dioxide, methane, sulphur hexafluoride, and halogenated refrigerants. The Intergovernmental Panel on Climate Change (IPCC) has defined the Global Warming Potential (GWP) for a number of greenhouse gases, and all are referenced to carbon dioxide which is assumed to have a GWP of 1. For example, the IPCC GWP for methane (CH_4) is 21. To allow a quantitative comparison between the emissions of different types of greenhouse gases it is necessary to convert all emissions to a universally comparable unit. The methodology adapted by the NGA Factors document and used in this assessment converts all emissions for non-carbon dioxide gases to a carbon dioxide equivalent (CO_2-e). Emissions from non-carbon dioxide gases are converted to t CO_2-e by multiplying the emission of each non-carbon dioxide gas by its GWP.

2 CALCULATIONS

2.1 SCOPE 1 EMISSIONS

2.1.1 Diesel Consumption by Loaders and Trucks Onsite

The formula for calculating GHG emissions from diesel fuel combustion onsite and during transportation of materials is given as

GHG emission (t CO_2-e) = Q x EF **(Equation 1)**

Where: Q is the quantity of fuel consumed expressed in tonnes or by volume (kL)

EF is the relevant emission factor, obtained from the *National Greenhouse Accounts (NGA) Factors* document, or the GHG Protocol online database

The FY2007 diesel usage from PKCT records were used in the calculations. Associated with this Scope 1 emission is also the Scope 3 emissions due to diesel consumption discussed below in Section 2.3.1. The EF for diesel combustion (Scope 1) is 2.7 t CO_2-e / kL of diesel consumed while the Scope 3 EF value is 0.2 t CO_2-e / kL of diesel consumed.

2.1.2 Emissions from Spontaneous Combustion of Stored Coal

The NGA Factors document does not provide methodology for the estimation of emissions from this source. A CSIRO study under the Australian Coal Association Research Program (ACARP, C8059 (2000)) derived a formula that showed that the emissions from the slow oxidation of coal were dependent on the carbon content of the material, ambient temperature and the type of active spontaneous combustion. So, for example, emission rate values in the range 0.0063 – 6.6 t yr^{-1} m^{-2} have been obtained for Hunter Valley sites studied in the CSIRO investigation.

We have used the EF value of 3 kg CO_2-e per tonne of coal sourced from *Projection of Fugitive Greenhouse Gas Emissions to 2020* (Energy Strategies, 2000). The formula used for the calculation was

GHG emission (t CO_2-e) = (Q x EF) / 1000 (Equation 2)

Where: Q is the quantity of coal throughput given in tonnes

EF is the emission factor for spontaneous oxidation

2.1.3 Emissions from Low Temperature Oxidation of Stored Coal

As for spontaneous oxidation of coal (Section 2.1.2) the following equation can be used to calculate emissions:

GHG emission (t CO_2-e) = (Q x EF) / 1000 (Equation 3)

Where: Q is the quantity of coal throughput given in tonnes

EF is the emission factor for low temperature oxidation

However, the emission factor of the low temperature oxidation is different, and smaller than the spontaneous combustion EF value, being 0.5 kg CO_2-e per tonne of coal. This value has been sourced from *Projection of Fugitive Greenhouse Gas Emissions to 2020* (Energy Strategies, 2000).

2.2 SCOPE 2 EMISSIONS

2.2.1 Emissions Associated with Electricity Consumption

Emissions from the consumption of purchased electricity were calculated using the following equation (*NGA Factors*, 2008)

GHG Emission (t CO_2-e) = (Q x EF) / 1000 (Equation 5)

Where: Q is the amount of electricity consumed in kWh

EF is the relevant emission factor, obtained from *NGA Factors* document

The amount of electricity consumed in FY2007 was used in the calculations for the current 24/7 operations which handles 11.7 Mt of coal per year.

In the proposed scenario the current 24/7 onsite operations will continue but since the amount of coal throughput will be increased to 16.5 Mt per year the amount of electricity consumption will also increase. We have allowed a 20% increase in the electricity usage to account for increased coal throughput.

2.3 SCOPE 3 EMISSIONS

2.3.1 Emissions Associated with the Extraction of Fuels

Associated with the diesel usage onsite (Scope 1) is the Scope 3 indirect emissions attributable to the diesel extraction process. The emission factor for this is different (0.2 t CO_2-e / kL diesel consumed) is much smaller than the Scope 1 diesel combustion emission factor from (0.2 t CO_2-e / kL diesel consumed). The sum of Scope 1 and Scope 2 emissions form the full fuel cycle emissions.

2.3.2 Emissions Associated with the Transport of Coal to PKCT Site

We have classed transport fuels consumed for the transport of coal from mines both by rail and road as Scope 3 for PKCT operations as this fuel is consumed by vehicles owned and run by companies other than PKCT. The emissions are calculated using the formula:

GHG Emission (t CO_2-e) = (Q x EF) / 1000 (Equation 6)

Where: Q is the amount of electricity consumed in kWh

EF is the relevant emission factor, obtained from *NGA Factors* document

The EF factor used in the calculations was the full fuel cycle value of 2.9 t CO_2-e / kL diesel consumed.

2.3.3 Emissions Associated with End-Use Coal Combustion

We have classed this indirect source of emissions under scope 3 as emissions will be generated by the end-user, with 93% (see Section 2.3.5) being generated overseas. The formula for calculating emissions from end-use coal combustion is given by:

GHG Emission (t CO_2-e) = (Q x EF) / 1000 (Equation 7)

Where: Q is the amount of electricity consumed in kWh

EF is the relevant emission factor, obtained from *NGA Factors* document

EF is the full fuel cycle emission factor for NSW coal (98.1 t CO_2-e per kg of coal combusted) and is the sum of both the Scope 1 and Scope 3 coal combustion EF values.

2.3.4 Emissions from Waste Generation and Disposal

Municipal solid waste that is ultimately disposed of in a well-managed landfill is estimated to produce methane in accordance with the formula:

GHG Emission (t CO_2-e) = [(Q x DOC) / 3 – R)] x 18.9 (Equation 8)

Where: Q is the quantity of municipal waste in tonnes

DOC is the degradable organic carbon expressed as a proportion of the particular waste type and listed in the NGA Factors document

R is the recovered methane (in tonnes) from wastewater in an inventory year

However, since the actual composition of the waste is not known (ie., DOC in Equation 3 not available) we use the weighted average emission factors for municipal, commercial and industrial and construction and demolition waste, given as 1.11 t CO_2-e / t waste, to calculate GHG emissions from the PKCT site.

2.3.5 Emissions Associated with Shipping of Product Coal to Customers

A preliminary estimate of GHG emissions from sea transport of product coal was undertaken using similar methodology to that used in the Anvil Hill Coal Project GHG Assessment Addendum Report to the Director-General Department of Planning (Independent Hearing and Assessment Panel for the Anvil Hill Coal Project, 2007). The assessment makes the following assumptions:

1. The percentage of clean coal produced that will be transported by sea to customers for the proposed scenario will be the same as the average over the 2007 operations. These percentages are as follows:
    - 21% – India
    - 15% – Europe/UK/Africa/Other
    - 57% – China/Japan/Korea/Taiwan
    - 7% – Domestic (assumed Whyalla, South Australia)
2. Cargo ship carrying capacity 75,000 tonnes.
3. Freight shipping energy efficiency is equal to 4.16 tkm / MJ.
4. Shipping distances are as follows:
    - 12,000 km to India/Japan/China
    - 20,000 km to Europe/UK/Africa
    - 1,000 km to Whyalla (South Australia)
5. Ships are assumed to burn heavy fuel oil.
6. All trips are assumed one way as it is likely that ships would carry other goods elsewhere upon unloading trip.

The calculations for the preliminary estimation of GHG emissions associated with shipping of clean coal are provided in **Table 3** (current operations) and **Table 5** (proposed operations).

2.4 EMISSIONS NOT INCLUDED IN ASSESSMENT

The following Scope 3 emission sources were not considered in this assessment:

- Disposal (end of life) of product sold
- Fugitive emissions due to coal production
- Extraction, production, and transport of other purchased materials and goods (eg. packaging materials)
- Out sourced activities.

There are practical difficulties and anomalies associated with determining these Scope 3 upstream emissions in any assessment and are thus generally not required to be included in GHG emission calculations, according to the international emission accounting and reporting frameworks. This is especially true of building materials production where no stringent records have been kept or are easily accessible from the open literature, or online.

In any case these minor point sources are expected to make negligible contributions in comparison with the major Scope 1 and Scope 2 emissions included in the assessment.

Table 1: Greenhouse Gas Assessment Calculations for Port Kembla Coal Terminal - Current

Parameter	Value	Unit
1. Emissions from PKCT Diesel Consumption Onsite		
FY2007 PKCT Diesel Consumption	126	kL / yr
Diesel Emission Factors (EF)		
(refer NGA Factors January 2008, p13, Table 1.2)		
EF (CO_{2-e}) Scope 1 (Diesel combustion)	2.7	t / kL
EF (CO_{2-e}) Scope 3 (Diesel combustion)	0.2	t / kL
EF (CO_{2-e}) Scopes 1 & 3 (Diesel consumption)	2.9	t / kL
Onsite Fuel Combustion GHG emission (Scope 1)	340.2	t CO_{2-e} / yr
Onsite Fuel Combustion GHG emission (Scope 3)	25.2	t CO_{2-e} / yr
Overall Onsite Fuel Combustion GHG Emission (Scope 1 + Scope 3)	**365**	**t CO_{2-e} / yr**
2. Slow Oxidation of Stored Coal (Scope 1)		
Current Total Coal throughput (11.7 Mt)	11700000	t / yr
EF (CO_{2-e}) Scope 1 (Slow coal oxidation)	0.5	kg CO_{2-e} / t coal
Onsite Slow Coal Oxidation GHG Emission (Scope 1)	5850	t CO_{2-e} / yr
Overall Onsite Slow Coal Oxidation GHG Emission (Scope 1)	**5850**	**t CO_{2-e} / yr**

3. Spontaneous Coal Combustion of Stored Coal (Scope 1)		
Current Coal throughput (11.7 Mt)	11700000	t / yr
EF ($CO_{2\text{-}e}$) Scope 1 (Spontaneous coal combustion)	3	kg CO_2-e / t coal
Onsite Spontaneous Coal Combustion GHG Emission (Scope 1)	35100	t CO_2-e / yr
Overall Onsite Spontaneous Coal Combustion (Scope 1)	**35100**	**t CO_2-e / yr**

4. Emissions from PKCT Electricity Consumption (Scope 2 & Scope 3)		
FY2007 PKCT Electricity Consumption	21,000,000	kWh / yr
Emission Calculations:		
EF ($CO_{2\text{-}e}$) Scope 2 (Electricity consumed in NSW & ACT)	0.89	kg/kWh
EF ($CO_{2\text{-}e}$) Scope 3 (Electricity consumed in NSW & ACT)	0.17	kg/kWh
EF ($CO_{2\text{-}e}$) Scope 2 & 3 (Electricity consumed in NSW & ACT)	1.06	kg/kWh
Onsite Electricity Consumption GHG Emission (Scope 2)	**18,690**	**t CO_2-e / yr**
Onsite Electricity Consumption GHG Emission (Scope 3)	**3,570**	**t CO_2-e / yr**
Overall Onsite Electricity Consumption GHG Emission (Scope 2 & 3)	**22,260**	**t CO_2-e / yr**

5. Emissions from Shipping to Customers (Scope 3)		
Total Emission from Shipping to Customers (Scope 3)	**2,789,362**	**t CO_2-e / yr**
Total Emission from Shipping to Customers (Scope 3) Overall Emission Rate	**2,789,362**	**t CO_2-e/yr**

6. Combustion of Coal (Scope 3)		
EF Scope 3 for NSW Coal Combustion	**98.1**	**t CO_2-e / yr**
Emissions from exported coal and domestic coal use (11.7 Mt)	**1,147,770**	**t $CO_{2\text{-}e}$ / yr**
Total Emission from Customer Coal Combustion (Scope 3)	**1,147,770**	**t CO_2-e / yr**

7. Emissions from Transport of Coal from Mines to PKCT by Road (Scope 3)		
Diesel Consumption for total distance travelled by all trucks	3000	kL
Diesel Emission Factors (EF)		
EF (CO_2-e) Full Fuel Cycle (Diesel consumption)	2.9	t / kL
Transport Diesel Combustion GHG emission (Scope 3)	**8700**	**t CO_2-e / yr**
Total GHG Emissions from Coal Transport from Mines to PKCT by Road (Scope 3)	**8700**	**t CO_2-e / yr**

8. Emission from Transport of Coal from Mines to PKCT by Rail (Scope 3)		
Coal transported by rail	6.5	Mt / yr
Diesel consumption for transport of 6.5 Mt of coal	2829.5	kL
EF (CO_2-e) Full Fuel Cycle (Diesel combustion)	2.9	t / kL
Emissions from transport of 6.5 Mt coal from mines to PKCT by rail	**8205**	**t CO_2-e / yr**
Total GHG Emissions from Coal Transport from Mines to PKCT by Rail (Scope 3)	**8205**	**t CO_2-e / yr**

9. Emissions from Waste Generated Onsite during Operations

Waste (dry) generated per year onsite	**351766**	**t**
Waste (liquid) generated per year onsite (volume*density)	**665298**	**t**
Weighting factor for unknown composition	**1.1**	t CO_2-e / yr
Emissions from disposal of waste generated onsite	**1118771**	t CO_2-e / yr
Total GHG Emissions from Waste Generated onsite during PKCt operations	**1118771**	t CO_2-e / yr

10. Emissions by Personnel (Scope 3)

(refer NSW Greenhouse Plan, NSW Govt. November 2005)		
NSW per capita emissions	23	t CO_2-e / yr
Total staff equivalent at weekends per year with 30 staff per day	3120	/ yr
Total staff equivalent during weekdays per year at 80 staff per day	20800	/yr
Emissions for total staff per year (travel to and from work, business travel, waste disposal)	**550160**	**t CO_2-e / yr**
Total GHG Emissions from PKCT Staff & Truck Drivers (Scope 3)	**550160**	**t CO_2-e / yr**
Total Scope 1 GHG Emissions	**41290**	**t CO_2-e / yr**
Total Scope 2 GHG Emissions	**18690**	**t CO2-e / yr**
Total Scope 3 GHG Emissions	**4.5**	**t CO2-e / yr**
Total GHG Emissions (Scope 1, Scope 2, Scope 3)	**5.687**	**Mt CO_2-e / yr**
Total GHG Emissions (Scope 1, Scope 2, Scope 3) per tonne of coal	**0.49**	**t CO2-e / yr**

Table 2: PKCT Shipping Information

End User Location	India	Europe/UK/Africa/Other	China/Japan/Korea/ Taiwan	Domestic	TOTAL
2007 Tonnage	2,457,000	1,755,000	6,669,000	819,000	**11,700,000**
% of Total Coal Throughput	21	15	57	7	**100**
Avg. Shipping Distance (km)	12,000	20,000	12,000	1,000	**45,000**
Carrying Capacity of Ship (tonnes)	75,000	75,000	75,000	75,000	**300,000**
No of Ship movements required	33	23	89	33	**178**
Total Shipping (Mtkm)	29,484	35,100	80,028	2,457	**147,069**
Energy Efficiency (tkm/MJ)	4.16	4.16	4.16	4.16	**17**
Energy Consumption (GJ)	7,087,500	8,437,500	19,237,500	590,625	**35,353,125**
Full Fuel Cycle Emission Factor (kg CO_{2-e} / GJ)	78.9	78.9	78.9	78.9	**315.6**
Total Emission (t CO_{2-e})	559,204	665,719	1,517,839	46,600	**2,789,362**

NOTES:

1. Assumed average shipping distance from Australia to China/Japan/India is 12,000km

2. Assumed average shipping distance from Australia to Europe/UK/Africa is 20,000km

3. Assumed average shipping distance to domestic customers in Australia is 1,000km (approx. distance to SA)

Table 3: Greenhouse Gas Assessment Calculations for Port Kembla Coal Terminal - Proposed

Parameter	Value	Unit
1. Emissions from PKCT Diesel Consumption Onsite		
FY2007 PKCT Diesel Consumption	126	kL / yr
FY2007 PKCT Diesel Consumption plus 20% increase	151	kL / yr
Diesel Emission Factors (EF)		
EF ($CO_{2\text{-}e}$) Scope 1 (Diesel combustion)	2.7	t / kL Diesel Consumed
EF ($CO_{2\text{-}e}$) Scope 3 (Diesel combustion)	0.2	t / kL Diesel Consumed
EF ($CO_{2\text{-}e}$) Scopes 1 & 3 (Diesel consumption)	2.9	t / kL Diesel Consumed
Onsite Fuel Combustion GHG emission (Scope 1)	408.2	t CO_2-e / yr
Onsite Fuel Combustion GHG emission (Scope 3)	30.2	t CO_2-e / yr
Overall Onsite Fuel Combustion GHG Emission (Scope 1 + Scope 3)	**438**	**t CO_2-e / yr**
2. Slow Oxidation of Stored Coal (Scope 1)		
Proposed Total Coal throughput (16.5 Mt)	16500000	t / yr
EF ($CO_{2\text{-}e}$) Scope 1 (Slow coal oxidation)	0.5	kg CO_2-e / t coal
Onsite Slow Coal Oxidation GHG Emission (Scope 1)	8250	t CO_2-e / yr
Overall Onsite Slow Coal Oxidation GHG Emission (Scope 1)	**8250**	**t CO_2-e / yr**

3. Spontaneous Coal Combustion of Stored Coal (Scope 1)		
Proposed Coal throughput (16.5 Mt)	16500000	t / yr
EF (CO_{2-e}) Scope 1 (Spontaneous coal combustion)	3	kg CO_{2-e} / t coal
Onsite Spontaneous Coal Combustion GHG Emission (Scope 1)	49500	t CO_{2-e} / yr
Overall Onsite Spontaneous Coal Combustion (Scope 1)	**49500**	**t CO_{2-e} / yr**

4. Emissions from PKCT Electricity Consumption (Scope 2 & Scope 3)		
FY2007 PKCT Electricity Consumption	21,000	MWh / yr
FY2007 PKCT Electricity Consumption plus 20% increase	25,200,000	kWh / yr
<u>Emission Calculation:</u>		
EF (CO_{2-e}) Scope 2 (Electricity consumed in NSW & ACT)	0.89	kg/kWh
EF (CO_{2-e}) Scope 3 (Electricity consumed in NSW & ACT)	0.17	kg/kWh
EF (CO_{2-e}) Scope 2 & 3 (Electricity consumed in NSW & ACT)	1.06	kg/kWh
Onsite Electricity Consumption GHG Emission (Scope 2)	**22,428**	**t CO_{2-e} / yr**
Onsite Electricity Consumption GHG Emission (Scope 3)	**4,284**	**t CO_{2-e} / yr**
Overall Onsite Electricity Consumption GHG Emission (Scope 2 & 3)	**26,712**	**t CO_{2-e} / yr**

5. Emissions from Shipping to Customers (Scope 3)

Total Emission from Shipping (see table below) to Customers (Scope 3)	**3,933,715**	**t $CO_{2\text{-}e}$ / yr**
Total Emission from Shipping to Customers (Scope 3) Overall Emission Rate	**3,933,715**	**t $CO_{2\text{-}e}$/yr**

6. Combustion of Coal (Scope 3)

EF Scope 3 for NSW Coal Combustion	**98.1**	**t $CO_{2\text{-}e}$ / yr**
Emissions from exported coal and domestic coal use (16.5 Mt)	**1,618,650**	**t $CO_{2\text{-}e}$ / yr**
Total Emission from Customer Coal Combustion (Scope 3)	**1,618,650**	**t $CO_{2\text{-}e}$ / yr**

7. Emissions from Transport of Coal from Mines to PKCT by Road (Scope 3)

Diesel Consumption for total distance travelled by all trucks	4800	kL
Diesel Emission Factors (EF)		
EF ($CO_{2\text{-}e}$) Full Fuel Cycle (Diesel consumption)	2.9	t / kL Diesel Consumed
Transport Diesel Combustion GHG emission (Scope 3)	**13920**	**t $CO_{2\text{-}e}$ / yr**
Total GHG Emissions from Coal Transport from Mines to PKCT by Road (Scope 3)	**13920**	**t $CO_{2\text{-}e}$ / yr**

8. Emission from Transport of Coal from Mines to PKCT by Rail (Scope 3)		
Coal transported by rail	6.5	Mt / yr
Diesel consumption for transport of 6.5 Mt of coal	2829.5	kL
EF (CO_{2-e}) Scope 3 (Diesel combustion)	2.9	t / kL
Emissions from transport of 6.5 Mt coal from mines to PKCT by rail	**8205**	**t CO_{2-e} / yr**
Total GHG Emissions from Coal Transport from Mines to PKCT by Rail (Scope 3)	**8205**	**t CO_{2-e} / yr**

9. Emissions from Waste Generated Onsite during Operations		
Waste (dry) generated per year onsite	422119	t
Waste (liquid) generated per year onsite (volume*density)	798356	t
Weighting factor for unknown composition	1.1	t CO_{2-e} / yr
Emissions from disposal of waste generated onsite	1342525	t CO_{2-e} / yr
Total GHG Emissions from Waste Generated onsite during PKCT operations	**1342525**	t CO_{2-e} / yr

10. Emissions by Personnel (Scope 3)

NSW per capita emissions	23	t CO_2-e / yr
Total staff equivalent at weekends per year with 30 staff per day	3120	/ yr
Total staff equivalent during weekdays per year at 80 staff per day	20800	/yr
Emissions for total staff per year (commute to and from work, business travel, waste disposal)	**550160**	**t CO_2-e / yr**
Total GHG Emissions from PKCT Staff & Truck Drivers (Scope 3)	**550160**	**t CO_2-e / yr**
Total Scope 1 GHG Emissions	**58158**	**t CO_2-e / yr**
Total Scope 2 GHG Emissions	**22428**	**t CO_2-e / yr**
Total Scope 3 GHG Emissions	**7.47**	**Mt CO_2-e / yr**
Total GHG Emissions (Scope 1, Scope 2, Scope 3)	**7.55**	**Mt $CO_{2\text{-}e}$ / yr**
Total GHG Emissions (Scope 1, Scope 2, Scope 3) per tonne of coal	**0.46**	**t CO2-e / yr**

Table 4: PKCT Shipping Information

End User Location	India	Europe/UK/Africa/Other	China/Japan/Korea/ Taiwan	Domestic	TOTAL
2007 Tonnage	3,465,000	2,475,000	9,405,000	1,155,000	**16,500,000**
% of Total Coal Throughput	21	15	57	7	**100**
Avg. Shipping Distance (km)	12,000	20,000	12,000	1,000	**45,000**
Carrying Capacity of Ship (tonnes)	75,000	75,000	75,000	75,000	**300,000**
No of Ship movements required	46	33	125	46	**251**
Total Shipping (Mtkm)	41,580	49,500	112,860	3,465	**207,405**
Energy Efficiency (tkm/MJ)	4.16	4.16	4.16	4.16	**17**
Energy Consumption (GJ)	9,995,192	11,899,038	27,129,808	832,933	**49,856,971**
Full Fuel Cycle Emission Factor (kg CO_2-e / GJ)	78.9	78.9	78.9	78.9	**315.6**
Total Emission (t CO_2-e)	788,621	938,834	2,140,542	65,718	**3,933,715**

NOTES:

1. Assumed average shipping distance from Australia to China/Japan/India is 12,000km
2. Assumed average shipping distance from Australia to Europe/UK/Africa is 20,000km
3. Assumed average shipping distance to domestic customers in Australia is 1,000km (approx. distance to SA)

Energy Savings Action Plan

PORT KEMBLA COAL TERMINAL

OCTOBER 2006

Organisation Name: Port Kembla Coal Terminal (PKCT)

ABN: 72 003 942 774

Brief Introduction to the Business

Port Kembla Coal Terminal (PKCT) is a key coal exporting facility on Australia's east coast, 72 km south of Sydney. It services two of the nation's richest coal reserves, the Southern and Western coalfields of New South Wales, exporting high quality coking and steaming coal to more than 60 customers in 25 countries around the world. The biggest customers are Japan (38%), India (14%), Korea (13%) and Europe (10%), while other customers include China, Taiwan, Algeria, Egypt, Turkey, Argentina, Brazil, Indonesia, the Philippines and Chile.

PKCT is a single site operated by five equal shareholders, all coal producers on the Southern and Western coalfields, who lease the Terminal from the NSW Government. The shareholders are: Excel, Xstrata Coal, BHPBilliton Illawarra Coal, Tahmoor Coal and Centennial Coal. BHPBilliton Illawarra Coal manages the Terminal on behalf of the consortium, and was the party that commissioned and participated in development of this Plan.

The first coal loader at the present site was commissioned in 1964 with a capacity of two million tonnes. This had expanded to 7.2 million tonnes by the time the loader was replaced by the No.2 Loader in 1982. The newer No.2 Berth is now used for virtually all movements from the site. In 2005, PKCT loaded 10,242,128 tonnes of coal from No.2 Berth into vessels ranging in size from approximately 30,000 tonne to "Cape" size vessels with capacities of up to 160,000 tonnes.

PKCT No.2 Berth operations can be divided into three main functions:

- Road receival conveyors and associated stackers (2)
- Rail receival conveyors and associated stacker
- Ship loaders (2) and associated conveyors

The No. 1 Loader has been retained for loading bulk cargoes such as granulated blast furnace slag and coke, and as a back-up for the main terminal. In 2005, only 398,891 tonnes of material, or 3.7 percent of all loadings, were moved through No.1 Berth. Material is delivered direct to No.1 Berth by truck.

Importantly, PKCT has more than seven million tonnes of spare capacity within the existing infrastructure. Further capacity could be provided by constructing additional storage and loading facilities. This means that PKCT is well placed to grow as world demand for coal increases. However, increases in coal throughput will increase energy consumption.

Background/History of Energy Savings within the Organisation

PKCT is committed to responsible environmental practices, and maintains quality accreditation to ISO 9001 and 14001 standards. PKCT's Business Plan has a stated target of a 2% reduction in energy consumption for the 2006/07 financial year. PKCT is also sensitive to community expectations and is committed to having positive relationships with its neighbours. Dust suppression and minimisation of complaints arising from dust emissions are key concerns for PKCT.

Introduction to Energy Savings within the organisation

This Plan was developed with co-operation from PKCT staff, including those listed below, particularly during the Management Review and Energy Savings Measures phases. Staff were keen to identify and report real opportunities that would help them to improve the site's energy performance.

How the plan integrates with existing business

A number of people were intimately involved in delivering this process at PKCT, as follows. These people constitute the energy management team on site and Illawarra Coal Corporate. Note that additional personnel were involved in the Energy Management Review Process, as outlined later.

- Ben O'Brien – Illawarra Coal Carbon Steel Materials
- Flavio Tonini – PKCT Finance Manager
- Wayne Strudwick – PKCT Electrical Maintenance Engineer
- Debra Murphy – PKCT Business Improvement & External Affairs Manager

The diversity in roles of the people involved in the development of this ESAP reflects the site's commitment to energy management, via the involvement of engineering and commercial management at a site level.

Signoff on the Illawarra Coal - PKCT ESAP

'I certify that this Savings Action Plan has been prepared in accordance with the Guidelines issued by the Minister for Utilities. I am authorised to submit this Plan, on behalf of the designated user, to DEUS'.

____

Flavio Tonini – PKCT Finance Manager

Baseline Energy Use (Template 1)

Organisation: Port Kembla Coal Terminal

Site: Port Kembla Coal Terminal

Business Unit: Port Kembla Coal Terminal

Organisation Name	Port Kembla Coal Terminal Pty Ltd
Site Name	Port Kembla Coal Terminal
Site Address	Port Kembla Road Inner Harbour
Meter Identification Number	NEEE001392
Baseline Start Date	1-Jan-05
Baseline End Date	31-Dec-05
A1 = baseline energy use per annum (GJ)	63,386 GJ
A2 = baseline energy use per annum (kWh)	17,607,115 kWh
Greenhouse Emissions (tCO_2-e)	17,343 t.CO_2
Is baseline representative of normal Energy use YES/NO	Yes
If NO, description of variation (e.g. restrictions, shutdown, refurbishment etc)	NA
B = Impact of variation on energy use (i.e. variation from normal) GJ per annum	0
C1 = A1 - B baseline energy use corrected for variation (GJ)	63,386 GJ
C2 = A2 - B baseline energy use corrected for variation (kWh)	17,607,115 kWh
Business Activity Indicators	tonnes loaded
D = Quantity of Site Business Activity Indicator per annum (corrected for variations)	10,641,019
E1 = C1 / D baseline Energy use key performance indicator (KPI)	5.957
Baseline KPI units (ie energy units / Business indicator eg GJ/m2)	GJ/10^3 tonnes loaded
E2 = C2 / D baseline Energy use key performance indicator (KPI)	1.655
Baseline KPI units (ie energy units / Business indicator eg kWh/m2)	kWh/tonnes loaded
Baseline summer peak Demand (kVA) (4:30pm 9 Nov 2005)	5,914 kVA
Baseline winter peak Demand (kVA) (5:30am 22 July 2005)	6,075 kVA

Energy Management Review (Template 2)

Organisation: Port Kembla Coal Terminal

Site: Port Kembla Coal Terminal

Business Unit: Port Kembla Coal Terminal

		Low	Moderate	Minimum Sustainable	Industry Leader	Best Practise
A	Senior Management Commitment			X		
B	Understanding of Energy Savings Potential			X		
C	Energy Targets and KPIs		X			
D	Energy Metering and Monitoring		X			
E	Energy Management Reporting			X		
F	Energy Supply Management		X			
G	Operating and Maintenance Procedures		X			
H	Accountabilities for Energy management			X		
I	Training and awareness procedures		X			
J	Compliance with regulatory and/or legal requirements			X		

Energy Management Actions (Template 3)

Organisation: Port Kembla Coal Terminal

Site: Port Kembla Coal Terminal

Business Unit: Port Kembla Coal Terminal

Action No	Energy Management Action (Enter Energy Management Action developed by Review Team)	Responsibility	Review Area/s.	Planned Start Date	Planned Completion Date
1	**Senior Management Commitment**		A	**Jan-07**	**Dec-10**
	a) Ensure that energy management is a regular agenda item at executive-level meetings. Report on energy management activities and progress made towards goals contained in the organisations energy directive/policy.	Flavio Tonini		*Jan-07*	*Dec-10*
2	**Training and awareness procedures**		I	**Jan-07**	**Dec-08**
	a) Conduct basic energy-awareness activities within your organisation, focusing on cost savings and environmental issues associated with energy use. Disseminate the information using tools such as the organisation web site or newsletter.	Wayne Strudwick		*Jan-07*	*Dec-08*
3	**Energy Metering and Monitoring & Energy Management Reporting**		D & E	**Jan-07**	**Dec-10**
	a) Establish specific performance indicators (i.e. kWh per unit of output, dollars per unit of output, etc.) for energy to manage progress towards overall cost reduction targets.	Wayne Strudwick / Energetics		*Jan-07*	*Jun-07*
	b) Have management recognise energy management achievements of individuals and teams through awards, newsletter articles, etc.	Flavio Tonini		*Jun-07*	*Dec-10*
4	**Energy Metering and Monitoring & Energy Management Reporting**		D & E	**Jan-08**	**Dec-08**
	a) Generate monthly reports depicting overall energy use per unit of activity (e.g. kWh per area) and examine results where they show large cost or usage variance from target.	Steve Wicks		*Jan-08*	*Dec-08*
5	**Operating and Maintenance Procedures**		G	**Jan-07**	**Dec-07**
	a) Implement maintenance practices that call for prompt corrective action once an energy wasting condition is identified.	Rob Royters		*Jan-07*	*Dec-07*
6	**Accountabilities for Energy management**		H	**Jan-07**	**Dec-07**
	a) Allocate responsibility for completion of the Management System Review actions (done), and overall responsibility and specific actions to achieve the 2% reduction in energy consumption for 2006/07 target.	Debra Murphy		*Jan-07*	*Dec-07*

Energy Savings Measures (Template 4)

Organisation: Port Kembla Coal Terminal

Measure No	Measure Description	Respons-ibility	Cost to Implement	Savings in Energy Consumption (GJ)	Savings in Winter Peak Demand (kVA)	Savings in Summer Peak Demand (kVA)	Total Cost Savings Consumption ($ p.a)	Total Cost Savings Peak Demand ($ p.a)	Other Cost Savings (eg water + labour + other) ($ p.a.)	IRR	Time Required to Implement	Completion Date
Previous Action Over Last Five Years												
1.1	Replace inefficient office air conditioning	Wayne Strudwick		Yes	Small	Small	Yes	Small	Maintenance		n/a	n/a
1.2	Remove redundant amenities lighting and heating	Wayne Strudwick		Yes	Yes	Yes	Yes	Yes	Maintenance		n/a	n/a
Cost-Effective Opportunities												
2.1	Optimise road delivery conveyors and stackers	Wayne Strudwick	$20,000	4,583	0	0	$42,980	$0		215%	6 months	Mar-07
2.2	Optimise rail delivery conveyors and stackers	Wayne Strudwick	$20,000	1,584	0	0	$22,800	$0		114%	6 months	Mar-07
2.3	Compressed air	Rob Royters	$30,500	1,066	Possible	Possible	$15,300	Possible	Maintenance	49%	15 months	Dec-07
2.4	Ship loaders base load	Wayne Strudwick	$20,000	731	0	0	$11,900	$0	Maintenance	59%	15 months	Dec-07
2.5	Improved power factor correction	Wayne Strudwick	$52,200	0	1,319	1,319	$0	$75,100		144%	24 months	Dec-07

Measure No	Measure Description	Respons-ibility	Cost to Implement	Savings in Energy Consumption (GJ)	Savings in Winter Peak Demand (kVA)	Savings in Summer Peak Demand (kVA)	Total Cost Savings Consumption ($ p.a)	Total Cost Savings Peak Demand ($ p.a)	Other Cost Savings (eg water + labour + other) ($ p.a.)	IRR	Time Required to Implement	Completion Date
Potential Cost-Effective Opportunities												
3.1	Direct coal load-out	Flavio Tonini	TBD	1,336	0	0	$19,200	0				
3.2	Replace chutes to allow conveyors to run at higher loads	Flavio Tonini	TBD	TBD	(increase)	(increase)	TBD	(increase)				
3.3	Reduced use of stockpile sprays	Jason Rosewarn	TBD	TBD	0	0	TBD	0	Water			
3.4	Reduced lighting in workshops	Wayne Strudwick	TBD	630	0	0	$9,050	0	Maintenance			
Total Consumption Savings for Site				9,929			**Total Energy Savings for all projects identified as a Percentage of Total Site Use (%)**					15.66%
Total Consumption Savings for Site				7,963			**Total Energy Savings for all cost effective projects as a Percentage of Total Site Use (%)**					12.56%
Total Peak Demand Savings for Site					1,319	1,319						

Energetics / Energy Savings Action Plan

ENERGY SAVINGS ACTION PLAN

PORT KEMBLA COAL TERMINAL

2006

Energetics

energy
greenhouse
solutions

Energetics Pty Ltd

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Description	Prepared By	Reviewed By	Approved By	Approval Date
ESAP	MCS	PDE	PDE	2006

Table of Contents

1. Overview and Introduction to PKCT Operations

Organisation Name: Port Kembla Coal Terminal (PKCT)

ABN: 72 003 942 774

Brief Introduction to the Business

Port Kembla Coal Terminal (PKCT) is a key coal exporting facility on Australia's east coast, 72 km south of Sydney. It services two of the nation's richest coal reserves, the Southern and Western coalfields of New South Wales, exporting high quality coking and steaming coal to more than 60 customers in 25 countries around the world. The biggest customers are Japan (38%), India (14%), Korea (13%) and Europe (10%), while other customers include China, Taiwan, Algeria, Egypt, Turkey, Argentina, Brazil, Indonesia, the Philippines and Chile.

PKCT is a single site operated by five equal shareholders, all coal producers on the Southern and Western coalfields, who lease the Terminal from the NSW Government. The shareholders are: Excel, Xstrata Coal, BHPBilliton Illawarra Coal, Tahmoor Coal and Centennial Coal. BHPBilliton manages the Terminal on behalf of the consortium. BHPBilliton Illawarra Coal manages the Terminal on behalf of the consortium, and was the party that commissioned and participated in development of this Plan.

The first coal loader at the present site was commissioned in 1964 with a capacity of two million tonnes. This had expanded to 7.2 million tonnes by the time the loader was replaced by the No.2 Loader in 1982. The newer No.2 Berth is now used for virtually all movements from the site. In 2005, PKCT loaded 10,242,128 tonnes of coal from No.2 Berth into vessels ranging in size from approximately 30,000 tonne to "Cape" size vessels with capacities of up to 160,000 tonnes.

PKCT No.2 Berth operations can be divided into three main functions:

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Importantly, PKCT has more than seven million tonnes of spare capacity within the existing infrastructure. Further capacity could be provided by constructing additional storage and loading facilities. This means that PKCT is well placed to grow as world demand for coal increases. However, increases in coal throughput will increase energy consumption.

Background/History of Energy Savings within the Organisation

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This Plan was developed with co-operation from PKCT staff, including those listed below, particularly during the Management Review and Energy Savings Measures phases. Staff were keen to identify and report real opportunities that would help them to improve the site's energy performance.
How the plan integrates with existing business
A number of people were intimately involved in delivering this process at PKCT, as follows. These people constitute the energy management team on site and Illawarra Coal Corporate. Note that additional personnel were involved in the Energy Management Review Process, as outlined later. ➢ Ben O'Brien – Illawarra Coal Carbon Steel Materials ➢ Flavio Tonini – PKCT Finance Manager ➢ Wayne Strudwick – PKCT Electrical Maintenance Engineer ➢ Debra Murphy – PKCT Business Improvement & External Affairs Manager The diversity in roles of the people involved in the development of this ESAP reflects the site's commitment to energy management, via the involvement of engineering and commercial management at a site level.

Site Number and Name	National Meter Identification	Level of Review Conducted and why	Site Location and Description
PKCT	NEEE001392	Per ESAP Guidelines	Location: Port Kembla; description: ship loading facility

2. Baseline

The Business Activity Indicator (BAI) selected for PKCT is tonnes of material loaded to ships. With the tonnes of material (mostly coal) loaded being the main measure for other site performance indicators, such as financial indicators, this measure is the most useful to the site. Energy use comprises three main components:

- Equipment that has a moderate to high relationship with the amount of coal loaded, including conveyors, stackers and reclaimers. These represent the main variable components of site energy consumption.
- Equipment that maintains a relatively static demand regardless of whether the site is loading coal or not (i.e. fixed component of energy demand and consumption). These loads are relatively minor for the site and include small ventilation fans; office, equipment and space lighting; some small air compressors and electrical motor and transformer losses.
- Equipment loading that is not static, nor related to the amount of coal loaded. These loads are also relatively minor for the site and are mainly stockpile watering and runoff water management pumps. Both are weather dependent.

A factor influencing future site energy usage is the potential increase in coal loading. PKCT has more than seven million tonnes spare capacity within existing infrastructure. Further capacity could be provided by constructing additional storage and loading facilities. This means that PKCT is well placed to grow as world demand for coal increases. However, increases in coal throughput will increase energy consumption.

Table 1 shows PKCT's energy use for the 2005 baseline year. Owing to the continuous operations at PKCT, it is not possible to predict when the peak demand will occur with certainty. Climate factors do not substantially influence peak demand, which can occur at any time during day or night throughout the year.

Table 1: PKCT Baseline Energy Use

Organisation Name	Port Kembla Coal Terminal Pty Ltd
Site Name	Port Kembla Coal Terminal
Site Address	Port Kembla Road Inner Harbour
Meter Identification Number	NEEE001392
Baseline Start Date	1-Jan-05
Baseline End Date	31-Dec-05
A1 = baseline energy use per annum (GJ)	63,386 GJ
A2 = baseline energy use per annum (kWh)	17,607,115 kWh
Greenhouse Emissions (tCO2-e)	17,343 t.CO2
Is baseline representative of normal Energy use YES/NO	Yes
If NO, description of variation (e.g. restrictions, shutdown, refurbishment etc)	NA
B = Impact of variation on energy use (i.e. variation from normal) GJ per annum	0
C1 = A1 - B baseline energy use corrected for variation (GJ)	63,386 GJ
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Business Activity Indicators	tonnes loaded
D = Quantity of Site Business Activity Indicator per annum (corrected for variations)	10,641,019
E1 = C1 / D baseline Energy use key performance indicator (KPI)	5.957
Baseline KPI units (ie energy units / Business indicator eg GJ/m2)	GJ/10^3 tonnes loaded
E2 = C2 / D baseline Energy use key performance indicator (KPI)	1.655
Baseline KPI units (ie energy units / Business indicator eg kWh/m2)	kWh/tonnes loaded
Baseline summer peak Demand (kVA) (4:30pm 9 Nov 2005)	5,914 kVA
Baseline winter peak Demand (kVA) (5:30am 22 July 2005)	6,075 kVA

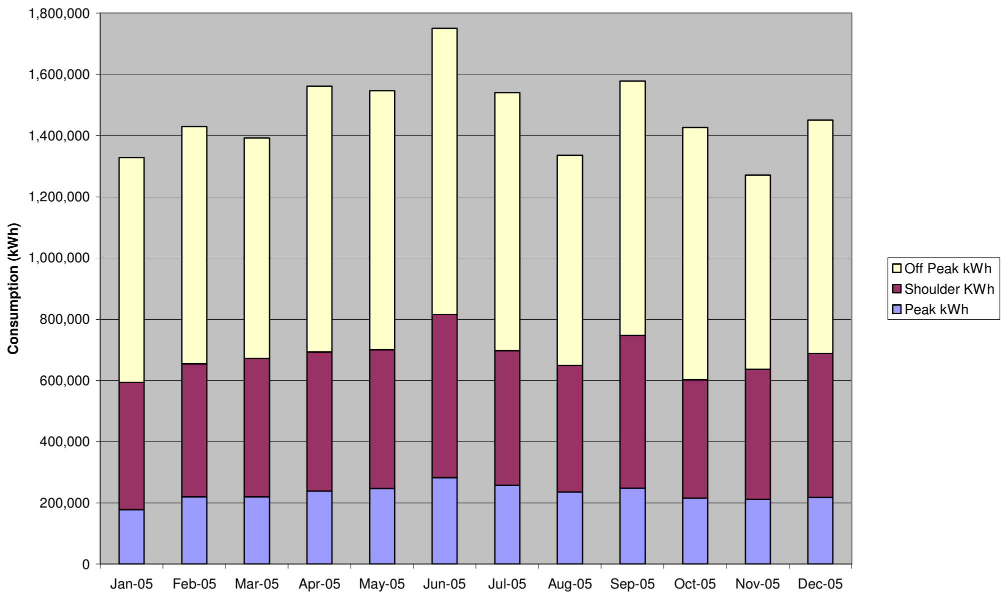
2.1 ENERGY BALANCE

As indicated above, the site used some 17,607 MWh of electricity in 2005 on NMI NEEE001392. This consumption gave rise to greenhouse gas emissions of 17,343 tonnes of carbon dioxide equivalent (tCO_2-e) using the Australian Greenhouse Office conversion factor for NSW in 2005 of 0.985 tonnes CO_2-e per MWh of final electricity use, as reported in the AGO Factors & Methods Workbook issued in December 2005.

2.1.1 Monthly Energy Use & Cost

Monthly electricity usage for the year 2005 is shown below. Electricity usage is quite variable due to variation in the amount of coal received and loaded each month.

Figure 1: Monthly Electricity Use - 2005



Electricity costs during 2005 largely mirror consumption and were calculated to be $1,397,329, giving an average electricity cost of $0.079/kWh including GST. Peak demand is charged at $4.936/kVA of peak demand on NEEE001392.

2.1.2 Daily Energy Use Trends & Interval Data

Daily electricity use trends on NEEE001392 are shown in Figure 2. This NMI includes all consumption at the site.

Average daily consumption for the 2005 year was approximately 48 MWh. Figure 2 shows that there is significant variation in daily energy consumption, from 15MWh to approximately 88 MWh per day for the year shown. This is reflective of the varying amounts of coal that may be received or loaded on a particular day. Coal receivals will be lower on weekends and public holidays. Ship loading will take place on average on one-third of all days of the year.

Figure 2: Daily Energy Use 2005-06

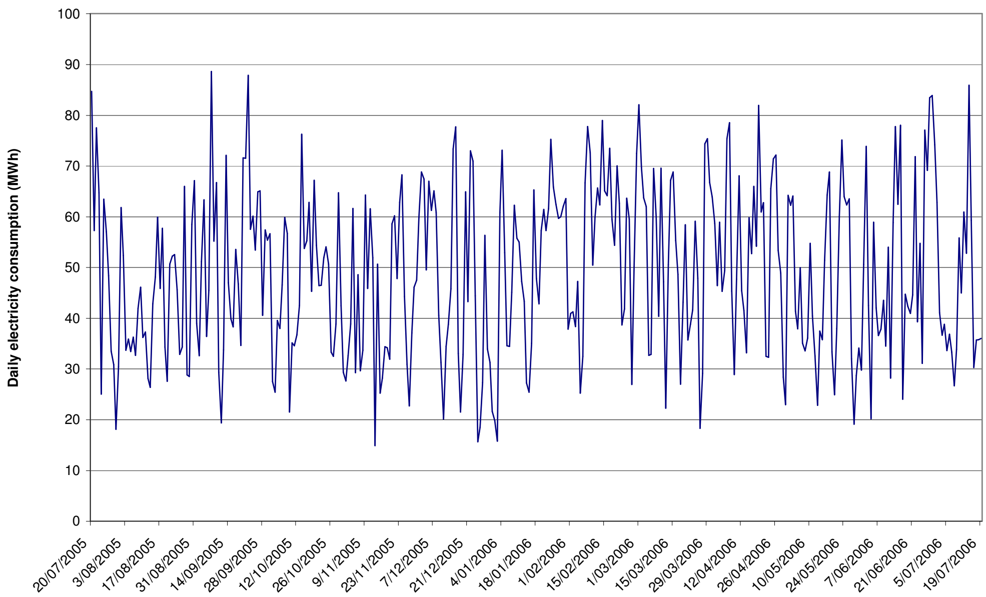


Figure 3 shows the trend in load profiles for 10 days of typical operations in June 2006. Load variability is also seen in this data, from a weekend daytime baseload of approximately 500kW, to a maximum over the 10 days of approximately 5,700kW.

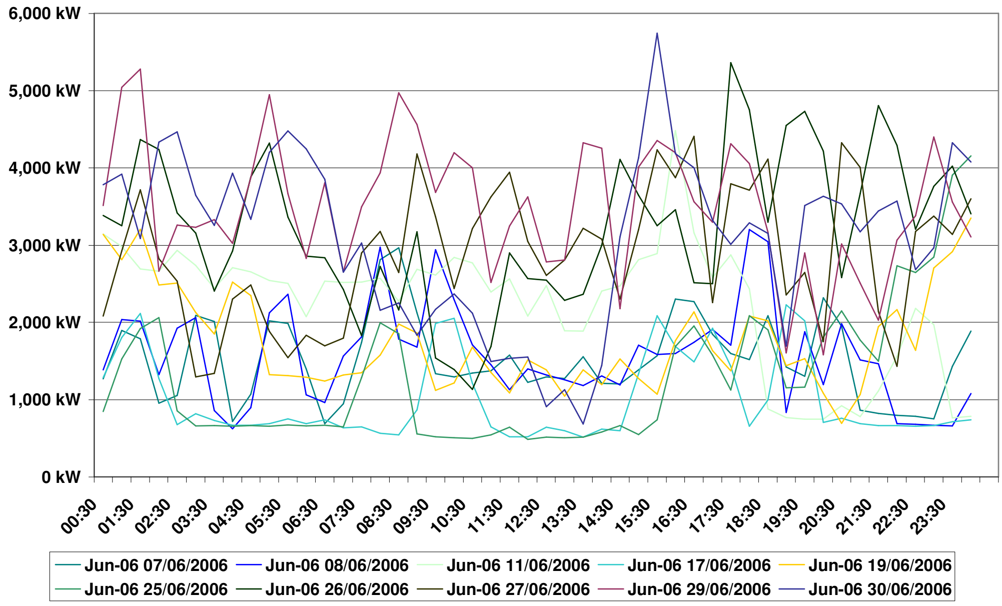
The weekend daytime baseload can be largely explained by transformer losses from the 22MVA of large transformers installed on site (110kW or 0.5%) and minor ventilation, lighting and auxiliaries, broken up across the following plant:

- 106kW at the North Substation Motor Control Centre (MCC)
- 46 kW at the South Substation MCC
- 70kW at the two ship loaders
- 30kW at the two reclaimers
- 30kW at rail receival; and
- a total of 20kW across the road receival and the three stackers.

This data was taken from logging carried out by PDE Solutions, some of which is shown in Figures 5 to 10 following.

Night-time flood lighting creates an additional base load of approximately 150kW based on the trends shown in Figure 3 and graphs produced by PDE Solutions.

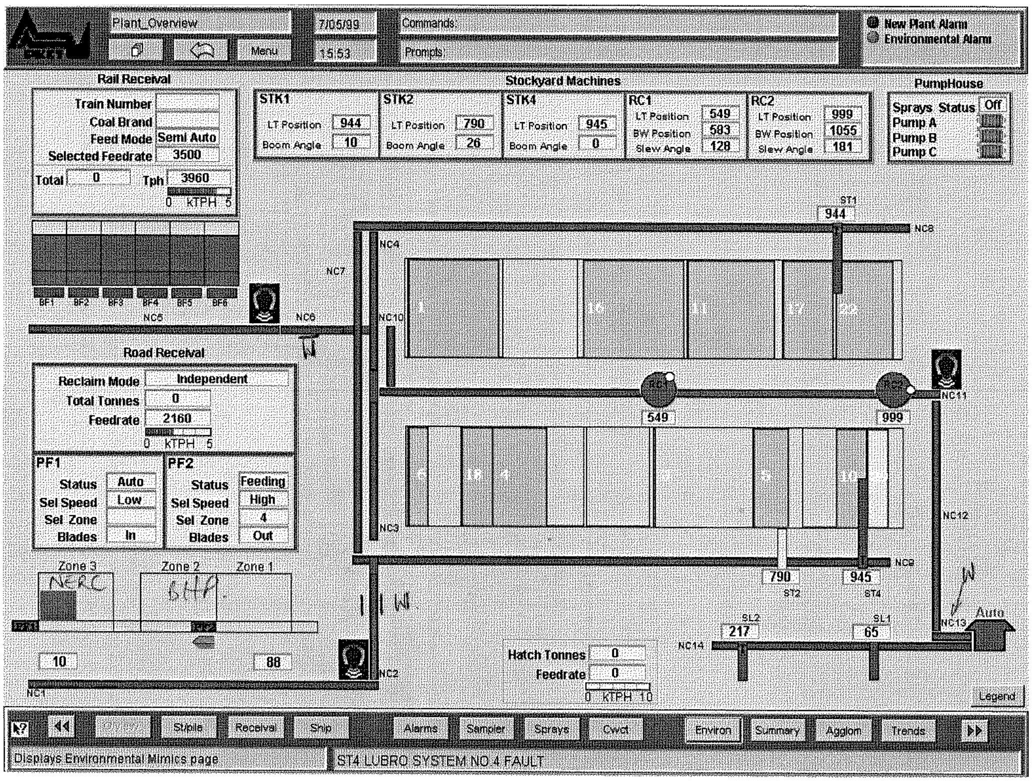
Figure 3: Daily Load Profile – NEEE001392, June 2006



2.1.3 Energy Use at Equipment Level

Major equipment at the PKCT site is shown in Figure 4 and is described below.

Figure 4: Schematic of Site Infrastructure



- Road Delivery system
  - Conveyors NC1 (rated at 250kW), NC2 (rated at 400kW) and NC9 (two drives rated at 520kW each)
  - Stackers (ST) 2 and 4 (peak load of approximately 300kW each, operated as duty/standby)
  - Minor loads including plough (dump shed) feeders, tunnel ventilation
- Rail Delivery system
  - Conveyors NC5 (two drives rated at 250kW), NC6 (rated at 250kW), NC4 (rated at 250kW) and NC8 (two drives rated at 520kW each)
  - Stacker (ST) 1 (peak load of approximately 325kW)
  - Minor loads including dump shed feeders
- Ship Loading system
  - Reclaimers (RC) 1 and 2 (peak load of approximately 600kW each, operated as duty/standby)
  - Conveyors NC11 (two drives rated at 520kW each), NC12 (two drives rated at 400kW each), NC13 (rated at 250kW) and NC14 (two drives rated at 520kW each)
  - Ship Loaders (SL) 1 and 2 (peak load of approximately 500kW each, operated as duty/standby)
  - Minor loads including sampling belts and crushers
- Auxiliaries
  - Transfer conveyors NC3 (rated at 250kW), NC7 (two drives rated at 250kW each operating as duty/standby in forward and reverse) and NC10 (rated at 150kW)
  - Stockpile watering
  - Runoff water collection pumps
  - No.1 Berth conveyors
  - Various outdoor lighting loads including approximately 100kW of night-time lighting, plus a lesser amount of enclosed conveyor gantry continuous lighting
  - Air compressors supplying workshops
  - Office lighting, air conditioning and equipment

Monitoring (logging) of power consumption was conducted by PDE Solutions in May and June 2005 for site power factor analysis. Some of the trends produced by PDE Solutions are shown following.

The logging was conducted at the level of transformers supplying major areas of the plant. Some major loads, such as stackers, reclaimers and ship loaders were logged individually. However, most conveyors are supplied from either Transformers North or Transformers South, depending on the location of their driven head. Details of which conveyors are supplied from which transformer are provided following.

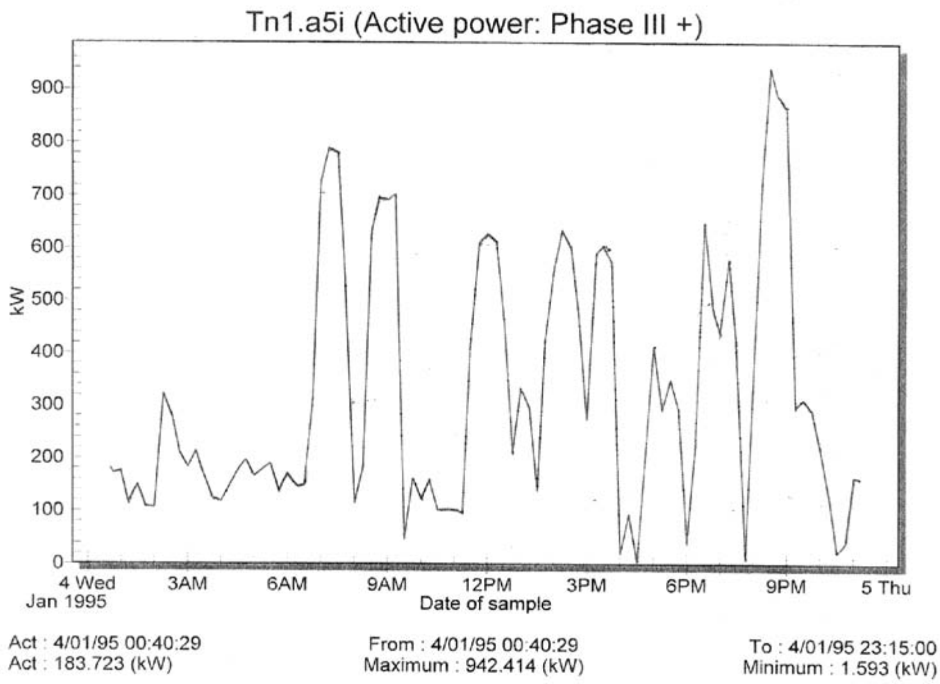
PDE Solutions also logged smaller site loads, including:

- Road ploughs, lights, general power etc (415V supply);
- Rail feeders, lights, general power etc (415V supply);
- South Substation MCC (415V supply), covering lighting, general power supplies, control equipment and some pumps; and
- North Substation MCC (415V supply), covering lighting, general power supplies, control equipment and some pumps.

Transformer North (TN) 1

Figure 5 shows consumption by conveyors powered from the northern substation TN1, including road receival conveyors NC1 and NC2, rail receival conveyors NC4, NC5 and NC6, and transfer conveyors NC3, NC7 and NC10. Spikes of 600 to 700 kW reflect road or rail belts operating in loaded condition for 1 to 1.5 hours duration, while higher spikes indicate the two systems operating together. Loads of 100kW to 400kW suggest belts running empty or at least underloaded. The opportunity to reduce or eliminate consumption during these periods is explored in Section 4.

Figure 5: Transformer North 1 (TN1) Logged Power Consumption



Transformer South (TS) 3

Figure 6 shows consumption by conveyors powered from the southern substation TN1, including rail receival conveyor NC8, road receival conveyor NC9 and ship loading conveyors NC11 to NC14. Within the trend it is difficult to pinpoint times when each of these systems were operating. However, demand less than 500kW, such as between 5pm and 3am, suggest that belts were operating underloaded. Again, the opportunity to reduce unloaded or underloaded operation of belts is explored further in Section 4.

Stacker (St) 1

Figure 7 shows consumption by Stacker 1. Stacker 1 is part of the designated rail receival system. Operation is usually start/stop with each train received. As shown in Figure 7, there are minor opportunities only to reduce unloaded operation prior to and post rail wagon unloading. Opportunities are explored in Section 4.

Figure 6: Transformer South 3 (TS3) Logged Power Consumption

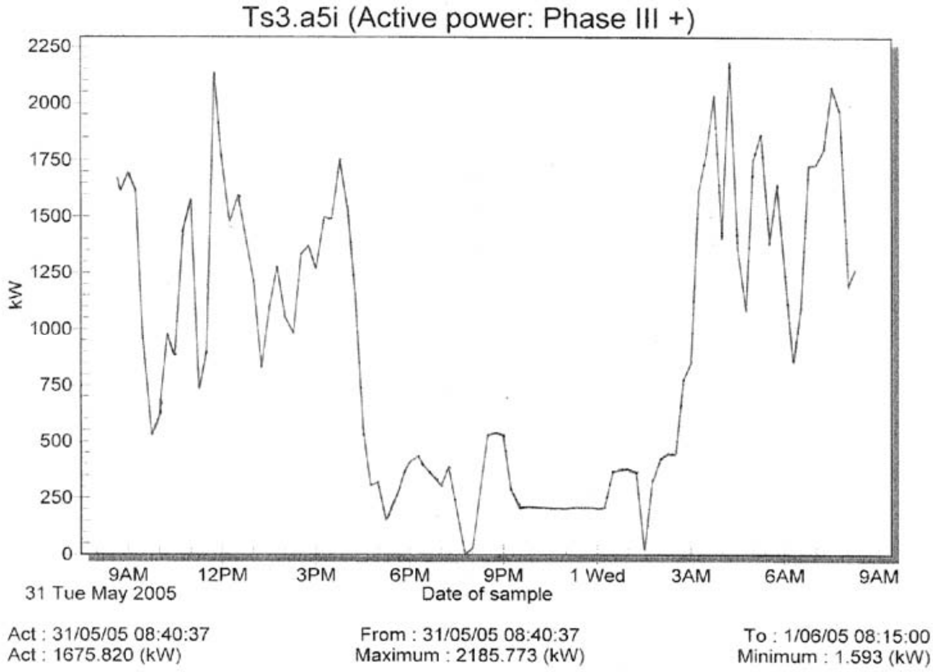
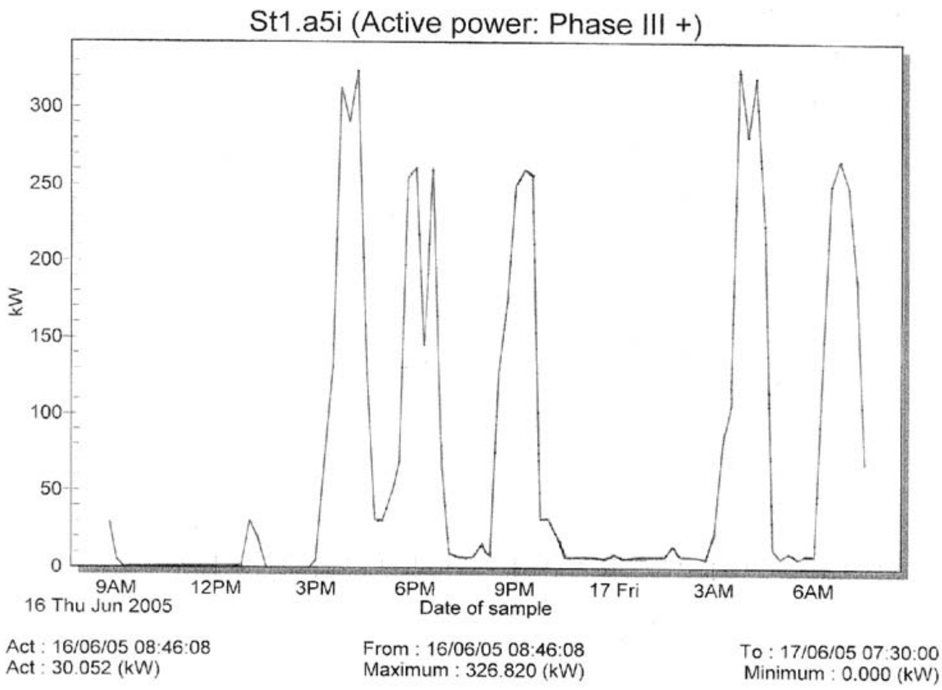


Figure 7: Stacker 1 (St1) Logged Power Consumption



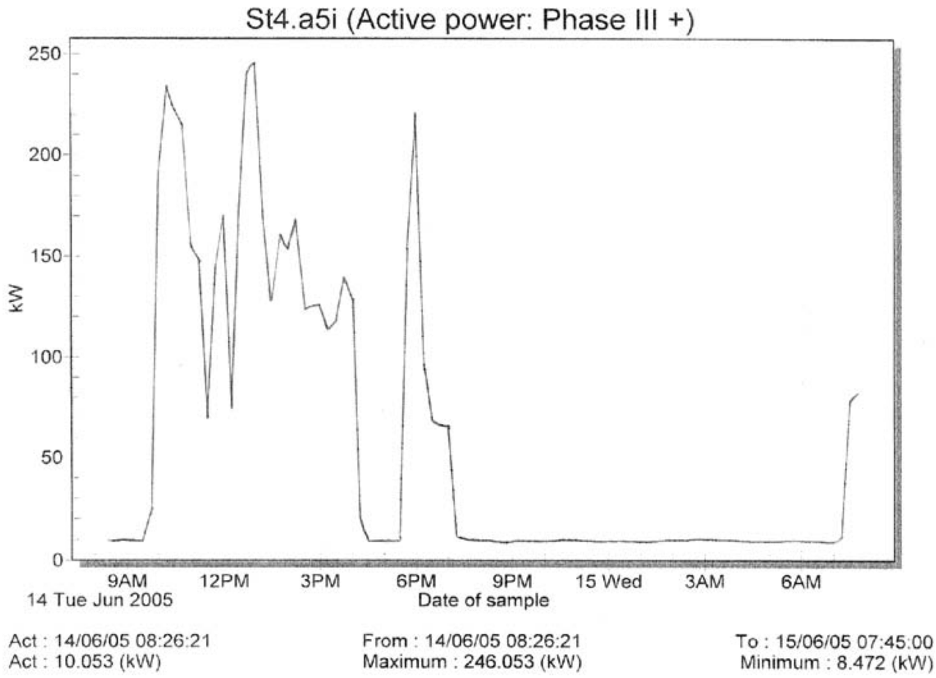
Stacker (St) 4

Figure 8 shows electricity consumption by Stacker 4. Stacker 2 and Stacker 4 are part of the designated road receival system. The two stackers operate as duty/standby and one stacker is usually dedicated to each of the two types of coal received by road. Stacker 4 in this case was more likely dedicated to BHPB coal.

The peak consumption of 250kW is indicative of fully loaded or near-fully loaded stacker belts. Periods of intermediate consumption suggest opportunities to reduce operation of partly loaded or unloaded belts. It is pleasing to see that the stacker was not operated for around 12 hours from 7pm to 7am, presumably when coal receivals did not warrant its operation.

Stacker 2 had lower utilisation during logging and was most likely dedicated to receival of NERC coal. There are fewer opportunities to reduce energy consumption on the NERC coal stacker, as this stacker and receival belts are normally operated fully loaded for just the duration of time needed to empty the relevant dump shed zone.

Figure 8: Stacker 4 (St4) Logged Power Consumption



Reclaimer (Rec) 1

Figure 9 shows electricity consumption by Reclaimer 1. Reclaimers 1 and 2 pick up coal from stockpiles for ship loading. The two reclaimers operate as duty/standby, with Reclaimer 2 having lower utilisation during logging. Load can be variable, particularly when feeding slowly to top up holds, but opportunities for savings are limited.

Ship Loader 1 (SL1)

Figure 10 shows electricity consumption by Ship Loader 1. Ship loaders 1 and 2 deliver the coal into the ships' holds. The two Ship Loaders operate as duty/standby, with Ship Loader 1 having lower utilisation during logging. Note the base load of approximately 40 to 50 kW, which may provide opportunities for savings. Otherwise opportunities are limited.

Figure 9: Reclaimer 1 (Rec1) Logged Power Consumption

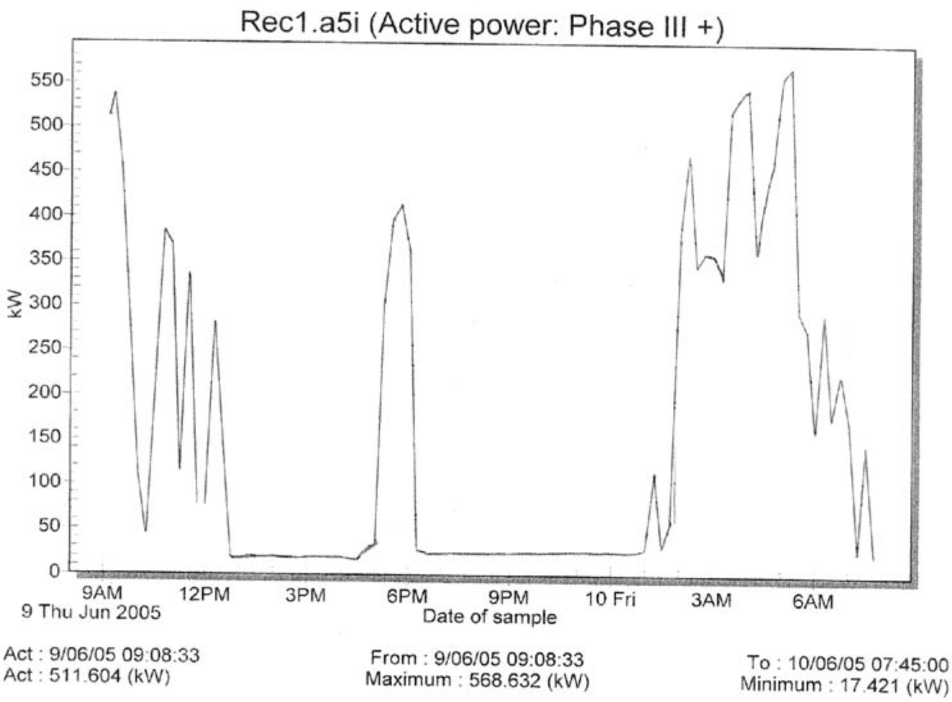
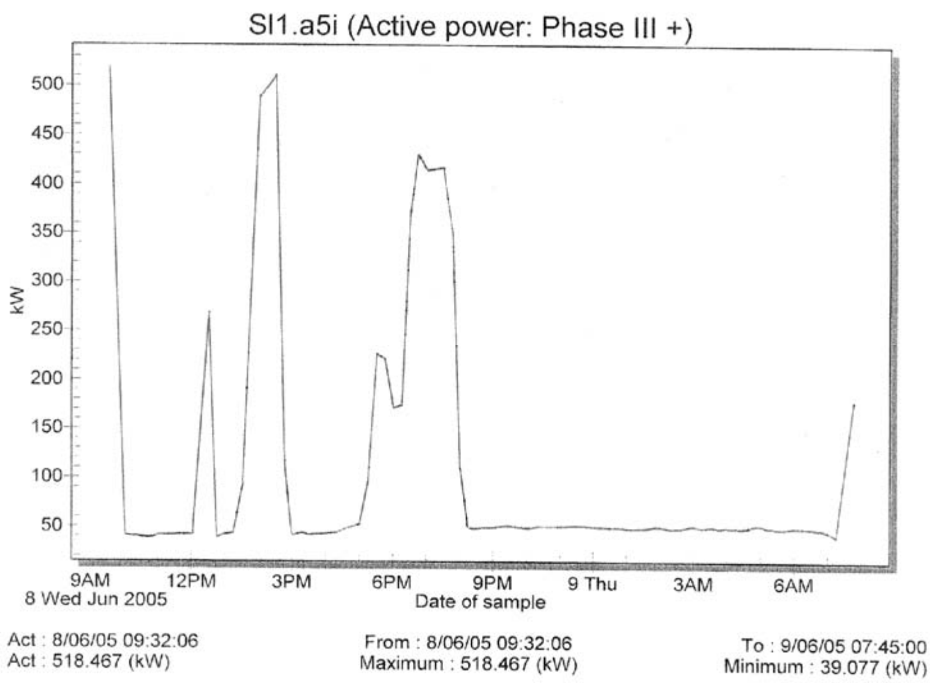


Figure 10: Ship Loader 1 (Sl1) Logged Power Consumption



2.1.4 Combined Site Energy Use at Equipment Level

The assessment of energy at an end-use level at PKCT indicates that demand from, and consumption by, major equipment is as shown in Table 2 and Figures 11 and 12. Maximum demand modelling was based on the maximum demands identified by the PDE Solutions logging and observed current drawn by operating conveyors during the site visit. Consumption modelling was based on the maximum demand breakup, observed current drawn by conveyors operating loaded and empty during the site visit, and operating profile as described by site personnel.

Table 2: Summary of Modelled Energy End-Use at PKCT

PLANT ITEM	PEAK LOAD (kVA)	% of PEAK LOAD	ANNUAL CONSUMPTION (MWh)	% of ANNUAL CONSUMPTION
ROAD DELIVERY STACKER	300	4.8%	1,276	7.2%
ROAD DELIVERY FEEDER	30	0.5%	128	0.7%
ROAD DELIVERY CONVEYORS NC 1,2,9	863	13.8%	3,671	20.6%
RAIL DELIVERY STACKER	350	5.6%	924	5.2%
RAIL DELIVERY FEEDER	120	1.9%	317	1.8%
RAIL DELIVERY CONVEYORS NC 4,5,6,8	1,340	21.5%	3540	19.9%
NO.1 BERTH CONVEYOR	238	3.8%	41	0.2%
MAIN SHIP LOADER SHIP LOADER	500	8.0%	1,158	6.5%
MAIN SHIP LOADER RECLAIMER	550	8.8%	1,073	6.0%
MAIN SHIP LOADER CONVEYORS NC 11,12,13,14	1,288	20.7%	2,983	16.7%
AUXILIARIES TUNNEL VENTILATION	9	0.1%	79	0.4%
AUXILIARIES TRUCK WASH	104	1.7%	63	0.4%
AUXILIARIES STOCKPILE WATERING	0	0.0%	434	2.4%
AUXILIARIES RUNOFF COLLECTION	275	4.4%	241	1.4%
AUXILIARIES LIGHTS	68	1.1%	438	2.5%
AUXILIARIES BATH HOUSE EXHAUST	9	0.1%	76	0.4%
AUXILIARIES AIR CONDITIONING	20	0.3%	32	0.2%
AUXILIARIES AIR COMPRESSORS	60	1.0%	394	2.2%
AUXILIARIES TRANSFORMER LOSS	110	1.8%	964	5.4%

Figure 11: Modelled Breakup of Peak Load at PKCT

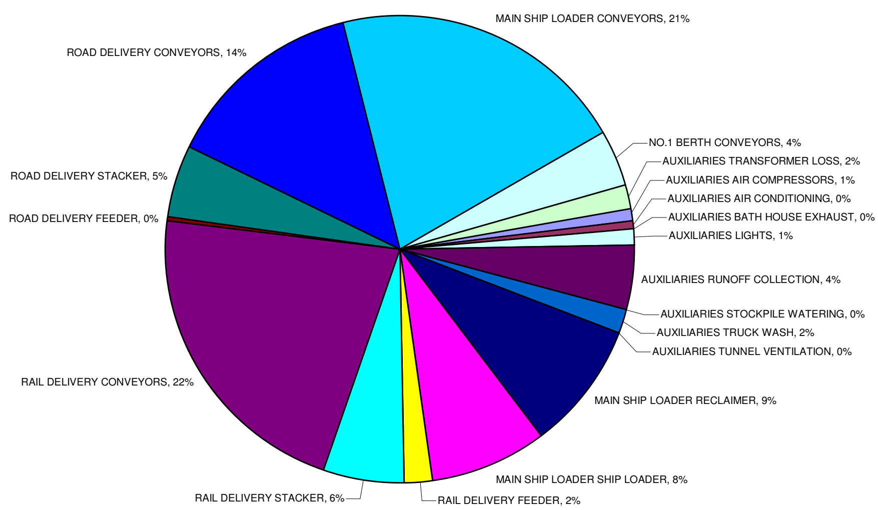


Figure 12: Modelled Breakup of Energy Use at PKCT

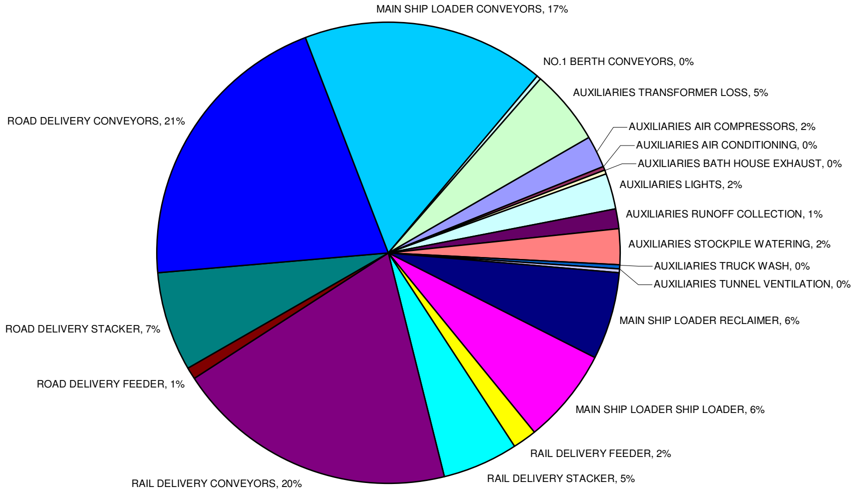


Table 2 and Figures 11 and 12 show that the major energy consumers on site are the rail delivery conveyors, road delivery conveyors, and ship loading conveyors. Together these loads account for nearly 60% of site energy consumption. The ship loading conveyors account for a greater percentage of peak load than of total consumption, due to their less frequent use than other equipment. Conversely, road delivery conveyors account for a lower percentage of peak demand than they do of consumption.

2.2 ASSESSMENT OF PERFORMANCE IN THE SITE KPI

Three metrics could potentially be used as site energy performance KPIs, as follows:

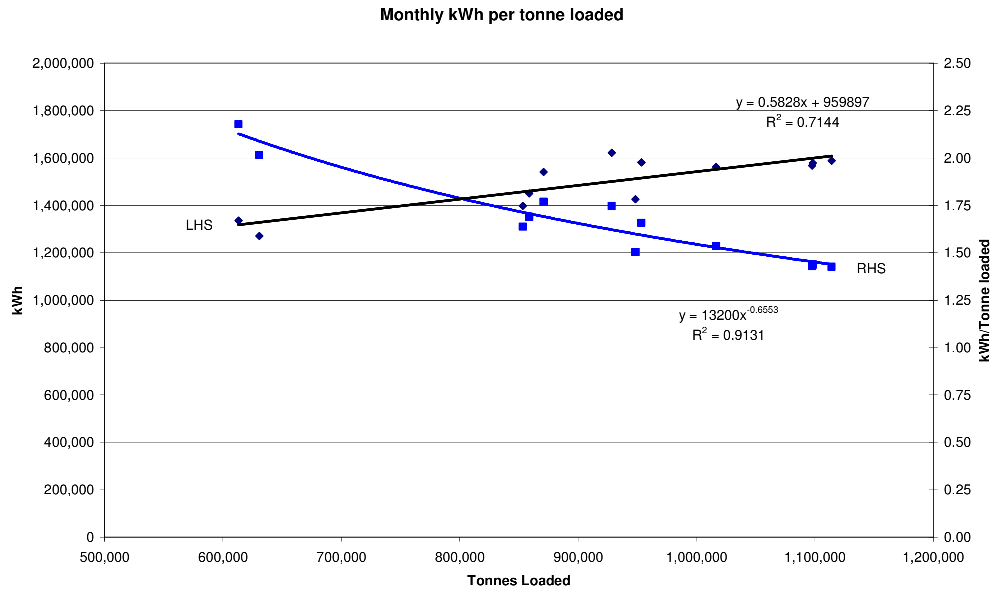
- Energy use per tonne of coal loaded. As shown in Figure 13 the correlation between the two is quite strong, with an R-squared over 0.7. The correlation could be even higher were it not for the relative effect of loading a large ship just outside or within a particular month. This is the KPI that PKCT prefers to use as it is reflective of their key production number – coal loaded. The KPI for the site over 2005/06 financial year was 1.63 kWh/tonne of coal loaded.
- Energy use per tonne of coal received. This gives a strong correlation, as around 55% of electricity used on site is used by road and rail feeders, conveyors and stackers to deliver the coal to stockpiles.
- Energy use per tonne of coal moved. This also gives a strong correlation, as all coal movements during a period of time are taken into account.

Table 3 shows the monthly energy consumption, tonnes of coal moved and resultant KPIs for the 2005/06 financial year. A chart of the correlation between energy use and coal loaded is shown following as Figure 13.

Table 3: Site Energy Use KPIs

Month	kWh	Loadings (T)	Receivals (T)	Total Movement (T)	kWh/T loaded	kWh/T received	kWh/T moved
Jul-05	1,540,653	870,796	1,001,862	1,872,658	1.769	1.538	0.823
Aug-05	1,335,253	613,119	764,699	1,377,818	2.178	1.746	0.969
Sep-05	1,578,400	1,098,077	987,921	2,085,998	1.437	1.598	0.757
Oct-05	1,426,148	948,313	825,800	1,774,113	1.504	1.727	0.804
Nov-05	1,270,972	630,658	788,662	1,419,320	2.015	1.612	0.895
Dec-05	1,450,144	858,697	874,752	1,733,449	1.689	1.658	0.837
Jan-06	1,567,893	1,097,395	965,267	2,062,662	1.429	1.624	0.760
Feb-06	1,561,988	1,016,459	1,037,784	2,054,243	1.537	1.505	0.760
Mar-06	1,621,494	928,283	1,108,306	2,036,589	1.747	1.463	0.796
Apr-06	1,588,256	1,113,903	987,399	2,101,302	1.426	1.609	0.756
May-06	1,397,631	853,206	927,306	1,780,512	1.638	1.507	0.785
Jun-06	1,580,747	953,359	1,003,217	1,956,576	1.658	1.576	0.808
Totals	17,919,579	10,982,265	11,272,975	22,255,240	1.632	1.590	0.805

Figure 13: Monthly kWh per Tonne of Coal Loaded



Despite the high R-squared values indicating good correlation, Figure 13 shows that energy consumption is quite consistent each month and is therefore somewhat independent of the amount of coal loaded. This suggests that there may be opportunities to reduce baseline non-productive energy consumption. Again, this is addressed in Section 4.

3. Energy Management Review

3.1 MEETING AGENDA AND ATTENDEES

The Energy Management review conducted using Energetics' proprietary One-2-Five®Energy. The review was held on site at PCKT administration offices on 28 June 2006, and ran for approximately two hours. The attendees are detailed below.

- Ben O'Brien – BHP Billiton Illawarra Coal - corporate
- Andrew Thompson - BHP Billiton Illawarra Coal - corporate
- Flavio Tonini – PKCT - Finance Manager
- Wayne Strudwick – PKCT - Electrical Maintenance Engineer
- Debra Murphy – PKCT - Business Improvement & External Affairs Manager
- Patrick Denvir – Energetics - Manager Energy & Resource Efficiency
- Martin Cousins - Energetics – Energy Consultant

Further discussions were held following the Energy Management Review as follows:

- Actions recommended by the diagnostic tool were discussed by the meeting attendees. Some further actions were proposed by the site personnel. All Energy management Review Actions are shown below.
- The main 'drivers' or key issues and decision making criteria for the site were discussed. These are also outlined below.
- A list of generic opportunities that might be expected at a coal terminal were examined and discussed, with the objective of developing a list of likely opportunities for more detailed investigation at the site. Opportunities which Energetics and/or site personnel believed were feasible were further investigated and screened during a site visit held on 24 August 2006 and via follow up correspondence with site personnel. Opportunities that were identified as cost effective, potentially cost effective or had already been done are outlined in Section 4.

3.2 ENERGY MANAGEMENT REVIEW

3.2.1 Results of the Management Review

PKCT achieved 2 stars in the One-2-Five®Energy review, and improvements in the areas identified to be a medium or high priority for action would raise this level to close to 3 stars. Mapping this performance against the requirements set out in the DEUS Energy Savings Action Plan Guidelines gives the following results:

Table 4: Results of Management Systems Review

		Low	Moderate	Minimum Sustainable	Industry Leader	Best Practise
A	Senior Management Commitment			X		
B	Understanding of Energy Savings Potential			X		
C	Energy Targets and KPIs		X			
D	Energy Metering and Monitoring		X			
E	Energy Management Reporting			X		
F	Energy Supply Management		X			
G	Operating and Maintenance Procedures		X			
H	Accountabilities for Energy management			X		
I	Training and awareness procedures		X			
J	Compliance with regulatory and/or legal requirements			X		

3.2.2 Management System Actions

The specific actions recommended from the One-2-Five®Energy review are listed in order below, with the ESAP management areas, responsibilities and planned completion dates. The last action was nominated as important by a site person.

Table 5: Responsibility for Energy Management Action

Action No	Energy Management Action (Enter Energy Management Action developed by Review Team)	Responsibility	Review Area/s.	Planned Start Date	Planned Completion Date
1	**Senior Management Commitment**		A	**Jan-07**	**Dec-10**
	a) Ensure that energy management is a regular agenda item at executive-level meetings. Report on energy management activities and progress made towards goals contained in the organisations energy directive/policy.	Flavio Tonini		*Jan-07*	*Dec-10*
2	**Training and awareness procedures**		I	**Jan-07**	**Dec-08**
	a) Conduct basic energy-awareness activities within your organisation, focusing on cost savings and environmental issues associated with energy use. Disseminate the information using tools such as the organisation web site or newsletter.	Wayne Strudwick		*Jan-07*	*Dec-08*
3	**Energy Metering and Monitoring & Energy Management Reporting**		D & E	**Jan-07**	**Dec-10**
	a) Establish specific performance indicators (i.e. kWh per unit of output, dollars per unit of output, etc.) for energy to manage progress towards overall cost reduction targets.	Wayne Strudwick / Energetics		*Jan-07*	*Jun-07*
	b) Have management recognise energy management achievements of individuals and teams through awards, newsletter articles, etc.	Flavio Tonini		*Jun-07*	*Dec-10*
4	**Energy Metering and Monitoring & Energy Management Reporting**		D & E	**Jan-08**	**Dec-08**
	a) Generate monthly reports depicting overall energy use per unit of activity (e.g. kWh per area) and examine results where they show large cost or usage variance from target.	Steve Wicks		*Jan-08*	*Dec-08*
5	**Operating and Maintenance Procedures**		G	**Jan-07**	**Dec-07**
	a) Implement maintenance practices that call for prompt corrective action once an energy wasting condition is identified.	Rob Royters		*Jan-07*	*Dec-07*
6	**Accountabilities for Energy management**		H	**Jan-07**	**Dec-07**
	a) Allocate responsibility for completion of the Management System Review actions (done), and overall responsibility and specific actions to achieve the 2% reduction in energy consumption for 2006/07 target.	Debra Murphy		*Jan-07*	*Dec-07*

3.3 DECISION MAKING CRITERIA

Financial return is an important consideration in evaluation of any project. Typically a two-year payback is sought for non OHS- or licence-related projects. However, decisions are not just made on the basis of a payback period, but on the benefits of the project relative to other proposals and to the overall available budget. Opportunities that are identified as 'cost effective' may not be implemented in the short term, or at all, due to these considerations and other criteria (below).

All projects and opportunities are also assessed using the company's criteria relating to all capital expenditure applications. A simplified version of the approvals form, shown below, outlines the key assessment criteria for each potential opportunity. Each major opportunity was presented in the template below, with supporting data and analysis as necessary, in order to facilitate assessment of opportunities.

ENERGY SAVING OPPORTUNITY EVALUATION			
Site:		**Date:**	
Project Name:			
Is approval being sought adding further cost to an existing capital project? (NO/YES):			
If "Yes" What is the capital project number (description)?:			
If "No" give a brief description of the Capital Project.			
Amount Sought:	**$**		
Project Classification:	Compliance / Productivity / Sustaining / Improvement Opportunity		
Person nominated for responsibility of project:			
Expected date of commissioning of asset:			
Capital Project No:		**Asset Location:**	
CAPITAL SUBMISSION MEMORANDUM: 1. SUMMARY Brief overview, significant issues, cost (in or out of budget) & classification 2. BACKGROUND Brief history (eg how plant is currently operated) 3. PROJECT DESCRIPTION Detailed description & reason for selection 4. OCCUPATIONAL HEALTH AND SAFETY CONSIDERATIONS Proposal risks or benefits, HSEC changes req'd, training 5. ENVIRONMENT AND COMMUNITY CONSIDERATIONS If applicable (eg flaring) 6. HR ISSUES Relevance to changes in the way the proposal affects employees / others (eg ventilation controls) 7. CAPITAL DESCRIPTION Items & associated costs / contingency 8. TIMING / PROJECT SCHEDULE Key date(s) 9. BUSINESS PLAN If applicable or BHPB to complete 10. DESCRIPTION OF OTHER ALTERNATIVES Identify alternatives, including do nothing, and reason for rejection 11. FINANCIAL ANALYSIS NPV, IRR, Payback, including assumptions & sensitivity analysis if applicable (eg 10-year life, 0% escalation, 15% discount rate) 12. EQUIPMENT STANDARDISATION / OTHER IMPACTS Similar equipment on site / IC 13. AREAS OF VULNERABILITY OR RISK Concerns (technology, people, support, environmental) 14. MARKETING ISSUES Impact on coal transport, quality, scheduling, quantity if applicable 15. APPENDICES List relevant supporting information & include below if applicable (eg spreadsheet, Citect trends)			

4. Opportunities Identified

4.1 OPTIMISE ROAD DELIVERY CONVEYORS & STACKERS

ENERGY SAVING OPPORTUNITY EVALUATION			
Site:	PKCT	**Date:**	October 2006
Project Name:	Automate & Optimise Road Delivery Conveyors & Stackers		
Is approval being sought adding further cost to an existing capital project? (NO/YES):	Yes		
If "Yes" What is the capital project number (description)?:			
If "No" give a brief description of the Capital Project.			
Additional programming as part of road dump shed automation to reduce under-loaded operation of road receival conveyors and other infrastructure, and thereby reduce energy consumption.			
Amount Sought:	**$ 20,000**		
Project Classification:	Improvement Opportunity		
Person nominated for responsibility of project:	**Wayne Strudwick**		
Expected date of commissioning of asset:	**March 2007**		
Capital Project No:		**Asset Location:**	

CAPITAL SUBMISSION MEMORANDUM:

1. SUMMARY

Additional programming is proposed as part of current road dump shed automation to reduce under-loaded operation of road receival conveyors and stackers, and thereby reduce energy consumption.

2. BACKGROUND

PKCT normally receives coal from two suppliers by road: BHPB and NREC. The coals are dumped in separate zones in the road receival dump shed, BHPB coal being received in Zones 1 and 2 and NREC coal in Zone 3. The coals are fed separately to designated stockpile areas using common belts.
Each dump shed Zone has a capacity of 1,000 tonnes, thus providing surge and storage capacity, particularly while the other coal variety is being delivered to stockpiles. Belts and stackers are devoted to BHPB coal by default and are then switched to NREC coal when required by the level in the NREC zone. For significant periods of time belts operate partly loaded or even empty, as truck arrivals of BHPB coal can be sporadic.
PKCT is planning to increase automation of the coal receival process using level sensors and PLC control. **It is proposed to use the opportunity presented by the dump shed level sensors and improved automation to reduce electricity consumption by reducing equipment run times and ensure that equipment is operated close to maximum loading at all times.**
Note that underloading of belts is not an issue with NREC coals, as Zone 3 is normally emptied in as short a period of time as possible, with belts operating at current capacity, to avoid Zones 1 and 2 filling and delaying truck unloading.

3. PROJECT DESCRIPTION

The project involves using programming being installed to measure coal level in each dump shed zone, to start and stop road dump shed feeders, conveyors NC1, 2 and 9, and stackers in a way that ensures equipment is operating as close as possible to fully loaded.

4. OCCUPATIONAL HEALTH AND SAFETY CONSIDERATIONS

Employees should be reminded that systems can start at any time under the proposed system.

5. ENVIRONMENT AND COMMUNITY CONSIDERATIONS

Positive benefit - reduction in electricity consumption and resultant greenhouse gas emissions.

6. HR ISSUES

Automation of road receival infrastructure will result in a manning reduction which was addressed in the original dump shed automation proposal.

7. CAPITAL DESCRIPTION
Minor additional programming beyond that already planned will be required.

8. TIMING / PROJECT SCHEDULE
Programming could be expected to be implemented by March 2007 in line with dump shed automation.

9. BUSINESS PLAN
Will address Business Plan goal of 2% reduction in energy consumption.

10. DESCRIPTION OF OTHER ALTERNATIVES
The main alternative is a business-as-usual or do nothing approach. While this is possible, it does not capture the readily available savings in energy, manning and maintenance costs.
Another alternative is to install VVVF drives on conveyors. However, this carries a much higher capital cost in the high voltage VVVF units, and to extend the two existing 2-level switch rooms.

11. FINANCIAL ANALYSIS
Additional capital requirement beyond that already approved for dump shed automation is minimal. Payback will be less than 3 months. See calculation of savings attached. Payback calculations exclude any maintenance benefits and benefits already included in justification of the current automation.

12. EQUIPMENT STANDARDISATION / OTHER IMPACTS
Equipment used is standard and industry proven.

13. AREAS OF VULNERABILITY OR RISK
HR issues associated with manning reduction are part of original dump shed automation proposal. Shutting off belts and allowing levels to build up in BHPB dump shed zones produces a small risk that more trucks will be held up if dump shed zones are not empty before switching to empty other zones. However, it is expected that the improved dump shed zone level monitoring will provide better information for operators to decide when to switch from delivering one coal type to another. Manual intervention to empty BHPB zones before switching to NREC zones should be able to overcome this. However, approval is required by the Operations Manager.

14. MARKETING ISSUES
Nil.

15. APPENDICES
A summary of calculations is shown.

Description	Quantity	Units	Comment
Road delivery - reduce operating hours			
Peak load	1,163	kW	Including road delivery belts and stacker
Belt empty load	582	kW	Assume 50% of peak load
Current annual operating time empty	2,190	hours	Assume belts and stacker operating unloaded for 6 hours a day based on transformer logging
Annual energy savings	1,273	MWh	By eliminating belt empty time
Annual cost savings	$42,980	pa	Assuming off-peak energy costs
Estimated cost	$20,000		Additional programming of dump shed automation
Simple payback	0.5	years	

4.2 OPTIMISE RAIL DELIVERY CONVEYORS & STACKER

ENERGY SAVING OPPORTUNITY EVALUATION			
Site:	PKCT	**Date:**	October 2006
Project Name:	Automate & Optimise Rail Delivery Conveyors & Stackers		
Is approval being sought adding further cost to an existing capital project? (NO/YES):	Yes		
If "Yes" What is the capital project number (description)?:			
If "No" give a brief description of the Capital Project.			
Additional programming as part of rail dump shed automation to reduce empty operation of rail receival conveyors and other infrastructure, and thereby reduce energy consumption.			
Amount Sought:	**$ 20,000**		
Project Classification:	Improvement Opportunity		
Person nominated for responsibility of project:	**Wayne Strudwick**		
Expected date of commissioning of asset:	**March 2007**		
Capital Project No:		**Asset Location:**	

CAPITAL SUBMISSION MEMORANDUM:

1. SUMMARY

Additional programming as part of rail dump shed automation to reduce empty operation of rail receival conveyors and other infrastructure, and thereby reduce energy consumption.

2. BACKGROUND

The conveyors and stackers normally dedicated to rail receival of coal are operated as required by PKCT operators. They are normally turned on prior to or as a train arrives at the terminal and turned off approximately 30 minutes after dumping is complete. Unnecessary operation can occur between starting the belts and dumping of the first wagon, particularly if train arrival is delayed, or if belts are not shut down as quickly as possible after completion of dumping. Using the planned dump shed level sensors and improved automation would allow unnecessary operation of belts and stackers to be reduced, and thereby reduce electricity consumption. Note that as existing procedures already restrict unloaded belt operation to relatively short periods of time, the potential savings are less than for the road belts described in section 4.1 above.

3. PROJECT DESCRIPTION

The project involves creating programming to measure coal level in the rail dump shed, and to start and stop feeders, conveyors and the stacker in a way that ensures equipment is operating only when coal is available.

4. OCCUPATIONAL HEALTH AND SAFETY CONSIDERATIONS

Employees should be reminded that systems can start at any time under the proposed system.

5. ENVIRONMENT AND COMMUNITY CONSIDERATIONS

Positive benefit - reduction in electricity consumption and resultant greenhouse gas emissions.

6. HR ISSUES

Automation of rail receival infrastructure will result in a manning reduction which was addressed in the original dump shed automation proposal.

7. CAPITAL DESCRIPTION

Minor additional programming beyond that already planned will be required.

8. TIMING / PROJECT SCHEDULE

Programming could be expected to be implemented by March 2007 in line with dump shed automation.

9. BUSINESS PLAN

Will help to address Business Plan goal of 2% reduction in energy consumption.

10. DESCRIPTION OF OTHER ALTERNATIVES

The main alternative is a business-as-usual or do nothing approach. While this is possible, it does not capture the readily available additional savings in energy and maintenance costs.

11. FINANCIAL ANALYSIS
Additional capital requirement beyond that already approved for dump shed automation is minimal. Payback will be less than 1 year. See calculation of savings attached. Payback calculations exclude any maintenance benefits.

12. EQUIPMENT STANDARDISATION / OTHER IMPACTS
Equipment used is standard and industry proven.

13. AREAS OF VULNERABILITY OR RISK
HR issues associated with manning reduction are part of original dump shed automation proposal. Minimal potential for delays to trucks or trains. However, approval is required by Operations Manager.

14. MARKETING ISSUES
Nil.

15. APPENDICES
A summary of calculations is shown. Existing trends for the rail system stacker can be seen in Figure 7.

Description	Quantity	Units	Comment
Rail delivery - reduce operating hours			
Peak load	1,690	kW	Including rail delivery belts and stacker
Belt empty load	845	kW	Approximately 50% of peak load
Annual operating time empty	1,042	hours	Assume 30 mins per train based on logging data and 2084 trains per annum from receival data
Saving in annual operating time empty	521	hours	Reduce empty running time by 15 minutes per train
Annual energy savings	440	MWh	
Annual cost savings	$22,800		Assuming average energy costs
Estimated cost	$20,000		Additional programming of dump shed automation
Simple payback	0.9	years	

4.3 COMPRESSED AIR

ENERGY SAVING OPPORTUNITY EVALUATION			
Site:	PKCT	**Date:**	October 2006
Project Name:	Replace and relocate site air compressors		
Is approval being sought adding further cost to an existing capital project? (NO/YES):	No		
If "Yes" What is the capital project number (description)?:			
If "No" give a brief description of the Capital Project.			
Replacing existing air compressors with a new efficient compressor closer to the points of use to reduce energy consumption.			
Amount Sought:	**$33,000**		
Project Classification:	Sustaining / Improvement Opportunity		
Person nominated for responsibility of project:	**Rob Royters**		
Expected date of commissioning of asset:	**December 2007**		
Capital Project No:		**Asset Location:**	

CAPITAL SUBMISSION MEMORANDUM:

1. SUMMARY

Replacing existing air compressors with a new efficient compressor closer to the points of use to reduce energy consumption.

2. BACKGROUND

PKCT has two approximately 30 kW 25-year old air compressors supplying workshops for air tools and a plasma cutter, an air hoist in the lube store and for filling tyres at the fuel bowsers. The compressors have been observed to operate continuously despite the highly intermittent identified air demands, suggesting a significant system leak or loss, or control problem. The compressors are also inefficiently located a significant distance from the points of air use. Based on identified air uses, the compressors appear to be operating far in excess of requirements. Replacement of existing compressors with a new, smaller compressor closer to the points of use would reduce energy consumption.

3. PROJECT DESCRIPTION

The project firstly involves verification of existing air compressor capacity and operation, and site air requirements. Leak testing has commenced and an issue has been identified with air loss at a grease pump in the lubrication store bypassing air intermittently under pressure. This issue needs to be resolved prior to assessment of the need to replace the compressors. A compressor duty cycle imbalance was also detected at the most recent service (following commencement of the ESAP process). Duty cycle control is being reviewed. If operation of existing compressors is still excessive and not able to be remedied by simple maintenance actions, the suggestion is to replace existing 25-year old compressors with a new efficient compressor closer to the points of use. Redundant pipework would also be isolated.

4. OCCUPATIONAL HEALTH AND SAFETY CONSIDERATIONS

Nil.

5. ENVIRONMENT AND COMMUNITY CONSIDERATIONS

Positive benefit - reduction in electricity consumption and resultant greenhouse gas emissions.

6. HR ISSUES

Nil.

7. CAPITAL DESCRIPTION

$33,000 in capital is requested to cover purchase and installation of a new compressor.

8. TIMING / PROJECT SCHEDULE

Project implementation could be expected by December 2007.

9. BUSINESS PLAN

Energy savings are expected to amount to a 1.5% reduction in site energy use, which is three-quarters of the Business Plan goal of 2% reduction in energy consumption.

10. DESCRIPTION OF OTHER ALTERNATIVES

The compressors have recently been serviced and a duty cycle imbalance was found. Duty cycle control is being reviewed. An issue with the grease pump in the lubrication store bypassing air intermittently under pressure was also detected and is being investigated. These measures may reduce compressor operation and energy consumption significantly and remove the need for capital expenditure. Addressing the problem with the grease pump is required for both the proposed and alternative options. Business-as-usual or do nothing is also a possible approach. However, this does not capture the potential savings in energy costs.

11. FINANCIAL ANALYSIS

Calculations of potential savings are shown below. A simple payback of around 2 years is expected.

12. EQUIPMENT STANDARDISATION / OTHER IMPACTS

Equipment used is industry proven.

13. AREAS OF VULNERABILITY OR RISK

Risk in cost estimate due to actual air demand and hence compressor size and cost.

14. MARKETING ISSUES

Nil.

15. APPENDICES

A summary of calculations is shown.

Description	Quantity	Units	Comment
Compressed air - replace existing compressors			
Current annual electricity consumption	394	MWh	Based on observed compressor operation
Revised annual electricity consumption	99	MWh	Assumed to be a quarter of existing unit
Assumed annual electricity saving	296	MWh	
Annual cost savings	$15,303		Based on average tariff rates
Estimated compressor cost	$15,500		
Estimated installation cost	$15,000		
Implementation cost	$30,500		
Simple payback	1.99	years	

4.4 SHIP LOADERS BASE LOAD

ENERGY SAVING OPPORTUNITY EVALUATION			
Site:	PKCT	**Date:**	October 2006
Project Name:	Reduce Ship Loader base load		
Is approval being sought adding further cost to an existing capital project? (NO/YES):	No		
If "Yes" What is the capital project number (description)?:			
If "No" give a brief description of the Capital Project.			
Provide electrical interlocks or modify processes and procedures to reduce base ship loader base load.			
Amount Sought:	**$20,000**		
Project Classification:	Improvement Opportunity		
Person nominated for responsibility of project:	**Wayne Strudwick**		
Expected date of commissioning of asset:	**December 2007**		
Capital Project No:		**Asset Location:**	

CAPITAL SUBMISSION MEMORANDUM:

1. SUMMARY

Modify processes and procedures to reduce base load at the Ship Loaders.

2. BACKGROUND

The two Ship Loaders have day-time base loads of 30 and 40 kW when not in use as shown by Figure 10. This represents a significant amount of energy given the modest usage rates of the loaders (estimated conservatively at no more than 50% of total hours based on power logging including that shown in Figure 10). The exact nature of this base load is uncertain, but may be lighting or ventilation fans that were heard & observed operating during site visits.

3. PROJECT DESCRIPTION

The project involves investigation of the source of the base load and whether this load is necessary when the ship loaders are idle. Assuming that the load is not necessary, work would aim to develop electrical interlocks or procedures to ensure that all unnecessary loads are shut off when ship loaders are idle.

4. OCCUPATIONAL HEALTH AND SAFETY CONSIDERATIONS

Nil.

5. ENVIRONMENT AND COMMUNITY CONSIDERATIONS

Positive benefit - reduction in electricity consumption and resultant greenhouse gas emissions.

6. HR ISSUES

Nil.

7. CAPITAL DESCRIPTION

$20,000 in capital is requested to investigate and if necessary develop electrical interlocks or procedures to ensure unnecessary loads are shut down when ship loaders are not in use.

8. TIMING / PROJECT SCHEDULE

Project implementation could be expected by December 2007.

9. BUSINESS PLAN

Energy savings could amount to a 230 MWh reduction in site energy use, which is 1.3% of site energy consumption.

10. DESCRIPTION OF OTHER ALTERNATIVES

Business-as-usual or do nothing is a possible approach. However, this does not capture the potential savings in energy costs.

11. FINANCIAL ANALYSIS

Calculations of potential savings are shown below. A simple payback of less than 2 years is expected.

12. EQUIPMENT STANDARDISATION / OTHER IMPACTS
Equipment used would be industry proven.

13. AREAS OF VULNERABILITY OR RISK
Assuming base load is due to ventilation fan operation, there is a small risk that modifications would result in insufficient ventilation and equipment failure.

14. MARKETING ISSUES
Nil.

15. APPENDICES
A summary of calculations is shown.

Description	Quantity	Units	Comment
Ship Loaders - reduce base load			
Current annual electricity consumption	307	MWh	Based on ship loader idle time and logged base load
Revised annual electricity consumption	77	MWh	Assumed to be a quarter of existing unit
Assumed annual electricity saving	230	MWh	
Annual cost savings	$11,909		Based on average tariff rates
Estimated implementation cost	$20,000		
Simple payback	1.68	years	

4.5 IMPROVED POWER FACTOR CORRECTION

ENERGY SAVING OPPORTUNITY EVALUATION			
Site:	PKCT	**Date:**	June 2006
Project Name:	Improve Site Power Factor		
Is approval being sought adding further cost to an existing capital project? (NO/YES):	No		
If "Yes" What is the capital project number (description)?:			
If "No" give a brief description of the Capital Project.			
Supply, install and commission new controls on site power factor correction equipment.			
Amount Sought:	**$52,200**		
Project Classification:	Sustaining / Improvement Opportunity		
Person nominated for responsibility of project:	**Wayne Strudwick**		
Expected date of commissioning of asset:	**June 2006 (substantially complete) with ongoing optimisation to December 2007**		
Capital Project No:		**Asset Location:**	

CAPITAL SUBMISSION MEMORANDUM:

1. SUMMARY

Supply, install and commission new controls on site power factor correction equipment.

2. BACKGROUND

PKCT had existing PFC capacitors and controllers. However, many of the 25-year old controllers were inadequate or no longer functioning correctly, which presented an improvement opportunity. PKCT implemented a power factor correction project in the first half of 2006 (after the baseline year). PKCT engaged PDE solutions to conduct a thorough review of power factor at boards across the site. **This project is now substantially complete** – PKCT has installed new controllers in many areas. Project justification analysis of this project is shown. Payback was estimated to be less than one year. PKCT is continuing to review power factor and is now investigating the need for additional capacitors across the site, in an attempt to further reduce peak demand charges.

3. PROJECT DESCRIPTION

The initial phase of the project involved assessment of power factor at boards across the site and identification and replacement of deficient controllers. Further work being undertaken involves monitoring of system performance and possible installation of additional capacitors.

4. OCCUPATIONAL HEALTH AND SAFETY CONSIDERATIONS

Nil.

5. ENVIRONMENT AND COMMUNITY CONSIDERATIONS

Positive benefit - reduction in electricity consumption and resultant greenhouse gas emissions.

6. HR ISSUES

Nil.

7. CAPITAL DESCRIPTION

Initial capital request was for $52,200 for controller replacement. Further capital may be requested to install additional capacitors.

8. TIMING / PROJECT SCHEDULE

Installation of new controllers was implemented in first half 2006. Ongoing monitoring is expected to mid 2007. Request for additional capacitors will then follow if beneficial.

9. BUSINESS PLAN

Project already committed and substantially completed.

10. DESCRIPTION OF OTHER ALTERNATIVES

Business-as-usual or do nothing was a possible approach, however this would not capture the potential savings in energy costs. Controllers have now been replaced and monitoring is taking place.

11. FINANCIAL ANALYSIS

Calculation of expected savings is shown. A simple payback of less than 1 year was expected.

12. EQUIPMENT STANDARDISATION / OTHER IMPACTS
Equipment used was industry proven.

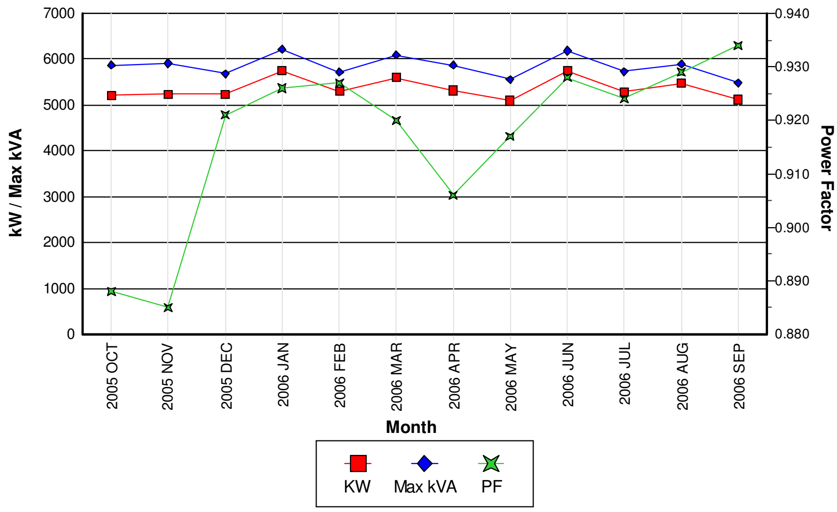
13. AREAS OF VULNERABILITY OR RISK
Potential for faults during installation and commissioning of new equipment. This phase has passed.

14. MARKETING ISSUES
Nil.

15. APPENDICES
A summary of calculations made by PKCT prior to installation and a trend of site performance for the year to September 2006 is shown.

Plant area	Maximum kVA	PF at Max kVA	New Target PF	New kVA at New PF	kVA Saving	kVA Cost	Total Cost Saving	kVA Cost Without PFC	kVA Cost with PFC
Reclaimer 1	680	0.75	0.95	537	143	$4.750	$680.00	$3,230.00	$2,550.00
Reclaimer 2	680	0.77	0.95	551	129	$4.750	$612.00	$3,230.00	$2,618.00
Road	21	0.7	0.95	15	6	$4.750	$26.25	$99.75	$73.50
Ship Loader 1	690	0.75	0.95	545	145	$4.750	$690.00	$3,277.50	$2,587.50
Ship Loader 2	637	0.76	0.95	510	127	$4.750	$605.15	$3,025.75	$2,420.60
Stacker 1	520	0.62	0.95	339	181	$4.750	$858.00	$2,470.00	$1,612.00
Stacker 2	454	0.62	0.95	296	158	$4.750	$749.10	$2,156.50	$1,407.40
Stacker 4	475	0.52	0.95	260	215	$4.750	$1,021.25	$2,256.25	$1,235.00
NSS TN1	203	0.9	0.95	192	11	$4.750	$50.75	$964.25	$913.50
SSS TS3	1948	0.86	0.95	1763	185	$4.750	$876.60	$9,253.00	$8,376.40
NS MCC	100	0.95	0.95	100	0	$4.750	$0.00	$475.00	$475.00
Rail	126	0.81	0.95	107	19	$4.750	$88.20	$598.50	$510.30
Total	6534	Average PF		5217					
		0.750833333			**Total Cost Savings per month**		**$6,257.30**	**$31,036.50**	**$24,779.20**
					Total Cost Savings per Year		**$75,087.60**		

Maximum kVA Demand Profile



4.6 POTENTIALLY COST EFFECTIVE OPPORTUNITIES

A number of other opportunities were considered at the site but required further investigation. These items are described below.

4.6.1 Direct Coal Loadout

Standard material movement at PKCT is to receive and dump (stack) the coal on the ground, then reclaim it as required to load ships. PKCT has the capability to load ships direct from the train or truck. This was done more often in the past but is now usually only done when a ship is waiting on a delivery of a particular coal by road or rail. Loading direct does require careful management to avoid delaying other trucks and trains, and to avoid demurrage costs through delaying ships, **so this option requires further investigation**. The potential savings are shown in the table below.

Description	Quantity	Units	Comment
Direct loading			
Avoid (per train)			
NC8 or NC9	-442	kWh	
Stacker	-350	kWh	
Reclaimer	-275	kWh	
Add			
Reclaimer belts half load	161	kWh	Ship loading may proceed slower than normal as delivery belts and feeders have lower rating.
Ship loader half load	62.5	kWh	
Net change (benefit per train)	-844	kWh	
Cost saving per train	-$44	per train	
Hours loading ships	2926	h pa	
Number of trains received during this time required for ship	440	trains	
Potential saving	371	MWh	All trains arriving while ship in required for ship directed to ship - this may not be possible
Potential saving	$19,221		Also need to consider demurrage costs

4.6.2 Replacing chutes to allow conveyors to run at higher loadings

Some of the finer coal that PKCT receives is known to be sticky and cause blockage problems in chutes at higher belt loadings. To overcome this problem, PKCT limits the tonnes per hour flowrate on the belts. This increases power consumption as belts run longer to transport the same amount of coal. Replacement of chutes to allow higher loadings is an **opportunity that requires further investigation**. It may also have substantial benefits in delaying need for site augmentation to process greater coal tonnage.

4.6.3 Reduced use of stockpile sprays

PKCT is a significant water use within NSW, consuming 488 ML in the year ended 30 June 06 and 464 ML in the year ended 30 June 05. The vast majority (95%) is for dust suppression purposes. It is understood that PKCT was required to produce a Water Saving Action Plan (WSAP) for DEUS.

Programming to use water efficiently is already in place, including operation of sprays according to wind speed and direction. Various cycle times and combinations of sprays are provided.

PKCT are also looking at receiving TTE (tertiary treated effluent) from a nearby sewage treatment plant (STP) to achieve a reduction in potable water use. This water is energy intensive to produce, although the energy consumption will occur at the STP and not the PKCT site and it is expected that PKCT will not pay more for this water.

Regardless of the source of water used, PKCT could consider opportunities to improve the effectiveness of their existing dust suppression, within the constraints of minimising dust movement off site. Opportunities that could be considered include:

- Using Citect to identify areas in which coal is stored and reducing watering in empty stockpile areas.

- Monitoring additional coal and weather conditions below and including them in programming. It is understood that other coal storage facilities use these measures.
    - Coal moisture
    - Humidity
    - Temperature
    - Evaporation

Reducing unnecessary stockpile watering would also reduce coal moisture, which is a key product quality consideration and is understood to have been a concern in some instances.

It would also be worth considering diverting treated site runoff water to the site storage tank for use in dust suppression, in preference to discharge from site. This would increase site energy consumption slightly due to additional pumping but would reduce site potable water consumption. It may also reduce site risks associated with quality and quantity of water discharge from site. Again, capture and reuse of runoff water is a common practice at similar sites.

The energy and water savings available through these measures are dependent on weather conditions and are difficult to quantify. The main risks of reduced watering are increased site dust emissions which could lead to increased community complaints and even EPA attention. Nevertheless, potential opportunities to reduce unnecessary wetting may exist. **This option requires further investigation.**

4.6.4 Reduce lighting in workshops

PKCT has large workshops which are now unused for long periods of time. There is an opportunity to reduce lighting hours and coverage in the workshop buildings. Approximately 30kW of high bay lighting exists across three maintenance workshop buildings. Assuming operation could be reduced by 16 hours/day, 7 days/week would give a saving of 175 MWh or $9,050 per annum. However, PKCT needs to consider OH&S implications of this action. **This opportunity therefore requires further investigation.**

4.7 ACTIONS WITHIN PAST 5 YEARS

Two further opportunities have been implemented since the baseline year, as described below.

4.7.1 Replacement of inefficient office air conditioning

A 35 kW air conditioner with heater banks previously serviced the whole office block and was operated continuously as parts of the office were manned 24 hours a day, seven days a week. The unit was replaced with a more efficient 25kW reverse cycle unit servicing the main upstairs office that now operates during office hours only, and a small split system for the downstairs office which is manned 24/7.

4.7.2 Removal of redundant amenities lighting and heating

The maintenance offices particularly previously housed a much larger number of staff. As many maintenance functions are now conducted by contractors, the number of amenities areas has been rationalised. Lighting and change room heating has been isolated from those areas that are no longer used.