Submission No 116

INQUIRY INTO CROSS CITY TUNNEL

Organisation:	Lane Cove Municipal Council
Name:	Mr Peter Brown
Position:	General Manager
Telephone:	
Date Received:	5/06/2006

Theme:

Summary

LANE COVE COUNCIL

SUBMISSION

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TO

JOINT SELECT COMMITTEE

ON THE CROSS CITY TUNNEL

WITH RESPECT TO

THE LANE COVE TUNNEL

May 2006

John Lee
Director Major Projects

Peter Brown
General Manager
Lane Cove Council
25 May 2006

The Rev Fred Nile,
Chair,
Joint Select Committee on the Cross City Tunnel

Dear Sir,

By letter dated 20th April 2006, Lane Cove Council was invited to make a submission in regard to the expanded terms of reference for the Joint Select Committee on the Cross City Tunnel to include:

(g) the role of Government agencies in relation to the negotiation of the contract with the Lane Cove Tunnel Consortium,
(h) the extent to which the substance of the Lane Cove Tunnel contract was determined through community consultation processes,
(i) the methodology used by the Roads and Traffic Authority for tendering and contract negotiations in connection with the Lane Cove Tunnel, and
(j) any other related matters.

The attached submission has been prepared by Council's Director Major Projects, Mr John Lee and is approved by Council under delegation given to me.

Mr Lee was appointed by Lane Cove Council to manage the Councils and community interests in regard to the Lane Cove Tunnel and he commenced employment with Council early in November 2003.

Victoria Pymm, Acting Principal Council Officer, General Purpose Standing Committees has confirmed that a late submission be accepted as John Lee, Lane Cove Council's Director Major Project will be overseas until 31 May 2006.

Yours faithfully,

Peter Brown
GENERAL MANAGER

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1. EXECUTIVE SUMMARY

The Terms of Reference of the Joint Select Committee into the Cross City Tunnel and its expansion to consider the Lane Cove Tunnel (TOR) are relatively narrow in (g) and (h) in regard to the period of contract negotiations between the RTA and the Lane Cove Tunnel Consortium (LCTC) after Project approval. During that 12 month period there was minimal consultation with the community or Council largely due to the commercial considerations.

In the month prior to contract signing, the RTA's conduct in regard to mid tunnel access was unacceptable and unprofessional. DoP's assessment role of the Mid Tunnel Access was also unacceptable in approving two residential lots for mid tunnel access despite it being least acceptable to Council and the community and when Council had put forward other viable options. Council's option for mid tunnel access with a truck loop under Epping Road and underground stockpiles was ultimately adopted (despite being rejected by Gary Humprhrey and John Betts in advice to DoP on 2 December 2003). Had genuine consultation with the Council and the community occurred, mid tunnel access could have been resolved much earlier without anxiety to those living adjacent to 130-132 Epping Road.

In regard to TOR (i) Council has limited and anecdotal information in regard to the methodology used by the RTA in its negotiations.

Within the intent of TOR (j) *"any other related matters"* it is necessary to consider relevant issues and information available for the period beyond the 12 months between Ministerial approval on 3 December 2002 and contract signing on 3 December 2003.

Of extreme concern is the conduct of the RTA in lodging its revised ventilation design for the tunnel on 25 October 2002 AFTER public submissions closed on 16 August 2002 for its Preferred Activity Report. There was no public consultation on the proposed ventilation design or public awareness of an air intake close to residential properties at 130-132 Epping Road or changes in emissions from the stacks.

Council had engaged the expert assistance of Dr Peter Best of Katestone Environmental to advise it of the project's environmental impacts. Katestone raised a number of serious issues. Clearly the basis of his assessment changed without opportunity for Council or others to further comment.

When the public consultation process requires a public EIS, consideration of representations and submissions, and then submission for approval a preferred activity report (PAR), there is a flaw in the process with public consultation ceasing after submissions to the PAR when the proponent can make major modifications to its PAR, 2 months after public submissions closed knowing that no further public input is required.

Also of concern is the six (6) working day planning assessment period between receipt of the revised ventilation design and the Director General's Draft Final

planning report. Six (6) working days is insufficient time for DoP to consult with experts and assess the RTA's revised ventilation design. Mistakes were made including setting the maximum concentrations and mass limits. Recently it came to light that the RTA had an amended report on congested conditions in circulation which superceded Appendix C of the DG Planning Report. This superceded report, however, was not made public and was not identified in the DG Planning Report. The circulation to and/or use made of the amended report on congested conditions by DoP warrants investigation.

The DG Planning Report referred to the revised ventilation design set out in Appendix C as a **major modification** including two additional ventilation tunnels and additional air flows.

Our concerns on unfiltered ventilation only compounded in May 2004, 6 months after the contract was signed to learn that the RTA contracted on a longer tunnel and deleted one of the ventilation tunnels 1600m long, redirecting its pollution loads from the eastern to the western stack. This change to the approved ventilation system was secretly made without community, Council or Government Agency consultation. This change included in the contract was not even referred to in the NSW Treasury report.

There would appear to be a lack in probity if Government contracts are entered into incorporating non-assessed, unapproved changes, involving millions of dollars.

The perfunctory RTA Consistency Assessment and Environmental Review carried out 5 months after the Contract, clearly failed to establish consistency with the approval. When the DoP was asked in June 2004 to require RTA comply with the legislation, Sam Haddad refused to get involved. Who does the community turn to if DoP have no capacity or legislative power to insist on compliance?

This submission examines the traffic volumes in the base case financial model forming part of the contract. It must be assumed that the base case financial model traffic volumes factored in the Government's expansion of public transport for the Lane Cove Corridor. Did nobody in the RTA do a sanity check on the traffic volumes and question how 93,500 vpd move through a two lane tunnel? Does the RTA really expect the tunnel to operate at maximum capacity eastbound between 6am and 7pm 10 years from now in 2016?

The RTA practice of under predicting traffic volumes is highlighted with reference to its feasibility study in 1999 and the base case financial model with a near doubling of traffic volumes for the tunnel in 2016.

Under predicting traffic volumes has resulted in wrong decisions being made on the number of lanes in the tunnel and on Epping Road. Low traffic volume predictions also misinformed the environmental impacts of the project. If all 4 tenderers proposed 3 lanes in each direction as an alternate solution, the decision by RTA not to incur a minor expense now to provide the required capacity (already identified in the base case financial model accepted by the RTA in its contract) needs to be investigated.

Council and members of the various community committees set up for the project have been continually frustrated by the RTA and LCTC's refusal to make public the traffic volumes being used for the project, claiming Commercial in confidence. No public interest was served by the RTA contracting non disclosure of traffic volumes.

The Contract's secrecy provisions deliberately kept the public uninformed about the much higher traffic volumes the LCTC predicted would use the tunnel. Alarm bells ring when the RTA's 2037 end of the project traffic projections are achieved in 2009/10 eastbound and 2011/12 westbound in the base case financial model,. They ring for much higher emission loads than the EIS projections, they ring for congestion on surface roads especially eastbound where there isn't the lane capacity to cope and they ring for the chaos that Epping Road surface modifications will bring.

It is clear that decisions made in regard to reducing the capacity of Epping Road in the absence of sufficient capacity within the tunnel were made on misinformation and must be reviewed. Quite simply one general traffic lane on Epping Road eastbound east of Mowbray Road will have a major adverse impact into the Lane Cove West Business Park and into Lane Cove more generally.

This Council has attempted to meet with various Roads Ministers with limited success. Air quality still remains a major issue. Although possibly outside the scope of this enquiry, the continued underestimation between 50% and 100% of particulates in the design of Sydney's M5 East, Cross City Tunnel and the Lane Cove Tunnel identified by the CSIRO's Dr Peter Manins is extremely concerning when CO is the only design criteria for the ventilation system in tunnel and the mistake in setting inappropriate limits allows unjustified levels of concentrations from the stacks.

The call for proven filtration technology has been consistent. The retrofit cost is much more expensive. RTA knew from their Japanese trip before the contract was signed that in tunnel filtration is recognized as being preferred to in stack treatment. The project deed is silent of filtration and makes no requirement to consider PM_{10} in the ventilation design. No details have emerged to demonstrate that space is provided in tunnel for electrostatic precipitators or what filtration solution has been considered and what is its estimate of cost. To date, no detailed costing to filter the Lane Cove Tunnel has been made public. The reliance on the Flagstaff report costing to retrofit filtration in the stack on the M5 East is inappropriate in its application to the Lane Cove Tunnel particularly in estimating the cost of filtration incorporated as part of the ventilation design. The RTA should identify what additional costs would now be incurred retrofitting filtration under traffic.

A $10m contribution from the Federal Government in October 2004 toward full filtration has not resulted in any serious negotiations other than a glib 'if the Federal Government increases its offer to 50% of an unknown amount….'. With an extra $62m spent on the additional ventilation as a solution to pollution based on dilution rather than filtration treatment, the real concerns of our community on this central issue continue to be ignored. More money has been spent on avoiding filtration than embracing its use. A community member of the AQCCC recently asked why the Japanese have incorporated filtration into more than 40 out of 80 tunnels more than 2

km. Garry Humphrey knows that the Japanese have cost effective solutions using Electrostatic Precipitators. Unfortunately filtration is seen by the RTA as a project risk rather than a community benefit.

We have proposed as an alternative to the filtration trial announced by former Roads Minister Scully for filtration to be included the Lane Cove Tunnel and monitored by RTA under operating conditions combining the $20m to be spent on the trial (rated at 10% of tunnel air flows) with the $10m from the Federal Government and matched with the $35m State Government promise of 50% made by Roads Ministers Costa and Tripodi based on RTA's ballpark $70m inflated cost. We believe that $70m of filtration would resolve M5 East as well as Lane Cove Tunnels.

The community consultation process with CCLGs and AQCCC during the construction period has been a farce on substantive issues. Fundamental to frustrations in Council and community dealings with the RTA, LCTC and TJH is that Contract details were completed without consultation on landscaping, urban design, ventilation including stacks and cycleways. When the community were unhappy with proposals and asked for changes, they were told time and again it couldn't be changed because it was in their contract. Further, the details of the Contract were kept secret. The failure to deliver the MCoA requirements for Epping Road do to provide a boulevard effect with underground power is but one of many examples where the contract seems to have overridden the intent of the approval for which the Community have been frustrated.

The appointment and engagement of independent experts, reviewers, verifiers and representatives should be independent of the constructing company and Proponent although the cost of their engagement may be indirectly borne by the Proponent. Conflicts of interest including the operator for the Lane Cove Tunnel owning the Independent Verifier is not in the interest of good public governance.

It is too late for many of the issues raised in this submission to result in physical changes to the project, but may assist in defining a better process in the delivery of infrastructure projects in the future.

Outcomes which this enquiry may have a positive influence on include:

a) A review of the MCoA 173 limits for mass and concentrations of pollutants within the tunnel;
b) Transparency of information including contract details other than price;
c) True independence from the proponent of those required to exercise an independent role on the project including the Independent Verifier, Independent Community Liaison Representative, and air quality auditors;
d) Inclusion of proven filtration technology within the tunnel to remove harmful pollutants both within the tunnel and from the discharged plume from 2 ventilation stacks;
e) A better quality of access into, from and within Lane Cove via Epping Road for local traffic;
f) Either by way of an expansion of these terms of reference or by other means, a review of the changes made to the project which are at variance to the Contract or the MCoA; and

g) A review of legislation that places responsibility for assessment of changes of a project exclusively with the Minister for Planning.

Council appreciates the efforts of the Legislative Council in issuing Parliamentary Orders which have brought to light many areas of concern. This submission refers to information obtained from contract documents tabled in the Legislative Assembly and from documents produced under a number of Parliamentary Orders of the Legislative Council.

The referenced documentation is extensive and has been included in full on the enclosed CD to assist the Committee in any contextual reading. Relevant extracts from referenced documents are included in the Attachments.

Issues that Council wishes to draw to the attention of the Committee are highlighted bold and underlined.

2. DICTIONARY

AM means anti meridian
Appendix C means the RTA Revised Ventilation Design Assessment submitted to DoP on 25 October 2002.
AQCCC means the Air Quality Community Consultative Committee required by the MCoA
Base Case Financial Model means the Base Case Financial Model forming part of the Project Deed.
Contract means the Contract between the RTA and Lane Cove Tunnel Company dated 3 December 2003.
Council means the Lane Cove Council, unless its context refers to another Council
DoP means the various names for the Department of Planning including Department of Urban Affairs and Planning (DUAP) and Department of Infrastructure, Planning and Natural resources (DIPNR).
EIS means the Environmental Impact Statement for the Lane Cove Tunnel and associated Road Improvements dated October 2001
LCTC means the Lane Cove Tunnel Company / Lane Cove Tunnel Consortium (Tender stage)
MCoA means a condition(s) imposed by the Minister for Planning for the Lane Cove Tunnel project
PB means Parsons Brinkerhoff, Principal designers for TJH
PM means post meridian
Project Deed means the Project Deed documentation forming part of the Contract.
RTA means the Roads and Traffic Authority
The Feasibility Report means the Link between M2 and Gore Hill Freeway Tunnel and Financial feasibility Study received by Council on 7 April 1999.
The DG Planning Report means the Proposed Lane Cove Tunnel and Associated Road Improvements Volume 1 Director-General's Report prepared under Section 115c of the Environmental Planning and Assessment Act 1979 dated November 2002.
TJH means the Thiess John Holland Joint Venture
Vph means the number of vehicles per hour .
Vpd means the number of vehicles per day

3. BACKGROUND

3.1. INTRODUCTION

Lane Cove Council was not a party to any negotiations of the contract with the Lane Cove Tunnel Consortium (LCTC).

Some information included in this submission has been obtained from contract documents tabled in the Legislative Assembly or from documents produced under a number of Parliamentary Orders of the Legislative Council.

The following section provides a background to the Lane Cove Tunnel approval.

3.2. 1999 RTA FEASIBILITY STUDY ON THE LINK BETWEEN THE M2 AND GORE HILL FREEWAY

Attachment 1 on page **39** is relevant extracts from the draft RTA's 1999 Tunnel and Financial Feasibility report ("the Feasibility Report") into the Link between the M2 and Gorehill Freeway dated prior to April 1999. A full copy of the report is included on the CD.

This Feasibility Report is referenced as it provides the background to selecting the preferred 2 lane Epping Road tunnel Option H3 with a $2.00 toll (1999 $) and 2 lanes on the Gore Hill Freeway (Option H3 page 3 and Scenario E1 Table 2.1 Page 12).

It is assumed that the $2.00 toll (1999 $) in the EIS and contract has its basis in this feasibility report.

The preferred option outlined in the Feasibility Report was:

- Two 2 lane motorway or tunnels east and westbound
- Main tolling facilities at the eastern portal within the Gore Hill Freeway
- Ramp tolling facilities at the Pacific highway at Alto Place
- Gore Hill Freeway and Reserve Road has direct access to /from the eastern portal
- M2 and Epping Road has direct access to/from the eastern portal
- Gore Hill Freeway has two lanes in each direction
- Epping Road two lanes each way, with one lane allocated as an eastbound AM transit lane and full right hand turns at intersections

Its relevance to this enquiry is to demonstrate RTA incompetence in predicting combined AM peak hour traffic projections for 2016 in the tunnel and on Epping Road west of the Pacific Highway between the initial feasibility, the EIS and traffic volumes in the contract's base case financial model.

The combined AM peak hour traffic projections for 2016 in vehicles per hour (vph) is summarized as:

Study	Epping Road west of Hwy	Tunnel
1999 Feasibility Study	1,939	**4,797**
2001 EIS	2,570	**7,727**
2002 Contract Base Case Financial Model	?	**9,000**

From Table 2.7 of the Feasibility Report, the annual average daily traffic for both tunnels was modelled at 58,456 vpd.. Clearly the initial feasibility study **significantly understated traffic projections when compared to the EIS projection of 119,901 vpd and the Base Case Financial model of 159,900 vpd.**

It must be concluded that the 1999 Feasibility Report misinformed the community in its deliberation in support of a two lane tunnel.

The much higher traffic volumes in the Base Case Financial Model compared to the EIS is further discussed in **Section 6.6** of this submission.

3.3. 2001 Environmental Impact Statement

The EIS for the Lane Cove Tunnel and Associated Road Improvements was dated October 2001. A copy of the relevant EIS working papers is included on the CD. The relevant extracts from Working Papers 4 (Traffic) and 9 (Air Quality) referred to in this submission are in **Attachment 2** and **Attachment 3** on pages 41 and 44 respectively.

3.4. Lane Cove Council Submissions to EIS

Attachment 4 on page 45 is Councils submission dated 7 January 2002 in regard to the EIS.

Specific reference is made to Points 6 and 7 which stated:

6 In the event that the project as currently proposed does not significantly ameliorate the high level of through traffic in the local streets of Lane Cove, then the RTA develop proposals and/or alter the project proposal to achieve the removal of through traffic from local streets; and

7 Subject to 6. above, reconfigure Epping Road between Centennial Avenue and Longueville Road to two lanes each way.

3.5. 2002 Representations Report including the Preferred Activity Report

The RTA's Representations Report including modifications to the proposal and a Preferred Activity Report (PAR) was prepared by the RTA in June 2002.

After the Representations Report was forwarded to DoP, the PAR was placed on public exhibition between 15 July 2002 and 16 August 2002. A further 60

representations were received subsequent to the closing date for representations to the EIS. Most additional representations were in response to the exhibition of the PAR.

Changes in the PAR of interest to Council included:

a) The western ventilation stack location was changed from Orion Road to Sirius Road with an approved Sirius Road stack height at RL 62 m AHD, 8m lower than a nearby commercial office Tower .
b) Bus Interchange at Longueville Road and Pedestrian Bridge link over Longueville Road;
c) Improved bus priority for the Pacific Highway between North Sydney and Longueville Road by converting the existing transit lanes to bus lanes to improve public transport opportunities;
d) At each exhaust station a space of 20m x 50m would be reserved for possible future installation of air treatment plant (filtration equipment). The air treatment plant would be located adjacent to the stack to enable the construction of a by-pass between the ventilation tunnel and the stack through the air treatment facilities.

3.6. LANE COVE SUBMISSIONS TO THE REPRESENTATIONS REPORT

Council's further response in regard to the Representations Report is **Attachment 6** on page 56**.** Its issues, particularly in regard to increased pedestrian movements to the proposed bus interchange and the need for signalized intersections at Little Street / Birdwood Ave for improved pedestrian safety have not been resolved. When the matter was raised during community consultation, TJH made it clear that such matters were "outside their project boundary". This is just one example of the lack of resolution of issued raised but not addressed by RTA.

3.7. CHANGES MADE TO THE VENTILATION SYSTEM AFTER PUBLIC EXHIBITION OF THE PAR AND BEFORE MINISTERIAL APPROVAL

Before considering the RTA / LCTC contract negotiations which involved changes to the approved ventilation design, it is essential to examine and understand the changes previously made to the ventilation design and on which Ministerial Approval was predicated. Once the PAR was exhibited, there was no further consultation with Council or the community in regard to changes to the ventilation design.

There were substantial changes made to the Ventilation System proposed in the EIS and as modified by the RTA in the PAR. As a consequence of issues raised by the DoP, NSW Health, EPA and the Community RTA were required to a revised the in-tunnel carbon monoxide (CO) design objective to 50 ppm over 30 minutes.

Attachment 5 on page 39 details the RTA's hourly emission loads and concentrations of their revised ventilation design submitted to DoP on 25 October 2002. The report is included in Volume 2 as Appendix C and included in full on the CD.

3.8. REVISED VENTILATION REPORT - APPENDIX C

The revised design in Appendix C was referenced in the DG Planning Report 17 times and once in the MCoA 173. Volume 2 (ISBN 0 7347 0394 5 (vol 2)) does not appear available on the Internet.

The DG Planning Report (an extract of which is in **Attachment 7** on page 67) outlines the changes as ***Major Modifications*** and as ***Substantial*** to include:

i) provision for a tunnel air extraction point in both the eastbound and westbound tunnels;
ii) excavation of additional exhaust tunnels to connect the tunnel air extraction points to main exhaust tunnels to the ventilation stacks;
iii) provision for an air intake station at ground level which provides external air to both the eastbound and westbound tunnels, and associated tunnel excavation;
iv) utilization of either the Moore Street compound area or two vacant lots of land (owned by the RTA) on the southern side of Epping Road, approximately 150 metres east of Moore Street at 130 and 132 Epping Road, for provision of the air intake station;
v) provision of additional exhaust fans at each of the eastern and western ventilation stacks;
vi) provision of additional jet/axial fans within both the eastbound and westbound tunnels; and

On page 26 of the DG Planning Report it said
The ventilation system considered in the EIS had the potential for smoke being drawn along the length (up to 3.4 km) of the tunnel to the ventilation stack or the portals during a fire or other smoke generating incident. Under the revised ventilation design, smoke would now travel a maximum of two (2) kilometres along the tunnel.

The Department considers that the new design is a substantial improvement over the initial design and that the set of safety provisions proposed by the Proponent will ensure that fire safety will be an integral consideration in the detail design and operation of the tunnel.

On 3 February 2003 the RTA provided an isometric sketch of the ventilation system at **Attachment 9** on page 72.

The relevance of these changes will be discussed in **Section 5.8** in the context of consistency with the changes the RTA contracted.

3.9. ASSESSMENT OF CONGESTED TUNNEL CONDITIONS REPORT

In addition to the Revised Ventilation Report as published in Appendix C of the DG Planning Report, in **Attachment 10** on page 73 Ref 2 page 1, the RTA referred Tenderers to an RTA Report entitled *"Assessment of Congested Tunnel Conditions"* also dated October 2002 (Amended Congestion Assessment Report). A copy of that report was provided under Parliamentary Orders in **Attachment 11** on page 76.

Attention is drawn to the footnote in Appendix C and the 'track changes' footnote to the RTA's Assessment of Congested Tunnel Conditions Report and it is concluded that **the Amended Congestion Assessment report amended the report included in Appendix C by at least 2 possibly 3 revisions.**

From Page 16 of the DG Planning Report (Page 35 of 222 of the pdf file) **Attachment 7** pp 67, the Director General advised that *"The potential environmental impacts of*

the revised design were assessed in an Environmental Assessment prepared by the RTA and included in Appendix C.

On Page 29 of the DG Planning Report (Page 48 of 222 of the pdf file) **Attachment 7** pp 67 the Director General discussed exit velocities as:
Air quality predictions have been based on stack exit velocities of between 5 metres per second (m/s) and a maximum velocity of 12.7 m/s in the eastern ventilation stack and 5 m/s and a maximum of 7.8 m/s in the western ventilation stack under normal operating conditions. For congested conditions within the tunnel, stack exit velocity would be in the order of 20 m/s. By reference to Table 5(a) of the Amended Congestion Assessment in **Attachment 11** on page 76 , the **exit velocity for the eastern stack was 50% higher at 30.9 m/sec for congested conditions**.

Further, the DG Planning Report made no reference to a contingency factor of 10% being added to annual loads included in Table 5 of the Amended Congestion Assessment (**Attachment 11** on page 76**)** in consideration of the order of accuracy of both traffic and air quality modelling.

The amended congestion assessment report clarifies that Tables 5 and 6 in Appendix C relates to predicted hourly and annual emission loads under **Normal Traffic conditions.** The report also contains additional information in Table 5(a) predicting hourly and annual emission loads from the ventilation stacks for 2006 traffic under Congested Flow conditions for 7 hours a day.

Neither report included an assessment of the predicted hourly concentrations from the proposed stacks under congested traffic conditions in 2006.

Given that the DoP appears to have only assessed the report in Appendix C and not the amended congestion assessment report, then:

i) **If DoP had received the amended congestion assessment report, when did it receive it and why wasn't it assessed in the DG Planning Report and included as part of Appendix C**?
ii) **If not, why did the RTA fail to provide the amended congestion assessment report to DoP?**
iii) **Why was there no disclosure that under the congested traffic scenario for 3 hours in the morning and 4 hours in the evening there could be more than a 100% increase in annual loads from both stacks for CO and PM_{10}?**
iv) **Why didn't DoP request information on the mass and concentrations of pollutants on an hourly basis under congested conditions?**

4. DEPARTMENT OF PLANNING ASSESSMENT AND CONDITIONS REGARDING VENTILATION

4.1. INTRODUCTION

The Planning assessment of the revised ventilation imposed inappropriate limits for the mass and concentration of pollutants within the tunnel and discharged from the ventilation stacks. As a direct consequence, **the RTA sanctioned changes to the ventilation design in its contract by increasing emissions out of the western stack**

4.2. THE REVISED VENTILATION DESIGN - APPENDIX C REPORT

The course of events after the PAR submissions closed on 16 August 2002 involving other Agencies is not clear. In September 2002 RTA engaged Connell Wagner to revise the ventilation design and on 25th October 2002 RTA submitted its revised ventilation design to DoP.

From **Attachment 10** on page 73 Ref 2 page 1, it is clear that the Final Draft of the DG Planning Report dated 5 November 2002 was given to Tenderers. **We submit that the intervening period of 6 working days was not a sufficient time for DoP to assess the RTA's revised ventilation design, seek independent review and consult with stakeholders including other Government Agencies.**

By reference to page 29 of the DG Planning Report **(Attachment 7** pp 67**)** the minimum exit velocity from the stacks was 5 m/sec. **There is no MCoA imposed to specify minimum exit velocities.**

With a minimum exit velocity of 5 m/sec, it would not be possible to maintain the constant concentration of CO level listed in Tables 7 and 8 for all hours of the day in each tunnel.

The maximum concentration of NOx and PM10 is predicted to occur around 4 am in each tunnel. In WP9 **Attachment 2** on page 41 the 2006 eastbound tunnel traffic was assessed at 105 cars and 30 trucks. Similarly the westbound tunnel was assessed at 100 cars and 27 trucks. Why then did DoP set the limits for NOx and PM_{10} for traffic at 4am?

Intuitively the criteria for maximum concentration of NOx and PM10 should not be based on an hour with little traffic when there is an ability to increase air flows and decrease concentrations. **Attachment 13** on page 90 analyses the % air flows based on exit velocity from the eastern stack compared to air flows to achieve a constant CO concentration of 62.5 mg/m^3. This analysis demonstrates that the maximum concentration imposed in MCoA 173, based on traffic volumes at 4 am had a theoretical 3.4% of maximum air flows despite minimum exit velocity of 5 m/sec producing air flows of 39.4% of maximum air flows for normal traffic conditions.

By specifying the maximum concentrations in MCoA 173 from the 4am concentrations listed in tables 7 and 8, DoP failed to analyse what the maximum concentrations would be under minimum exit velocities or what change in air flow would be required to ensure that an artificially high limit was not imposed.

In the context of the ventilation changes approved in the contract, this failure has allowed higher levels of pollution from the western stack as part of the contacted changes.

Note: A Tenderer drew this matter to the attention of the RTA in **Attachment 10** on page 73. Correspondence between Council and RTA at **Attachment 15** on page 93 shows that the RTA failed to respond to answer Council's quite specific questions asked of the RTA a second time.

To further demonstrate the lack of assessment by DoP:

i) Table 8 was incorrectly titled

ii) Appendix C does not include a tabled assessment for CO, NOx and PM10 concentrations under congested conditions other than a maximum concentration quoted for both tunnels
A maximum CO concentration of 51 mg/m^3 in the western stack and 52 mg/m^3 in the eastern stack under congested traffic conditions should have alerted DoP that additional air flows (i.e. > 20% more air than that required to achieve a concentration of 62.5 mg/m^3) was required to reduce the concentration of PM_{10}.

Using data from Table 5, 5(a) and 6 in **Attachment 11** on page 76 and in **Attachment 14** on page 91 provides an easily undertaken sanity check to demonstrate that between 25% - 48% greater concentrations of PM10 would occur in the AM peak and around 20% in the PM peak by maintaining constant CO concentrations. **DoP failed to assess and report that under congested conditions PM_{10} became a critical consideration.**

iii) As DoP knew that congested conditions will occur, **there was no discussion on the % of time congested conditions were likely or which pollutant required additional air flows under congested conditions.**

There seems to have been an assumption that congested conditions in the tunnel will occur infrequently. When one sees an afternoon queue of 3 lanes of westbound traffic extending back from the M2 all the way back along Epping Road and the Gore Hill Freeway well past Reserve Road, the probability of three lanes in the tunnel regularly congesting is high.

iv) **Tables 5 and 6 of Appendix C were used by DoP to set the mass limits from both stacks for NOx and PM_{10}. There was no assessment documented to demonstrate why DoP set the annual discharge limit for CO at 1,530 tonnes, 170% above the 900 tonnes of CO (being the sum of CO from both stacks) listed in Tables 5 and 6 for normal flow.**

Were annual limits set for congested conditions occurring for 7 hours per day for each day of the year? If so stringency should be *made of sterner stuff*.

v) Note: Figures referred to in Appendix C were not included.

4.3. THE AMENDED VENTILATION DESIGN REPORT FOR CONGESTED TRAFFIC CONDITIONS

As discussed in **Section 3.9**, an Amended Congestion Assessment Report also dated October 2002 was issued to Tenderers.

Table 5(a) in **Attachment 11** on page 76 included the hourly emissions under congested traffic for 7 hours per day occurring for 3 hours in the morning and 4 hours in the evening. Potentially, congested conditions **for 7 hours per day result in more than 100% increase in annual emission load for CO and PM_{10}.**

No reassessment has been provided to determine the outcomes associated with the traffic implications for tunnel capacity based on the Base Case Financial model discussed in **Section 6.5**.

The annual limits for PM_{10} set by DoP allow for congested conditions to regularly occur. No assessment was undertaken to determine the increase in surface pollution around the portals or the associated additional surface road capacity required to cope with regular congested conditions in the tunnel

Pollutant	Limit Set by MCoA 173 (Kg/year)	Normal Traffic Conditions Kg/year (Table 5)	Congested Traffic Conditions Kg/year (Table 5a)
CO Eastern Stack		582,422	1,067,269
CO Western Stack		317,524	717,578
CO Combined Stacks	**1,530,000**	**999,946**	**1,774,847**
NOx Eastern Stack		131,979	127,271
NOx Western Stack		96,614	94,939
NOx Combined Stacks	**229,000**	**228,693**	**222,210**
PM10 Eastern Stack		4,501	9,266
PM10 Western Stack		3,480	7,121
PM10 Combined Stacks	**14,000**	**7,981**	**16,387**

DoP does not appear to have assessed what additional annual mass of pollutants was likely to be emitted under congested conditions for the revised ventilation design.

4.4. CONDITION 173

MCoA 173 states that the concentration and mass of pollutants discharged from the ventilation stack(s) referred to in Table 6 must not exceed the respective limits specified for that pollutant.

The stack limits and imposed concentrations limits are well above the concentrations applicable during the higher trafficked (daytime) hours. The set limits are also extremely high relative to actual concentrations in the M5 East where we already have major problems.

The condition also requires an independent person or organisation to:

a) verify that compliance with stack limits detailed in Table 6 will not result in air quality impacts greater than predicted in Appendix C (Environmental Assessment for Revised Tunnel Ventilation Design for the Lane Cove Tunnel) of the Director-General's report;

b) undertake an appropriate assessment to the satisfaction of the Director General and in consultation with the EPA to indicate how stack discharge velocities have been optimised in consideration of energy requirements and air quality impacts at all sensitive receivers; and,

c) validate recorded monitoring data and certify compliance with the stack limits.

By reference to a table extracted from **Attachment 12** on page 86 which compares the designers Parsons Brinkerhoff (PB) predictions for annual pollution to the stack limits in Condition 173, **the discrepancy between PB and RTA's predictions suggests gross underestimation of actual pollution during tunnel operation and therefore gross underestimation of the air impacts. Alternately if PB are correct, then the stack limits are grossly in error, allowing the operator to legally pollute up without fear of breaching the approval**.

Whichever inference is correct, the reasons for the discrepancies need investigation.

Ventilation Stack Pollutant Limits

Year of Consideration	Tunnel	CO	VOC	PM_{10}	NO_x
		[Tonne/year]	[Tonne/year]	[Tonne/year]	[Tonne/year]
2006	Eastbound	430	43.0	3.7	89
	Westbound	202	20.2	4.0	70
	Total	**632**	**63.2**	**7.7**	**159**
Stack Emission Limit	**Eastbound + Westbound**	**1530**	**153**	**14**	**229**

We expect that you will be reassured that Dr Graeme Ross has reassessed the ground level concentrations. Dr Ross has already agreed that he was given the model inputs. These inputs were based on spurious fleet mixes having the same proportion of diesel and petrol trucks to cars for the 12 hour AM period and a different proportion in the 12 hour PM period. The inputs were not assessed for the effects beyond 2006 based on a spurious notion that 2006 would be the worst case year

4.5. STRINGENCY

Claims by Former Roads Minister Costa in Attachment 52 on page 257 and in Government correspondence to the community to the effect that "*In relation to filtration, the Governments position remains that the Department of Infrastructure, Planning and Natural Resources, in consultation with the Department of Health and Department of Environment and conservation has set the toughest air quality standards in the world….* " has no basis in respect of NOx or PM10 concentration limits nor has it any basis in respect of annual limits.

4.6. CORRECTIVE ACTION

To comply with the approval, DoP must now strictly enforce the literal interpretation of MCoA 173 to ensure that the hour by hour concentrations and mass of pollutants from the tunnel will not be any greater than the hour by hour concentrations and mass of pollutants set out in Tables 5-8 of Appendix C.

5. RTA CONTRACT NEGOTIATIONS REGARDING VENTILATION

5.1. INTRODUCTION

Council was not a party to the contract negotiations between the tenderers and the RTA. Council's records indicate that brief meetings with each of the tenderers were held and that each were made aware of Council's issues in **Attachment 16** on page 106.

A copy of the Contract ventilation requirements is **Attachment 17** on page 109.

5.2. COUNCIL UNAWARE OF CHANGES TO VENTILATION UNTIL 12 MAY 2004

The contract was signed on 3 December 2003. Council was not made aware by the RTA that they had already contracted changes to the ventilation tunnels. As part of our submissions in regard to Mid Tunnel Access discussed in **Section 7,** Council relied on the ventilation schematic in Figure 4.6 included in Appendix C (**Attachment 8** on page 71**)** and the isometric view provided by the RTA **(Attachment 9** on page 72**).**

The deletion of the 1600m eastern ventilation tunnel or change in cross sectional area of the western ventilation tunnel was not discussed in the RTA's Mid Tunnel access sites - Comparative Assessment of Options or their subsequent response.

It was not until 12th May 2004 that RTA met with Council to brief the changes made to the project between Ministerial Approval and Contract signing. **Attachment 18** on page 111 sets out the RTA changes. A copy of the RTA briefing note on that meeting is at **Attachment 19** on page 112.

Although the RTA agreed at the 12 May 2004 meeting to provide the changed air flows for the modified ventilation for comparison with the approved ventilation in Fig 4.6 of Appendix C, **RTA subsequently refused to provide that data as TJH were finalizing their ventilation design in Hong Kong**. **Attachment 20** on page 116 refers to the relevant correspondence with RTA.

Council again met with RTA on 3 June 2004 in relation to the contract ventilation changes . An internal Council briefing note is at **Attachment 21** on page 120.

Although documents tabled under Parliamentary Orders are voluminous, the contract negotiations and documents surrounding the changed ventilation design including air flows does not appear to have been released.

Council's meeting notes are **Attachment 22** on page 121**.** Council's Executive Manager Urban Services, Mr Ross Selleck (RS) specifically referred John Anderson (JA) for RTA back to a meeting with the RTA and LCTC in December 2003 soon after the contract was signed. The following extract from **Attachment 22** pp 121 highlights the difficulties faced in discussions with the Proponents. The theme song of being *locked into the RTA's approved design* has been a recurrent tune.

"

RS referred JA back to the December 03 meeting with the LCTC attended by JA and Chris Herbert and to discussions about filtration and opportunities to reduce air volumes. CH had advised that they were locked into the approved design and had little room to move. RS considered that there had been sufficient discussion at that meeting for the RTA to have advised of changes to the Fig 4.6 design to the LCTC contracted design.

"

The RTA should explain why they did not include any flexibility in the contract's ventilation design requirements

5.3. CHANGES PROPOSED BY LCTC

Attachment 23 on page 123 was obtained from Parliamentary Orders and is **believed to outline the changes to the ventilation proposed as an alternate bid by the Lane Cove Tunnel Consortium**. The complete document was not included in the documents provided to Parliament. It also appears that pages 4-6 and 8 were not included in the documents provided under the Parliamentary Order.

5.4. CHANGES PROPOSED BY OTHER TENDERERS

Attachment 24 on page 129 outlines what appears to have been two different Tenderer proposals, both including filtration as an alternate bid. Of particular note is Hyder's proposal as Hyder had been a major consultant with the RTA in the EIS preparation. **Both Tenderers discuss the environmental benefits of their alternate proposals.**

5.5. RTA ASSESSMENT OF TENDERER PROPOSALS

Attachment 25 on page 135 is the RTA Summary of the Environmental Assessment of Feasible Options based on three Lane Tunnel Options. This assessment does not appear to assess the alternate ventilation proposals by LCTC (or other tenderers) for a 3 lane tunnel option.

The traffic benefits of a 3 lane tunnel are discussed in **Section 6.7**.

5.6. DISCUSSION ON THE CHANGES

5.6.1. Pacific Highway Exit Ramp

Council did not have an issue with an extension of the ventilation tunnel from the eastern stack to also connect the Pacific Highway exit ramp to reduce the amount of air to be moved against the flow of traffic, as it did not result in a change in pollutant loading from the eastern stack

Council does however object to the manner in which subsequent changes were made without consultation when its relocation was an integral factor to the partial collapse of the apartment block.

5.6.2. Exit to the Eastbound Tunnel and Entrance to Westbound Tunnel Relocated Further East and Moved Together.

The eastern portals were relocated eastward extending the tunnel by 145 m (4%). Although no objection is raised from an urban design or traffic management perspective, this change added to the length of the tunnel and changed the basis on which the tunnel was assessed. The direct impacts not assessed included:

i) length of motorist travel westbound before polluted air can be extracted
ii) length of smoke travel in the event of a fire
iii) increase in emissions (in addition to those associated with the contracted deletion of the eastern ventilation tunnel discussed below) to the western stack
iv) loss of flexibility in managing air flows to keep emission from both stacks at a minimum level at all times

5.6.3. Redirection of the Eastern Ventilation Tunnel to the Western Stack.

The exhaust ventilation tunnel connecting approximately the midpoint of the westbound tunnel was redirected from the eastern to the western ventilation stack.

This change was described by RTA as a minor change yet it involved:

a) **the deletion of 1600 m of tunnel with a cross sectional area of 43 m^2** between the mid point of the eastbound tunnel. **The deletion reduced the excavation by at least 70,000 m^3.**
b) Shifting the location of the exit point for the exhaust tunnel from the main westbound tunnel 350m further west. **Combined with the extension of the tunnel of 145m, westbound drivers would be exposed to an additional 495m of travel within the tunnel. The effects of the longer length of travel have not been assessed.**
c) Only marginally increasing the cross sectional area of the western stack exit tunnel.

Diagrammatically the changes are shown in **Attachment 26** on page 138.

Subsequent information from PB in **Attachment 55** on page 267 has shown that the number of fans and air flows has been reduced at the eastern ventilation Stack without a corresponding increase in air flows, giving a total air flow of 2,250 m^3/sec when the approved ventilation was given on the basis of increased air flows of 2,550 m^3/sec. **The Contract required a ventilation system with minimum air flows less than the approval**.

The cross sectional area of both the vent stacks is now substantially smaller than the 100m^2 in Appendix C with the western stack at 72 m^2 and the eastern stack at 60m^2.

5.6.4. Change in Tunnel Gradient

The RTA claimed that the maximum tunnel gradient reduced from 6.5% to 4.6% between Lane Cove River and Stringybark Creek. In fact the change in maximum gradient only affected 180m from the western portal. The remaining 1000m to Stringybark Creek changed from 0.5% downgrade to 0.5% upgrade westbound.

No assessment was documented combining the additional in tunnel pollution load for the up-grade section and the additional 145 m of westbound tunnel at the eastern portal.

5.7. NO ENVIRONMENTAL REVIEW BEFORE THE CONTRACT WAS SIGNED

Attachment 28 on page 144 shows that the **RTA failed to undertake its consistency assessment and environmental review until 28th April 2004, some 5 months after the contract was signed.**

This means that the RTA / LCTC contract was let with substantial changes to the approved ventilation design without any environmental assessment and without a fully costed change (variation) order.

The RTA appears to have the view that the approved project is twin tunnels linking the M2 to the Gore Hill Freeway and associated roadworks and that any changes to the project is consistent provided the tunnels provide the link.

By way of comparison on what is minor, **Attachment 27** on page 139 is a list of changes that the RTA had sought Ministerial approval for around the same time that it approved the substantial changes to the ventilation system. Sam Haddad had concluded that the proposed amendments are minor in nature and closely reflect the purpose and intent of the conditions of approval.

If the following minor changes required Ministerial approval,:

- Minor editorial errors
- Misdescriptions of a number of conditions relating to preconstruction requirements
- Apparent misdescription relating to emergency discharge (of emissions) from the tunnel

then the failure by RTA to seek Ministerial approval for the substantial changes to the approved ventilation specifically referenced by the Director General before the changes were contracted defies any test of reasonableness.

Whilst on Attachment 27 on page 139, the modification the RTA sought for the apparent misdescription relating to emergency discharge to MCoA 152 leaves it wide open to the operator to determine an emergency situation and to continue portal emissions until normal traffic conditions resume as there is no definition of what "*normal traffic conditions*" means, leaving the condition open to abuse.

5.8. CONSISTENCY ASSESSMENT AND ENVIRONMENTAL REVIEW

The RTA's refused to provide Council with its internal Consistency Assessment and Environmental Review (CAER). This document, at **Attachment 28** on page 144**,** was obtained from Parliamentary Orders. **This document purports to show consistency with the Ministers approval to avoid referring it to any other Government Agency**.

CAER is factually deficient, biased in issues assessed and is written to justify a prior position taken in the contract. The following examples are but a few of the shortcomings of CAER.

- 1.1 Introduction when it was claimed that:
  The Lane Cove Tunnel project contract includes the design, construction, maintenance and operation o f a 3.6 km twin two to three lane tunnel from Mowbray Rd West to the Gore Hill Freeway, Artarmon. All approved works are

detailed in Section 7 of the Lane Cove Tunnel Representations Report (RTA 2002) (the Representations Report) and duplicated within the Preferred Activity Report (the PAR) for the project dated July 2002

In fact, the tunnel was 3.4 km, long and the approved ventilation was not included in the PAR dated July 2002 but submitted to DoP on 25 October 2002.

- In the glossary, CAER defined the Representations report as: *Lane Cove Tunnel and Associated Road Improvements Representations Report prepared by RTA Environmental Technology on behalf of the RTA and dated 24 October 2002.* **The Representations Report *dated 24 October 2002* has not been made public.**

- **CAER claims that the approved ventilation concept design was shown in Appendix A. Although diagrammatic, failed to document the reduction in air flows, number of fans or cross sectional areas of the ventilation tunnels and stack compared to Figure 4.6 of Appendix C.**

- **Irrespective of the merit or otherwise to reduce the ventilation tunnels by some 77,000 m^3 by deleting 1600m of tunnel, the change to the approved ventilation system to ADD pollution to the western stack emissions was not assessed by anyone other than the RTA and is clearly inconsistent with the approval.**

- CAER did not address the in tunnel impact of 495 m additional travel under congested tunnel conditions before polluted air can be extracted, nor did it assess the extra length of tunnel smoke is required to travel before extraction. It is now over 2km and inconsistent with the DG Planning Report.

- **The requirement in MCoA 173 *to verify that compliance with stack limits detailed in Table 6 will not result in air quality impacts greater than predicted in Appendix C (Environmental Assessment for Revised Tunnel Ventilation Design for the Lane Cove Tunnel) of the Director-General's report* was not even considered in CAER.**

- **RTA knew that the LCTC traffic volumes were higher than those used in the EIS for air quality assessment but failed to pass those volumes on to Holmes Air Science to remodel the change in air quality.**

- **The assessment noted that there will be changes in emissions from the east and west ventilation stacks due to the revisions to the tunnel design. Emissions from the western ventilation stack will rise and emissions from the eastern ventilation stack will be reduced. The changes will be greatest for CO emissions in the peak hours**. Holmes Air Science did not include a table identifying the value of changes in either mass or concentrations of pollutants.

- **the extent of inconsistency with the hour by hour mass and concentrations being emitted out of the western stack compared to Appendix C was not determined.**

- **All previous assessment had been made for 2006 as being the worst year. CAER undertook its assessment based on 2016 for comparison simply on the basis that the tunnel would not open in 2006.** (See Page 36 of 58). **Not to undertake the comparison for 2006 is another failure to assess consistency.**

The major modifications to the ventilation are set out in **Section 3.8 i) - vi) against which consistency cannot be established.**

In summary, MCoA 160-164 were specifically added to ensure that the benefits of the revised ventilation system were realized. **Despite the inconsistencies with the DG assessment of the revised ventilation design in Appendix C outlined below,** the RTA concluded that the changes to the ventilation design included in the contract were consistent with the approval:

i) **Tunnel length increased by 145m (4.2%)**
ii) **Increased emission to western stack**
iii) **Ventilation capacity reduced by 650 m^3/sec**
iv) **Westbound air off take shifts 350m – with additional tunnel length of travel and exposure before air is drawn off is approx 495m**
v) **Deletion of the additional vent tunnel to the eastern stack**
vi) **Smaller cross sectional area in the stacks**
vii) **Smoke now travels more than the maximum 2km approved by the DG Report**
viii) **A loss of 70,000 m^3 sink capacity to the eastern stack**
ix) **Increase pollution levels at elevated receptors around western stack not assessed**
x) **2006 figures – supposed to be the worst case figures not assessed in the air modelling because the tunnel would open in 2007 Assessment only done on cleaner exhaust emissions from EIS traffic volumes not the higher LCTC in 2016**
xi) **60% increase in CO discharged from western stack from 45 g/s to 72 g/s** (in 2016 ! – presumably higher in 2006)
xii) **Coincident exhaust air extraction was reduced from 2,550 m^3/sec to 2,250 m^3/sec. Note: The lower value was contracted by RTA as the minimum air flows.**
xiii) **Both internal stack dimensions substantially reduced when compared with the approved 100m^2 stacks in Figure 4.6.**
xiv) **No assessment on how a different ventilation design would comply with the specific reference to Appendix C in MCoA 173.**

5.9. DoP REFUSAL TO REQURE RTA TO PROPERLY ASSESS FOR CONSISTENCY

The basis of the CAER was *"The RTA may modify the approved activity without the need to obtain the Minister's approval to a modification, if the activity as modified would be consistent with the Minister's approval and the RTA has considered the environmental impact of the modification of the activity in accordance with Section 115BA(4) of the EP&A Act"*

There was no basis therefore for the RTA's to claim that the changes were minor, and consistent with the approval especially when the DG Planning described their original inclusion into the approval as "Substantial" and "MAJOR MODIFICATIONS" (See pages 34/45 of 222 pdf) Section 4.4.1 of the DG Planning Report

For the reasons set out above the RTA failed to establish that the approved ventilation scheme as modified would be consistent with the Minister's approval**.**

Attachment 29 on page 169 is DoP's reply dated 29 June 2004 to Council's letter dated 15 June 2004 seeking the Department's assistance in RTA's compliance with the legislation. The reply signed by Sam Haddad washed his hands of any planning responsibility to ensure that its legislation was complied with as the RTA had the power to make its own determination on consistency.

5.10. EPA NOT CONSULTED ABOUT THE CHANGES

Correspondence dated 8 July 2004 from EPA to RTA is included as **Attachment 30** on page 170 to **demonstrate that the EPA was not consulted about the changes to the ventilation system and RTA's reply**. These documents were obtained from Parliamentary Orders. It is not known if RTA consulted with NSW Health or other agencies including DoP on the ventilation changes either prior to or as part of the CAER assessment after signing the contract. It is not known what follow up action EPA took on this matter.

5.11. NSW TREASURY SUMMARY OF CONTRACTS

A review from page 6 the NSW Treasury Summary of Contracts published on their website at http://www.treasury.nsw.gov.au/wwg/pdf/lane-cove.pdf (page 10 of 56) shows that although the revised ventilation design submitted after the PAR and prior to Ministerial approval is referenced, the Treasury Report **failed to advise of the changes included in the Contract made after approval** even though the deletion of the 1600m polluted air ventilation tunnel saved millions of dollars

It would be normal contract practice to agree a price for an alternate ventilation design to be used as the basis of a change order by the RTA **IF** a consistency assessment indicated that the revised ventilation design did not increase the approved level of emissions and the change order issued after subsequent approvals obtained (either RTA or Ministerial). **This did not happen and therefore there was no transparency about the changes**.

There is something awry when the excessive cost of removal of the fig tree can be reported as a change order to the contract without reporting the much higher order of cost of the contracted changes to ventilation design.

6. TRAFFIC VOLUMES

6.1. INTRODUCTION

Traffic volumes are integral to any air quality assessment. As discussed in **Section 3.2**, the 1999 tunnel traffic projections for 2016, on which a decision to proceed with a 2 lane tunnel, were grossly underestimated.

Study	Epping Road west of Hwy	Tunnel
1999 Feasibility Study	1,939	**4,797**
2001 EIS	2,570	**7,727**
2002 Base Case Financial Model	?	**9,000**

Why the combined tunnel traffic predictions for 2016 made between 1999 and 2002 have nearly doubled requires examination.

6.2. 2002 TRAFFIC VOLUMES

Attachment 32 on page 176 is the RTA published daily traffic volumes for 2002. These volumes are relevant to demonstrate that the EIS traffic volumes were underestimated eastbound in the AM on the two lead in roads of M2 and Epping Road. Note: The 2016 AM eastbound EIS projections for M2 were exceeded in 2002.

	Actual 2002 Max / Average	EIS – 2006	EIS 2016
Epping Road Eastbound AM	2,547 / 2,490	2,355	2,751
M2 Eastbound AM	2,630 / 2,514	2,243	2,445
Combined M2 Epping Road	5,177 / 5,004	4,598	5,196

The 2002 traffic volumes do not of course include the additional traffic to the M2 from completion of the M7.

6.3. EIS TRAFFIC VOLUMES

The following highlight just some of the unreliability of the EIS traffic volumes contained in WP4 in **Attachment 2** on page 41.

i) Was it reasonable to predict that eastbound traffic on both M2 and Epping Road would decrease between 1999 and 2006?
ii) Was it reasonable to predict that only 74 vph eastbound would be attracted to the M2 in the AM peak but 643 in the PM peak?
iii) Would traffic on Longueville Road decrease between 2006 and 2016?
iv) Assuming that Mowbray Road (north of Epping Road) northbound peak hour traffic does decrease to of 234 vph – an unreasonable assumption – would growth to 308 vph in 2016 be a reasonable projection?

In our opinion, the answer is NO to all of the above points. Under predicting the traffic volumes under predicted air quality outcomes

6.4. FAILURE TO DISCLOSE TRAFFIC VOLUMES

Despite numerous requests, the RTA and LCTC refused to make available the traffic volumes used in the ventilation design. Reasons given were that the traffic volumes were commercial in confidence. Until the contract was made public in November 2005, we were not aware that the contract prohibited the disclosure of traffic volume information. RTA should explain why the traffic volumes projections should not be made public as there is nothing commercial about traffic projections over time, if based on rigorous traffic modelling.

6.5. TUNNEL CAPACITY

Using traffic data from M5 East Tunnel where traffic volumes regularly change from free flowing to congested conditions, its maximum two lane capacity is less than 4,400 vehicles per hour (vph). PIARC suggests a maximum capacity of a tunnel is 2,000 passenger car units (PCU) per hour. Under congested conditions, the tunnel capacity would reduce to 1,300 vph eastbound and 2,000 vph westbound.

Using the vph to PCU factor of 0.945 (calculated from **Attachment 55** on page 267), Parsons Brinkerhoff have used a maximum two lane tunnel capacity of 4160 vph. We have used a maximum optimistic capacity of 4,400 vph eastbound and 6,250 vph westbound for considering the base case financial model discussed below. In practice, 4,400 vpd eastbound is unlikely to be achieved on a regular basis.

6.6. BASE CASE FINANCIAL MODEL

The RTA / LCTC Contract for the Lane Cove Tunnel was tabled in Parliament in November 2005 including the Base Case Financial Model.

The traffic volumes used in the Base Case Financial Model (BCFM) for 2006 – 2037 (to the end of the contract concession period) is shown in **Attachment 34** on page 190 and tabulated for ease of reading in **Attachment 35** on page 192. It is clear that the LCTC modelling has predicted a much higher growth rate when compared to the RTA projections. **An explanation on the discrepancy in traffic projections as shown in Attachment 37 on page 194 is required.**

The BCFM traffic volumes raise the following observations:

i) Congestion on the lead in roads for eastbound traffic is likely to occur soon after the tunnel opens (assuming a limited ramp up period
ii) The number of hours per day in which the congestion on the lead in roads for eastbound traffic increases beyond an acceptable level by 2010
iii) By 2016, the eastbound tunnel would have to operate at full capacity for every hour between 6am and 7 pm to achieve a throughput of 74,800 vehicles per day (vpd). By 2037, the tunnel would have to operate at full capacity for every hour between 4am and 11 pm to achieve a throughput of 93,545vpd. (**Attachment 38** on page 195**).**
iv) With the proposed changes to Epping Road there will be no spare capacity available on Epping Road or Mowbray Road to use ramp metering or flow control to manage tunnel traffic and hence surface traffic will congest outside the tunnel increasing the pollution levels.

v) Truck volumes (for toll purposes) are significantly lower than EIS projections. As trucks are the main generator of particulates estimations of PM10 are also significantly low.

vi) Once congested traffic conditions occur, the hourly throughput reduces to 600-700 vph quickly adding to surface congestion and reduced external air quality.

vii) **RTA's 2037 traffic projections for the tunnel would be reached by 2011/12**

6.7. 3 LANES

The LCTC traffic eastbound projections in the Base Case Financial Model cannot be accommodated in a 2 lane tunnel eastbound. **Attachment 25** on page 135 shows that all tenderers proposed a 3 lane tunnel in each direction.

Attachment 38 on page 195 provides the strongest argument that could be mounted for a 3 lane tunnel eastbound. It shows that soon after the tunnel opens and reaches its predicted volumes (after a period of approx 2 years) the tunnel will need to progressively operate at or near capacity for more hours per day to achieve the Lane Cove Tunnel projected traffic volumes. It is understood that including a third lane as a trade-off for the development fee was proposed by LCTC and rejected by RTA.

If every tenderer submitted an option for a 3 lane tunnel in each direction, it is a RTA should answer what was the cost benefit comparisons between providing the additional lane capacity as part of the project or providing it in the future.

If the Lane Cove Tunnel is being used by the RTA to throttle traffic to the Sydney Harbour crossings, then it will have spent $1.2 billion to transfer congestion slightly westward ALONG Epping Road.

The RTA should explain, when they reviewed the traffic volumes in the Base Case Financial Model, why they decided not to negotiate with the LCTC to build a 3 lane eastbound tunnel even if it opened only two lanes to traffic in the initial period.

If the Base Case Financial Model traffic volumes were predicated on a two lane tunnel what was the traffic projections for a three lane tunnel?

6.8. AIR QUALITY COMMUNITY CONSULTATIVE COMMITTEE (AQCCC)

6.8.1. Traffic volumes

Through a series of questions on traffic volumes raised in the AQCCC it became possible to approximate the hourly truck and heavy vehicle volumes for 2006 used by TJH in the ventilation design. This information raised serious concerns about much lower heavy vehicles used in the design than identified in the EIS.

Although the terms of reference do not extend to community consultation after the contract was let, it is important to note that Council and the community members of the AQCCC were denied access to traffic volumes used in the ventilation design. Given that the Base Case Financial Model revealed much higher traffic volumes, Council has raised a number of questions on air quality impacts with the AQCCC and

is awaiting a response. A copy of the questions and background documents are included in the CD.

There is clear evidence that the RTA, TJH and LCTC misled the AQCCC by insistence that traffic volumes used by LCTC were consistent with and slightly higher than EIS. They were not!

Through the AQCCC, LCTC agreed to Gillian Akers of Parsons Brinkerhoff (PB) meeting with Council to discuss traffic modelling although she was gagged from discussing actual traffic volumes. She assured Council that the traffic volumes used in the Financial modelling was more robust that used by RTA, used most recent data and had to satisfy the financiers. She confirmed that there was no difference between the expected traffic volumes and those used to justify the financial viability.

In advice given to Dr Peter Manins in **Attachment 39** on page 196**,** PB advised: *"The traffic numbers used* [in the ventilation design] *came from LCTC's patronage projections and assumes that the Lane Cove Tunnel remains a tolled road. LCTC is a commercial enterprise and if anything will have overestimated rather than underestimated the patronage."* **If true, overstated traffic volumes overstate the toll revenue**. The PB advice to Dr Manins is certainly inconsistent with the RTA and LCTC advice referred to above.

6.8.2. Discrepancy Between RTA and LCTC Hourly Emission Loads

The table below using emissions from the ventilation designers Parsons Brinkerhoff in **Attachment 12** on page 86 is included to provide by way of comparison to the RTA hourly emission loads under normal and congested conditions. **We are most concerned that some of the designers' predictions are SO MUCH LOWER than the RTA predictions, even after adjusting for the contracted redirection of pollution to the western stack**

kg/hr

	RTA Table 5 Normal	PB	RTA Table 5a Congested	PB	Note Due to deletion of ventilation tunnel to eastern stack
AM Peak Eastbound					
CO	111.5	83.6	299.91	143.1	Excludes 54.6 from Eastbound tunnel
NOx	23.2		23.25	10.7	Excludes 3.4 from Eastbound tunnel
PM10	0.8	1	2.8	0.67	Excludes 0.25 from Eastbound tunnel
PM Peak Eastbound					
CO	123.6	76	301.66	156.1	Excludes 59.6 from Eastbound tunnel
NOx	26.6		27.7	7.2	Excludes 2.3 from Eastbound tunnel
PM10	0.9	0.5	3.31	0.39	Excludes 0.14 from Eastbound tunnel
AM Peak Westbound					
CO	51.2	32.9	215.88	236	Includes 54.6 from Eastbound tunnel
NOx	15.4		17.76	19.9	Includes 3.4 from Eastbound tunnel
PM10	0.6	0.8	2.15	1.48	Includes 0.25 from Eastbound tunnel
PM Peak Westbound					
CO	76.3	46.2	217.26	256.5	Includes 59.6 from Eastbound tunnel

NOx	22.2		21.24	18.2	Includes 2.3 from Eastbound tunnel
PM10	0.8	0.9	2.55	1.22	Includes 0.14 from Eastbound tunnel

6.9. RELATED ISSUES

6.9.1. Underestimation of In Tunnel concentrations

In **Attachment 40** on page 200**,** Dr Peter Manins has highlighted that for both CCT and LCT the in tunnel concentrations for PM_{10} are underestimated by between 50% and 100%. This underestimation has not been accepted by the designers. If Dr Manins is correct, in combination with increased daily traffic and higher truck volumes, a breach of the annual limits for PM10 is likely and in tunnel PM10 will or should drive air flows.

Referring back to the air flows tables provided by PB in **Attachment 12** from page 86 PM_{10} it can be shown that PM_{10} does becomes the critical factor for more hours with increase concentrations as predicted by Dr Manins.

6.9.2. Ramp Up period

The Base Case Financial Model includes a ramp up profile (**Attachment 36** on page 193). This two year ramp up period after opening the Lane Cove Tunnel is expected. Experience from other major projects including M5 East, ED, CCT and M7 all show a ramp up period.

On the M7 Daily traffic was 137,013 vpd during Toll Free school holidays! Post Toll in the holiday traffic dropped down to 80, 359 less than 60% of toll free figures. The CCT has been a stark reminder of driver opposition to forced funnelling of traffic into private sector funded projects.

6.9.3. Epping Road

During the ramp up period neither Epping Road nor Mowbray Road, operating at full capacity will cope.

If the LCTC traffic volumes are correct, the failure to include 3 lanes will mean access into Lane Cove will mirror South Dowling Road adjacent to the Eastern Distributor – using a highly technical traffic management term - **STUFFED**.

6.9.4. Longueville Road /Little Street/Birdwood Ave Intersection

With increased patronage to the bus interchange, Council's request for signalization of the Longueville Road Little Street/Birdwood Ave Intersection to form part of the reconfigured intersection as part of Stage 2 has been ignored.

6.10. NSW HEALTH STUDY

Dr Michael Staff of NSW Health despite having ample time in which to commence the study much earlier and knowing of the ramp up period recently announced an air quality health study for the Lane Cove Tunnel to be conducted between June 2006 and the last quarter of 2007.

This study is DESIGNED TO FAIL at great expense because:

a) **background data will not be collected over a 12 month period prior to the tunnel opening taking into account any seasonal factors;**

b) **the tunnel will not be operating at its polluting capacity;**

c) **surface roads will be congested;**

d) **the study does not specifically target those known to be sensitive to changes in air quality and more likely to be affected by short term high concentrations from the stack plume;**

e) **the children used in the cohort study will be unavailable for continued testing for longer term exposure beyond the end of 2007; and**

f) **the study does not also target the work places in the shadow of the stack fallout.**

The conclusions can only be that there will be insufficient evidence to determine any short or long term change in resident health.

7. MID TUNNEL ACCESS

7.1. INTRODUCTION

In the period between Ministerial Approval on 3 December 2002 and Contract signing, consultation with Council and the Lane Cove Community appears to have been limited to discussion on mid tunnel access and filtration. Filtration will be discussed in **Section 8.**

Although Mid Tunnel Access was ultimately resolved to Council's satisfaction, the background into its resolution should be investigated.

7.2. MCoA 243

The location of the Mid Tunnel access was not resolved in the Ministers approval and required further assessment. Conditions 243 – 259 only applied if the Moore Street compound was used for Mid Tunnel Access.

MCoA 243 required *"Prior to any works at the proposed Moore Street compound site, the Proponent shall investigate alternative sites and alternative construction compound designs to address the potential environmental impacts."*

It took the RTA 11 months to undertake that investigation and despite a requirement to consult with Council, RTA refused to extend the public exhibition period beyond 14 days (**Attachment 41** on page 203**).**

The Comparative Assessment of Options investigation looked at 13 sites most of which were clearly unsuitable being in local schools or on sites too small.

Despite the refusal by RTA (**Attachment 41** on page 203) to extend the period for submissions, Council detailed 4 viable options including the current access arrangements under Epping Road.

RTA engaged Connell Wagner to prepare a dismissive response to Council's options within 10 calendar days from close of public submissions to lodgement of their subsequent response. That period of time must rate as a near record to prepare a brief, have it authorized properly assessed, engage the consultant, undertake the assessments of 4 alternate mid tunnel options, fully costed, quality assured and report printed.

The Connell Wagner was grossly unprofessional and whilst marked preliminary its use was intended to provide expert engineering advice on which DoP would rely on.

Council's letters to DIPNR **Attachment 42, Attachment 43 and Attachment 44 (**on pages 206, 211 and 214 respectively) documents the unprofessional errors, deficiencies and client bias in the Connell Wagner report**. DoP ignored Council's pleading not to approve the use of 130 -132 Epping Road as the mid tunnel access site.**

Council's issues were clear to DoP and despite meeting with them late on 2 December, Attachment 46 on page 241 shows that by 8:19 am the following

morning, RTA had received approval from Mr Sam Haddad for mid tunnel access on 130-132 Epping Road. So much for consultation.

MCoA 244 acted to delete the remaining conditions applying to the Moore Street mid tunnel compound. Contrary to the assertion by Mr Sam Haddad in Attachment 45 on page 238, the DoP Mid Tunnel Access approval was issued without imposition of any similar conditions to those which applied to the Moore Street compound, even though 130-132 Epping Road was bounded by residential properties and noise and air quality even more critical.

The haste in which DoP approved the alternate mid tunnel access at 130-132 Epping Road requiring further investigation by the Contractor would support a view that staff were under undue pressure to issue an approval to facilitate financial closure and contract signing on 3 December 2003, exactly 12 months after Ministerial approval for the project.

7.3. FINAL MID TUNNEL SITE

It took until May 2004 to resolve mid tunnel access and through Council and community involvement, mid tunnel access was created under Epping Road, generally in line with one of the 4 options included in Council's submission.

Had a spirit of consultation been in place, mid tunnel access could have been resolved 5 months earlier without a lot of unnecessary anxiety from those most affected by the 130-132 Epping Road site.

8. FILTRATION

8.1. INTRODUCTION

Filtration remains the single biggest issue for Council.

8.2. RTA JAPAN TRIP

When the Minister for Roads the Hon Carl Scully told Parliament that tunnel filtration technology a high tech placebo, presumably that advice came from the RTA who have resisted the use of proven technology.

The RTA delegation went to Japan in October 2003 prior to the Contract being signed. From the Japanese trip RTA knew that the technology in Japan was mature and viable yet failed to even make provision in the contract for in tunnel filtration as a variation.

When Garry Humphrey of the RTA attended the 2004 World Road Congress he advised the C5 Technical Committee (**Attachment 47** on page 243) that:
One of our key risks that will influence project costs at the development stage is spiralling ventilation costs.

I was in Japan the week before last looking at tunnels on a tour organised by Mr Mizutani. ***Japan has some excellent cost effective longitudinal ventilation systems in long mountain tunnels employing electrostatic precipitators. They also have some very expensive applications in urban areas****. They are probably one step further down the path of rapidly increasing ventilation costs than Australia.*

Whilst other countries may not believe that they have this problem, it needs to be recognised as a serious threat. The ease of communication, particularly on the internet, means that information spreads very rapidly. If someone opposes one of your tunnels they will very quickly learn that air quality is a strong platform to launch from.

The other key ventilation risk is that of increasing air quality standards. The sleeper that is emerging is NO_2*. Bernt Frieholtz highlighted this when we met in Stockholm. It has also emerged in Australian because of the work done in Sweden. …*

8.3. NOX AND PM_{10}

Despite knowledge known about NOx gases becoming a more important consideration in tunnel ventilation there is no condition imposed by the MCoA specifying individual exposure limits for NOx or PM10. There are therefore no penalty provisions for unsafe exposures.

It is widely recognized that with cleaner fuels CO emissions will decrease. As the predicted rate of decrease of CO is much higher than NOx or PM_{10}, **air flow requirements to meet the CO limits set by MCOA 160 and 161 decrease over time, and in tunnel concentration for NOx and PM10 will increase**.

8.4. ANNUAL STACK LIMITS

In order to determine if the annual stack limits are reached part way through a year, it is of utmost importance that monitors accurately measure the mass every second of every day. All too often as with the M5 east, monitors are faulty or incorrectly calibrated and not corrected for months. Although Condition 174 requires DoH, EPA and DoP to be notified, there are no notification provisions to the Council or community.

8.5. IN TUNNEL VS IN STACK

There is general acknowledgement that in tunnel rather than in stack filtration is preferred. Given the concerted requests to include filtration in the Lane Cove Tunnel, no evidence has been provided to demonstrate how or where in tunnel filtration would be installed. In fact no evidence has been provided on how any filtration could be provided.

Was the Lane Cove community subjected to the same loss of Government (or RTA Motorway Management) reputation theory as applied to the Cross City Tunnel (**Attachment 48** on page 249**) in not incorporating Filtration?** Did the RTA as a result of their Japanese trip, prior to letting the Contract seek from LCTC an estimated cost to install in tunnel filtration should it be required, or demonstrate how Electrostatic Precipitators could be installed in the tunnel or include an agreed responsibility protocol for its inclusion?

It is of utmost concern to note that as late as 19 January 2006 (Page 3 of Attachment 49 on page 251) independent verification noted that future pollution control systems at the stacks had not been resolved despite the buildings being constructed.

Community members raised concern about the failure by TJH to include details on how pollution control could be incorporated into the stacks as required by the MCoA in the relevant sub plan covering the ventilation stacks (Sub Plan H).

8.6. IN STACK FILTRATION

MCoA 153 required *"The tunnel shall be designed and constructed so as to make provision for future installation of an appropriate pollution control system to meet air emissions from the tunnel as may be required by the Director General. The Proponent shall provide evidence to this effect during the design and construction phases to the satisfaction of the Director-General"*

MCoA 154 required *"All plant and equipment associated with the ventilation stack including possible pollution control systems shall be located below the existing surface level unless incorporated into an existing, proposed or newly constructed building as identified in Condition of Approval No. 151 or otherwise agreed by the Director-General following consultation with the relevant local Councils"*

Having regard to in tunnel rather than in stack filtration being preferred, the Director General Planning should explain how he was been satisfied during the design and construction phases of the details of an appropriate pollution control system in the tunnel design and what space has been made available for that system.

There has been no evidence provided to Council that the required spaces and adits have been excavated to incorporate in tunnel filtration. Failure to do so would add significantly to the cost of excavation under traffic conditions if a decision was made in the future for in tunnel filtration.

8.7. RTA COMMITMENT TO FULL FILTRATION

Attachment 58 on page 271 is an extract of advice was given by the previous CEO of the RTA, Paul Forward to the Auditor General in his Performance Report on Managing Air Quality – DEC. Mr Forward advised that the RTA had provided for the future installation of filtration systems for the M5 East, Cross City and Lane Cove Tunnels should the need arise for their installation. That commitment must include a financial commitment to fund its installation.

8.8. FEDERAL GOVERNMENT CONTRIBUTION

In November 2004, the Federal Government confirmed its commitment of $10 million toward full filtration of the Lane Cove Tunnel - on page254. **Attachment 51** on page 255 expresses disappointment that the offer had not been accepted in February 2005. As at 3 May 2006, the State Government has only promised in Parliament "*if the Federal Government were to increase its offer of $10 million for filtration to a commitment totalling half of the cost, via a special purpose grant, the RTA would be directed to hold discussions with the Lane Cove Tunnel Company about raising the other half*".

Attachment 52 on page 257 is former Roads Minister Costa's indication that RTA's budget estimate to remove all pollutants is in the order of $70m. On this basis it could be considered that the State Government is now committed to $35m. We are of the view that $35m plus $10m Federal funding is more than sufficient to install proven and effective filtration technology in the Lane Cove Tunnel.

There is still no information on the RTA's detailed estimate of cost required by former Roads Minister Costa and therefore no dialogue with the Federal Government about what extra increase in offer was sought.

There is no commitment from the State Government to fund any filtration, as the advice to Parliament suggests that LCTC would be required to fund half the cost.

Attachment 53 on page 258 shows ball park filtration costs of $38.9 m based on the Flagstaff report for remote filtration in the Turella Stack prepared by Garry Humphrey. Air flows in the Lane Cove Tunnel are in the order of 560 m^3/sec not 850 m^3/sec, suggesting on this style of analysis that the cost would be even less.

9. COMMUNITY CONSULTATION

9.1. INTRODUCTION

A thesis could be written on the shortcomings of community consultation during construction.

Whilst community consultation during construction is not the subject of the enquiry, the following comments are raised in regard to **the extent to which issues which the Ministers Conditions required community involvement had already been determined and contracted without any community involvement.**

Much of the community frustrations evident at the Community Liaison Group Meetings arose from being told that either the detail was in the EIS, in the approval or in the contract and could not be changed.

Other frustrations came from different interpretations on what the community consultation role involved.

9.2. EXAMPLES

9.2.1. MCoA 42 – Pedestrian and Cycleway access

MCoA requires: *"A safe, high quality and contiguous cyclist/pedestrian path(s) shall be provided for recreational and commuter cyclists and for pedestrians for the length of the Project. Details of the provisions for cyclists shall be developed through the preparation of a detailed Cycleway and Pedestrian Plan which shall be prepared in consultation with Bicycle NSW, local councils, relevant bicycle user groups, NSW Health and the CLGs.*

At the date of this report, the Cycleway is built for most of the project with the exception of the link between Pacific Highway and Mowbray Road as part of the Epping Road surface modifications after the tunnel opens, yet the detailed Cycleway and Pedestrian Plan is just being prepared.

When the Community raised legitimate issues of safety particularly around bus stops and where the proposed Cycleway was located on property boundaries of units affecting driveways, the consistent response was that TJH couldn't change the location as it was part of their contract

9.2.2. Eastern Ventilation Stack

The DG Planning Report advised "*The installation of a ventilation stack in any location would have significant visual impacts. The Department is satisfied that the locations for ventilation stacks both situated in primarily industrial areas generally minimises the impacts to immediate views. If it could be achieved there is likely to be some visual advantages to encompassing the stacks within associated buildings. As the visual impacts of the stacks have only been assessed on a conceptual basis the Department recommends that Condition of Approval No. 87 be included that ensures that the final stack designs including treatments and finishes be addressed in a specific Urban Design and Landscape Sub Plan which would be subject to further*

community consultation and approval by the Department. The Sub Plan would also need to address the urban design and visual issues associated with any air intake structure.

MCoA 87, 151 and 208 were all relevant to the discussion.

Attachment 54 261is legal advice to the RTA that condition 151 related to the western and eastern stacks.

Why was the response from DoP contrary to the DG Planning Report?

Documentation associated with the preparation of Sub Plan H by TJH would show that the Council and community wanted the RTA to incorporate the eastern stack in a new building, and at least to address the issue. The eastern stack is now a symbol of defiance to protect public health.

9.2.3. Eastern Stack Location

Attachment 56 on page 269 shows the location of the eastern stack in the Contract project Deed to maintain a view corridor from Cobden Avenue.

Attachment 57 on page 270 shows the approved location of the stack blocking the Cobden Ave view corridor.

For those who live in the Cobden Ave area, the photo impression of the stack impact was deliberately misleading suggest that the impact when viewed from Cobden Ave would be no worse than the height of a power pole.

9.2.4. Air Intake 130-132 Epping Road

No community consultation occurred with any residents in regard to the use of 130-132 Epping Road as an air intake. Council's request to have the structure moved further away from the road to maximise public use of the park was

9.2.5. Canberra Ave Air Intake

The RTA contracted to include an air intake at Canberra Ave / Epping Road to "cool" an Electrical Substation within the tunnel. There was no community or Council consultation prior to its inclusion in the contract.

10. TOLLS

10.1. INTRODUCTION

There is no condition of approval to limit the imposition of tolls by the RTA to the $2.00 toll in 199 dollars quoted in the EIS.

10.2. RTA CONTACT

Although the RTA Contract sets out the toll regime, it is not known what changes to the toll pricing has been agreed to by the RTA. Using CPI adjustments, the toll on opening is expected to be around $2.65 for cars.

10.3. RENT

The Contract provides for the following rent

"Rent" means, in respect of any Rent Period, the aggregate of:

(a) the amount of $1.00;

(b) in respect of each Non-toll Business, the share of gross revenue (exclusive of GST) derived from the Non-toll Business that is agreed between the Lessor and the Company pursuant to clause 17.3 of the Project Deed; and

(c) the aggregate of:

(i) 0% of that amount of Actual Revenue that is greater than 100% and less than or equal to 110% of Base Revenue;

(ii) 10% of that amount of Actual Revenue that is greater than 110% and less than or equal to 120% of Base Revenue;

(iii) 20% of that amount of Actual Revenue that is greater than 120% and less than or equal to 130% of Base Revenue;

(iv) 30% of that amount of Actual Revenue that is greater than 130% and less than or equal to 140% of Base Revenue;

(v) 40% of that amount of Actual Revenue that is greater than 140% and less than or equal to 150% of Base Revenue; and

(vi) 50% of that amount of Actual Revenue that is greater than 150% of Base Revenue.

Base revenue relates to the gross revenue in the base case financial model.
The factors that can change the base case revenue are:

i) A variation involving an agreed increase in toll
ii) A higher CPI; or
iii) Traffic volumes.

Whilst it is not known if i) applies, ii) acts to share windfall revenue from higher CPI rises. **Maintaining high traffic volumes at the expense of existing road capacity is a direct incentive to the RTA to maximise funnelling of traffic into the tunnel irrespective of the public interest**.

As discussed in Section 6.6iii) having the tunnel to operate at maximum capacity for most hours of the day to achieve the Based Case Financial Model traffic volumes would suggest that unless the amount charged for the tolls increases well above CPI, the RTA would not receive rent above $1.00.

A higher toll regime in combination with M2 and SHB/SHT is not in the public interest.

We remain concerned that if eastbound traffic volumes cannot be accommodated in the tunnel, tolls will be increased to ensure its the financial viability. Again this is not in the public interest

Attachment 1 - Extract from RTA Tunnel and Financial Feasibility Report 1999

2.6 Preferred Motorway / Tunnel Option

The preferred motorway / tunnel scheme considered for sensitivity testing consists of:

- two 2 lane motorway or tunnels east and west bound
- main tolling facilities at the eastern portal within the Gore Hill Freeway
- ramp tolling facilities at the Pacific Highway on/off ramps at Alto Place
- Gore Hill Freeway and Reserve Road has direct access to/ from the eastern portal
- M2 and Epping Road has direct access to/ from the western portal
- Gore Hill Freeway two lanes in each direction.
- Epping Road has two lanes each way, with one lane allocated as an eastbound a.m. transit lane and full right hand turns at intersections.

Figure 2.4 - Toll Versus Traffic Flow

	Scenario / Toll and 2016 am Peak Hour Flows v.p.h.				No tunnel a.m. scenarios	
Roads	**C /No toll**	**F / $1**	**E1 / $2**	**D/ $3**	**A, 1997, Flows v.p.h.**	**B1, 2016, Flows v.p.h.**
Tunnel						
Eastbound - v.p.h.	3627	3655	3606	2820	-	-
Westbound - v.p.h.	3439	1790	1191	823	-	-
Total - v.p.h.	**7066**	**5445**	**4797**	**3643**	-	-
Epping Road (1)						
Eastbound - v.p.h.	1204	725	894	928	2718	2435
Westbound - v.p.h.	995	978	1045	1147	1535	971
Total - v.p.h.	**2199**	**1703**	**1939**	**2075**	**4253**	**3406**
Mowbray Road West (2)						
Eastbound - v.p.h.	917	1119	1149	1409	1630	1364
Westbound - v.p.h.	410	530	462	494	473	1112
Total - v.p.h.	**1327**	**1649**	**1611**	**1903**	**2103**	**2476**
Delhi Road (3)						
Eastbound - v.p.h.	1667	1671	1654	1723	802	1459
Westbound - v.p.h.	1309	1606	1650	1462	660	1524
Total - v.p.h.	**2976**	**3277**	**3304**	**3185**	**1462**	**2983**

(1) Between Longueville Road / Centennial Avenue
(2) West of Pacific Highway
(3) East of M2

The calculation of the predicted 2016 $2 tolled 2 lane tunnel Average Annual Daily Traffic (AADT) appears in **Figure 2.7 Estimated AADT in Tunnel**

Figure 2.7 - Estimated AADT in Tunnel

Period in Day	Hours / Year	2016 Model	Modifier	Eastbound v.p.h.	Westbound v.p.h.	Modified Total v.p.h.	Total veh /year
No flow	660	-	1	0	0	0	0
Light off peak	1,000	0	0.4	543	509	420	420,000
Medium off peak	1,650	0	1	543	509	1,052	1,735,800
Medium business	1,650	N	0.6	1,988	2,067	2,433	4,014,450
Business peak	1,800	N	1	1,988	2,067	4,055	7,299,000
a.m. shoulder peak	400	E1	0.6	3,606	1,191	2,878	1,151,200
p.m. shoulder peak	400	B3	0.6	1,318	3,251	2,741	1,096,400
a.m. peak	600	E1	1	3,606	1,191	4,797	2,878,200
p.m. peak	600	B3	1	1,318	3,251	4,569	2,741,400
Total hours/ year	**8,760**			**Total Vehicles / year Estimated AADT v.p.d.**			**21,336,450 58,456**

Attachment 2 – RTA EIS Working Paper 4 - Traffic

Table 8.5 – Modelled Future 2006 Traffic Volumes With and Without Lane Cove Tunnel (veh/hr)

	Morning Peak Hour				Evening Peak Hour			
Location	**1999 Base***	**2006 Base**	**2006 Tunnel**	**Tunnel less Base (2006)**	**1999 Base***	**2006 Base**	**2006 Tunnel**	**Tunnel less Base (2006)**
M2 S of Delhi Rd EB	2,246	2,243	2,317	74	726	845	1,498	653
M2 S of Delhi Rd WB	603	748	1,346	598	2,319	2,383	2,994	611
Epping Rd E of Pittwater Rd EB	2,382	2,355	2,643	288	2,611	2,744	3,356	612
Epping Rd E of Pittwater Rd WB	2,129	2,504	2,812	308	2,967	3,208	4,529	1,321
Mowbray Rd N of Epping Rd EB	800	946	234	-712	556	320	274	-46
Mowbray Rd N of Epping Rd WB	574	969	402	-567	912	1,256	269	-987
Centennial Av S of Epping Rd NB	858	767	863	96	439	398	509	111
Centennial Av S of Epping Rd SB	710	699	774	75	954	942	877	-65
Longueville Rd E of Parklands Rd EB	4,141	3,866	1,468	-2,398	2,814	3,139	1,077	-2,062
Longueville Rd E of Parklands Rd WB	2,306	2,436	1,070	-1,366	4,655	4,601	2,007	-2,594
Lane Cove Tunnel EB	-	-	3,736	3,736	-	-	3,686	3,686
Lane Cove Tunnel WB	-	-	3,073	3,073	-	-	5,695	5,695
Fullers Rd W of Pacific Hwy EB	1,158	1,137	1,152	15	1,047	1,593	1,035	-558
Fullers Rd W of Pacific Hwy WB	922	1,055	897	-158	1,504	1,390	1,264	-126
Mowbray Rd W of Pacific Hwy EB	1,348	1,526	930	-596	725	545	547	2
Mowbray Rd W of Pacific Hwy WB	947	1,442	895	-547	1,193	1,556	618	-938
River Rd E of Northwood Rd EB	1,777	1,973	2,097	124	1,223	1,298	1,152	-146
River Rd E of Northwood Rd WB	1,087	1,125	1,065	-60	2,236	2,502	2,345	-157
Pacific Hwy N of Gore Hill Fwy NB	1,795	2,354	1,436	-918	3,206	3,384	1,929	-1,455
Pacific Hwy N of Gore Hill Fwy SB	2,386	2,439	2,094	-345	1,377	1,922	1,052	-870
Gore Hill Fwy at Willoughby Rd O/Pass EB	3,630	3,620	4,917	1,297	2,653	3,321	4,129	808
Gore Hill Fwy at Willoughby Rd O/Pass WB	2,804	3,397	4,178	781	3,964	4,137	5,444	1,307
Falcon St E of Miller St EB	1,189	1,051	889	-162	1,643	1,534	1,203	-331
Falcon St E of Miller St WB	2,153	1,815	1,061	-754	1,510	1,520	1,357	-163
Military Rd W of Ben Boyd Rd EB	1,543	1,621	1,605	-16	3,340	3,208	3,139	-69
Military Rd W of Ben Boyd Rd WB	3,029	3,065	2,894	-171	1,115	1,213	1,602	389
Falcon St North-facing Ramps NB	-	-	1,433	1,433	-	-	556	556
Falcon St North-facing Ramps SB	-	-	598	598	-	-	1,543	1,543
Epping Rd at Stringy Bark Ck EB	3,465	3,279	621	-2,658	3,159	3,282	1,372	-1,910
Epping Rd at Stringy Bark Ck WB	2,489	2,646	1,049	-1,597	3,605	4,358	829	-3,529
Epping Rd W of Sam Johnson Way EB	3,896	3,738	1,091	-2,647	2,790	3,622	920	-2,702
Epping Rd W of Sam Johnson Way WB	2,225	2,370	782	-1,588	4,383	3,530	1,585	-1,945
Pacific Hwy N of Greenwich Rd NB	1,123	1,144	1,182	38	2,100	2,336	2,514	178
Pacific Hwy N of Greenwich Rd SB	2,095	2,089	1,484	-605	1,314	1,295	946	-349
Pacific Hwy E of Christie St EB	1,818	1,950	1,428	-522	1,563	1,498	1,233	-265
Pacific Hwy E of Christie St WB	1,342	1,437	1,140	-297	1,516	1,710	1,860	150

*Note: * 1999 traffic volumes are modelled; Tunnel configuration 2 to 3-lane eastbound and 3-lane westbound; no induced car trips.*

Table 8.6 - Modelled Future 2016 Traffic Volumes With and Without Lane Cove Tunnel (veh/hr)

	Morning Peak Hour				Evening Peak Hour			
Location	**1999 Base***	**2016 Base**	**2016 Tunnel**	**Tunnel less Base (2006)**	**1999 Base***	**2016 Base**	**2016 Tunnel**	**Tunnel less Base (2006)**
M2 S of Delhi Rd EB	2,246	2,445	2,589	144	726	1,030	1,699	669
M2 S of Delhi Rd WB	603	1,002	1,600	598	2,319	2,788	3,481	693
Epping Rd E of Pittwater Rd EB	2,382	2,751	3,154	403	2,611	2,571	3,336	765
Epping Rd E of Pittwater Rd WB	2,129	2,551	2,955	404	2,967	3,462	5,004	1,542
Mowbray Rd N of Epping Rd EB	800	1,229	308	-921	556	505	299	-206
Mowbray Rd N of Epping Rd WB	574	1,071	478	-593	912	1,392	390	-1,002
Centennial Av S of Epping Rd NB	858	806	850	44	439	458	586	128
Centennial Av S of Epping Rd SB	710	713	810	97	954	920	910	-10
Longueville Rd E of Parklands Rd EB	4,141	3,901	1,378	-2,523	2,814	3,219	1,203	-2,016
Longueville Rd E of Parklands Rd WB	2,306	2,816	1,192	-1,624	4,655	4,809	1,949	-2,860
Lane Cove Tunnel EB	-	-	4,283	4,283	-	-	3,879	3,879
Lane Cove Tunnel WB	-	-	3,444	3,444	-	-	6,393	6,393
Fullers Rd W of Pacific Hwy EB	1,158	1,203	1,263	60	1,047	1,754	1,099	-655
Fullers Rd W of Pacific Hwy WB	922	1,096	935	-161	1,504	1,484	1,326	-158
Mowbray Rd W of Pacific Hwy EB	1,348	1,704	988	-716	725	695	655	-40
Mowbray Rd W of Pacific Hwy WB	947	1,518	1,017	-501	1,193	1,641	711	-930
River Rd E of Northwood Rd EB	1,777	2,258	2,209	-49	1,223	1,539	1,334	-205
River Rd E of Northwood Rd WB	1,087	1,337	1,231	-106	2,236	2,792	2,482	-310
Pacific Hwy N of Gore Hill Fwy NB	1,795	2,467	1,633	-834	3,206	3,522	1,924	-1,598
Pacific Hwy N of Gore Hill Fwy SB	2,386	2,745	2,431	-314	1,377	2,166	1,259	-907
Gore Hill Fwy at Willoughby Rd O/Pass EB	3,630	3,961	5,408	1,447	2,653	3,266	4,270	1,004
Gore Hill Fwy at Willoughby Rd O/Pass WB	2,804	3,456	4,433	977	3,964	4,214	5,663	1,449
Falcon St E of Miller St EB	1,189	1,209	1,116	-93	1,643	1,644	1,208	-436
Falcon St E of Miller St WB	2,153	2,101	1,150	-951	1,510	1,610	1,400	-210
Military Rd W of Ben Boyd Rd EB	1,543	1,641	1,658	17	3,340	3,390	3,351	-39
Military Rd W of Ben Boyd Rd WB	3,029	3,218	2,882	-336	1,115	1,256	1,498	242
Falcon St North-facing Ramps NB	-	-	1,435	1,435	-	-	533	533
Falcon St North-facing Ramps SB	-	-	578	578	-	-	1,601	1,601
Epping Rd at Stringy Bark Ck EB	3,465	3,568	693	-2,875	3,159	3,549	1,404	-2,145
Epping Rd at Stringy Bark Ck WB	2,489	2,909	1,060	-1,849	3,605	3,884	821	-3,063
Epping Rd W of Sam Johnson Way EB	3,896	4,056	1,256	-2,800	2,790	3,108	886	-2,222
Epping Rd W of Sam Johnson Way WB	2,225	2,570	746	-1,824	4,383	4,871	1,731	-3,140
Pacific Hwy N of Greenwich Rd NB	1,123	1,220	1,170	-50	2,100	2,892	3,043	151
Pacific Hwy N of Greenwich Rd SB	2,095	2,306	1,953	-353	1,314	1,252	1,017	-235
Pacific Hwy E of Christie St EB	1,818	2,343	1,793	-550	1,563	1,380	1,123	-257
Pacific Hwy E of Christie St WB	1,342	1,513	1,173	-340	1,516	2,049	2,403	354

*Note: * 1999 traffic volumes are modelled; Tunnel configuration 2 to 3-lane eastbound and 3-lane westbound; no induced car trips.*

Attachment 3 – RTA EIS Working Paper 9 - Air Quality

Table E-3. Hourly traffic and emission rates for tunnel with twin stacks in 2006

Eastbound (Eastern Stack, RTA preferred location)							Westbound (Western Stack, RTA preferred location)						
Location (AMG Coordinates, m)			331259, 6256707				Location (AMG Coordinates, m)			328267, 6257726			
Height (m)			30				Height (m)			30			
Diameter (m)			5.83				Diameter (m)			5.42			
Base elevation (m)			98				Base elevation (m)			20			
Length of tunnel (m)			3490				Length of tunnel (m)			3490			
Hour	Total number of vehicles	Total Heavy Vehicles	Total vent stack emissions (g/s)				Hour	Total number of vehicles	Total Heavy Vehicles	Total vent stack emissions (g/s)			
			CO	NOx	HC	PM_{10}				CO	NOx	HC	PM_{10}
1:00	265	17	2.94	1.23	0.257	0.025	1:00	664	19	6.26	1.49	0.511	0.040
2:00	154	22	1.81	1.00	0.179	0.026	2:00	217	14	2.11	0.60	0.185	0.021
3:00	120	20	1.43	0.84	0.145	0.023	3:00	117	8	1.14	0.33	0.100	0.012
4:00	135	30	1.69	1.14	0.184	0.034	4:00	127	27	1.38	0.62	0.148	0.031
5:00	253	51	3.11	1.99	0.330	0.058	5:00	177	36	1.91	0.84	0.204	0.042
6:00	1,021	103	11.63	5.61	1.078	0.132	6:00	429	75	4.53	1.86	0.466	0.089
7:00	3,476	181	38.08	15.01	3.249	0.281	7:00	1,343	57	12.81	3.28	1.073	0.099
8:00	3,741	103	40.17	13.96	3.268	0.211	8:00	3,084	146	29.52	7.76	2.497	0.243
9:00	3,741	141	40.50	14.87	3.362	0.249	9:00	3,084	183	29.80	8.28	2.576	0.281
10:00	3,480	157	37.91	14.46	3.193	0.257	10:00	2,782	179	26.99	7.67	2.354	0.267
11:00	2,757	175	30.49	12.67	2.656	0.254	11:00	2,660	190	25.96	7.61	2.293	0.275
12:00	2,799	181	30.98	12.93	2.703	0.261	12:00	2,860	193	27.83	8.01	2.440	0.284
13:00	2,898	244	32.58	14.75	2.940	0.326	13:00	3,166	239	31.00	9.24	2.757	0.341
14:00	2,806	213	31.34	13.72	2.788	0.292	14:00	3,693	356	36.76	11.88	3.384	0.476
15:00	2,815	198	31.29	13.38	2.758	0.278	15:00	3,910	308	38.39	11.60	3.433	0.434
16:00	3,016	176	33.21	13.48	2.866	0.262	16:00	4,587	351	44.95	13.45	4.004	0.498
17:00	3,277	146	35.68	13.56	3.001	0.240	17:00	5,355	349	52.00	14.83	4.543	0.520
18:00	3,705	92	39.69	13.58	3.212	0.199	18:00	5,699	255	54.43	14.11	4.579	0.433
19:00	3,416	52	36.29	11.72	2.877	0.150	19:00	5,047	156	47.65	11.49	3.902	0.312
20:00	2,349	31	24.91	7.94	1.967	0.099	20:00	3,778	75	35.35	8.01	2.831	0.191
21:00	1,430	28	15.25	5.06	1.220	0.069	21:00	2,419	41	22.57	5.02	1.796	0.115
22:00	1,219	30	13.06	4.46	1.056	0.065	22:00	2,009	31	18.72	4.12	1.485	0.092
23:00	920	32	9.93	3.58	0.819	0.058	23:00	1,578	23	14.70	3.22	1.164	0.071
0:00	569	14	6.10	2.09	0.494	0.031	0:00	1,094	17	10.20	2.25	0.809	0.050
Daily:	50,362	2,437	1980 kg/d	767 kg/d	168 kg/d	14 kg/d	Daily:	59880	3327	2077 kg/d	567 kg/d	178 kg/d	19 kg/d

Table E-4. Hourly traffic and emission rates for tunnel with twin stacks in 2016

Eastbound (Eastern Stack, RTA preferred location)							Westbound (Western Stack, RTA preferred location)						
Location (AMG Coordinates, m)			331259, 6256707				Location (AMG Coordinates, m)			328267, 6257726			
Height (m)			30				Height (m)			30			
Diameter (m)			5.83				Diameter (m)			5.42			
Base elevation (m)			98				Base elevation (m)			20			
Length of tunnel (m)			3490				Length of tunnel (m)			3490			
Hour	Total number of vehicles	Total Heavy Vehicles	Total emission (g/s)				Hour	Total number of vehicles	Total Heavy Vehicles	Total emission (g/s)			
			CO	NOx	HC	PM_{10}				CO	NOx	HC	PM_{10}
1:00	284	19	3.15	1.32	0.275	0.027	1:00	721	21	6.80	1.62	0.554	0.043
2:00	165	24	1.94	1.07	0.191	0.028	2:00	236	16	2.29	0.66	0.200	0.023
3:00	129	21	1.54	0.90	0.156	0.025	3:00	127	9	1.24	0.36	0.109	0.013
4:00	145	33	1.81	1.23	0.198	0.036	4:00	138	29	1.50	0.67	0.161	0.034
5:00	271	54	3.33	2.14	0.353	0.062	5:00	193	39	2.08	0.92	0.221	0.046
6:00	1,094	110	12.46	6.01	1.155	0.141	6:00	466	81	4.92	2.02	0.506	0.097
7:00	4,000	208	43.82	17.28	3.738	0.323	7:00	1,458	62	13.90	3.56	1.165	0.108
8:00	4,000	110	42.95	14.92	3.494	0.226	8:00	3,444	164	32.97	8.66	2.788	0.272
9:00	4,000	151	43.31	15.90	3.595	0.266	9:00	3,444	204	33.28	9.25	2.877	0.313
10:00	4,000	181	43.58	16.62	3.670	0.296	10:00	3,019	194	29.30	8.32	2.555	0.290
11:00	2,954	188	32.66	13.57	2.845	0.272	11:00	2,887	206	28.18	8.26	2.489	0.299
12:00	2,999	194	33.19	13.85	2.896	0.279	12:00	3,105	209	30.20	8.70	2.649	0.308
13:00	3,105	261	34.90	15.80	3.149	0.349	13:00	3,436	260	33.64	10.03	2.992	0.370
14:00	3,006	228	33.57	14.70	2.987	0.313	14:00	4,009	386	39.90	12.89	3.673	0.517
15:00	3,016	212	33.53	14.34	2.954	0.297	15:00	4,244	334	41.66	12.59	3.726	0.471
16:00	3,231	189	35.58	14.45	3.070	0.281	16:00	4,979	381	48.79	14.60	4.346	0.541
17:00	3,511	156	38.22	14.52	3.215	0.257	17:00	6,000	391	58.27	16.62	5.090	0.582
18:00	3,878	97	41.54	14.22	3.362	0.208	18:00	6,000	268	57.30	14.86	4.821	0.456
19:00	3,659	55	38.88	12.55	3.082	0.161	19:00	5,800	179	54.76	13.20	4.484	0.358
20:00	2,516	33	26.69	8.51	2.107	0.106	20:00	4,101	82	38.37	8.69	3.073	0.207
21:00	1,532	30	16.34	5.42	1.307	0.074	21:00	2,626	44	24.50	5.45	1.950	0.124
22:00	1,306	32	13.99	4.78	1.131	0.070	22:00	2,181	33	20.32	4.47	1.612	0.100
23:00	985	34	10.64	3.84	0.877	0.062	23:00	1,713	25	15.95	3.50	1.263	0.077
0:00	610	15	6.54	2.24	0.529	0.033	0:00	1,187	18	11.07	2.44	0.878	0.055
Daily:	54394	2635	2139 kg/d	829 kg/d	181 kg/d	15 kg/d	Daily:	65511	3635	2272 kg/d	620 kg/d	195 kg/d	21 kg/d

Attachment 4 – LCC Submission to the EIS dated 7 January 2002

Date: 7 January 2002
Ref: R Selleck
File No. T65.85.20
Folio No:

The Manager
Lane Cove Tunnel EIS
Box 558
BLACKTOWN NSW 2148

Dear Sir

Lane Cove Tunnel EIS

Having reviewed the EIS for the proposed tunnel under Lane Cove, Lane Cove Council has resolved its position as follows:

1. Endorse the construction and operation of the tunnel configuration proposed in the EIS including the widening of the Gore Hill Freeway to three lanes each way and the connections at the M2, Epping Road, Pacific Highway, Reserve Road and Falcon Street.

2. Endorse the additional lanes on the Gore Hill Freeway but only as bus lanes as in Epping Road.

3. Endorse the retention of all turning movements at the intersection of Epping Road/Mowbray Road and the provision of an at-grade pedestrian crossing in lieu of the underpass.

4. Recognising the findings of the extensive research carried out by the Lane Cove Tunnel Action Group, that in-tunnel treatment of vehicle emissions be provided without the need for any vent stacks.

5. The RTA, in cooperation with Lane Cove Council, carry out traffic modeling of local streets so as to allow proper assessment of the impact of the

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project on traffic in the neighbourhood of the project as suggested in note (f) to clause 4c of the Statutory Requirements for the Preparation of an EIS under Part 5 of the Environmental Planning and Assessment Act 1979.

6. In the event that the project as currently proposed does not significantly ameliorate the high level of through traffic in the local streets of Lane Cove, then the RTA develop proposals and/or alter the project proposal to achieve the removal of through traffic from local streets.

7. Subject to 6. above, reconfigure Epping Road between Centennial Avenue and Longueville Road to two lanes each way.

8. Having regard to the possibility that significant disturbance of the bushland on the south side of Epping Road may occur, the RTA carry out detailed investigation of the configuration of Epping Road between the Shell Service Centre and Sam Johnson Way prior to determination of the EIS.

9. The location of the cycleway within Turrumburra Park be subject of Council approval of the detailed design.

10. The RTA re-instate the right hand turn from Centennial Avenue west into Epping Road. This may be possible by establishing Centennial Avenue with one left turn lane, one through lane northbound, one right hand turn east into Epping Road and one lane southbound for the southside of Epping Road and a similar arrangement north of Epping Road.

11. More detail must be provided prior to determination of the EIS in respect of the transport interchange and parkland on the north east corner of Parklands Avenue and Longueville Road so that proper assessment of the proposal can be made. The details of the interchange should take into account separate RTA investigations of a bus priority lane through Birdwood Avenue and Longueville Road.

12. The RTA confirm that motorists eastbound on Epping Road will be able to gain access to Kimberley Avenue by executing a right hand turn at the Pacific Highway and then right again to travel westbound on Longueville Road and into Kimberley Avenue.

13. To address concerns in regard to personal safety the cycleway tunnel under the Pacific Highway be configured such that there is clear vision through the entire length of the tunnel.

14. As has proved to be the case in previous projects, the portrayal of the treatment of Epping Road and proposed plantings significantly overstates the "aesthetic" improvements resulting from the project and the documentation must be redrafted to fairly indicate the final outcome in

terms of urban design. The redrafted document must clearly define the landscape treatment at the intersection of Mowbray Road and on the Gore Hill Freeway east of the Pacific Highway having regard to their importance in terms of their being "gateways" to Lane Cove.

15. The proposed treatment of the north side of Epping Road between Centennial Avenue and Parklands Avenue is not a true indication of the intrusion into the azalea beds or the height of the proposed retaining wall and having regard to the significance of these plantings Lane Cove Council insists that the RTA prepare detailed drawings of this section of road so that the proposal can be properly assessed prior to determination of the EIS.

16. No alteration be made to any traffic management devices in Lane Cove area, and particularly in Lane Cove West, during the construction of the project.

17. Notwithstanding the recommendations below, having regard to the level of traffic in Moore Street and safety concerns in respect of construction traffic turning across this traffic to access the Moore Street construction site, that all access to the construction site be left in from Epping Road and left out, and if necessary that turning lanes be provided in Epping Road to assist that access.

18. Having regard to the narrow width of local streets that adequate on-site parking for employees be provided at both the Moore Street and the Pacific Highway/Longueville Road construction sites to ensure that carparking does not cause congestion in local streets.

19. The assessment of bio-diversity is inadequate. A threatened species, the red-crowned toadlet exists in adjacent bushland and has not been considered in the EIS.

20. Location of the proposed work compound at Moore Street will destroy the existing wildlife corridor connecting Hands Quarry Reserve with the Stringybark Creek valley. The RTA must identify how this corridor will be preserved prior to determination of the EIS.

21. The EIS is unclear, inadequate and unclear in respect of indigenous heritage. Potential archaeological sites along Stringybark Creek require further testing prior to determination of the EIS.

22. Non-indigenous heritage has not been adequately addressed. The Moore Street works compound would destroy the southern half of bushland on the south side of Epping Road that has been identified in the Lane Cove Heritage Study (item L38) as being of landscape significance.

23. The impacts of the work compound at Moore Street must be fully identified prior to determination of the EIS.

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24. Pedestrian and cycle access from Lane Cove to Artarmon Station that was severed during construction of the Gore Hill Freeway must be fully restored.

Should you wish to discuss any aspect of this letter please contact me on 9911 3560.

Yours sincerely

Ross Selleck
EXECUTIVE MANAGER
URBAN SERVICES

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Attachment 5 – RTA Revised Ventilation Design 251002

APPENDIX C

Environmental Assessment for the Revised Tunnel Ventilation Design for the Lane Cove Tunnel (RTA)

Department of Planning

Environmental Assessment

For the

REVISED VENTILATION DESIGN FOR LANE COVE TUNNEL

The following tables are extracted from Appendix C – Revised Ventilation Design

Annual load for each pollutant

Table 5 and Table 6 show the hourly and annual average emission loads for CO, NO_x and PM_{10} for the eastern and western ventilation stacks respectively. These have been calculated by Holmes Air Sciences using the PIARC methodology. The final ventilation design is being done by Connell Wagner and using the same methodology and so should yield similar results. VOC emissions cannot be calculated with PIARC and these have been assumed to be 10% of CO emissions.

Hourly concentration

Hourly concentration limits for each pollutant under normal traffic flow conditions are provided in Table 7 and Table 8.

Table 5. Hourly and annual emission loads and exit velocities for Eastern Ventilation Stack in 2006

Hour	CO(kg/h)	NOx(kg/h)	PM(kg/h)	VOC(kg/h)	Exit velocity (m/s)
1	10.1	2.6	0.1	1.0	5.0
2	5.1	1.6	0.1	0.5	5.0
3	3.7	1.2	0.0	0.4	5.0
4	4.2	1.7	0.1	0.4	5.0
5	7.6	2.9	0.1	0.8	5.0
6	28.6	7.7	0.3	2.9	5.0
7	95.9	19.6	0.6	9.6	9.8
8	111.3	21.8	0.7	11.1	11.4
9	111.5	23.2	0.8	11.2	11.4
10	103.4	22.2	0.7	10.3	10.6
11	84.4	20.1	0.7	8.4	8.7
12	86.5	20.7	0.7	8.7	8.9
13	90.8	23.6	0.9	9.1	9.3
14	91.3	24.4	0.9	9.1	9.4
15	92.5	23.9	0.9	9.2	9.5
16	101.0	25.4	0.9	10.1	10.4
17	111.4	26.6	0.9	11.1	11.4
18	123.6	26.3	0.8	12.4	12.7
19	112.6	22.2	0.7	11.3	11.6
20	78.8	15.3	0.5	7.9	8.1
21	48.6	9.7	0.3	4.9	5.0
22	41.2	8.3	0.3	4.1	5.0
23	31.4	6.6	0.2	3.1	5.0
24	20.0	4.1	0.1	2.0	5.0
Annual total (kg/year)	582,422	131,979	4,501	58,242	

In 2016 the PIARC emission estimation method gives lower estimates for all emissions compared with 2006. Thus the 2006 emission load and model predictions based on them can be taken to be the worst case.

Table 6. Hourly and annual emission loads and exit velocities for Western Ventilation Stack in 2006

Hour	CO(kg/h)	NOx(kg/h)	PM(kg/h)	VOC(kg/h)	Exit velocity(m/s)
1	8.0	2.2	0.1	0.8	5.0
2	3.0	1.1	0.0	0.3	5.0
3	1.9	0.7	0.0	0.2	5.0
4	2.1	1.1	0.1	0.2	5.0
5	3.3	1.7	0.1	0.3	5.0
6	10.2	4.2	0.2	1.0	5.0
7	32.6	9.8	0.4	3.3	5.0
8	51.0	14.6	0.5	5.1	5.2
9	51.2	15.4	0.6	5.1	5.2
10	46.8	14.5	0.5	4.7	5.0
11	41.8	13.6	0.5	4.2	5.0
12	44.0	14.2	0.5	4.4	5.0
13	47.7	16.2	0.6	4.8	5.0
14	52.7	18.7	0.7	5.3	5.4
15	54.6	18.3	0.7	5.5	5.6
16	62.3	20.5	0.8	6.2	6.4
17	71.1	22.2	0.8	7.1	7.3
18	76.3	21.6	0.7	7.6	7.8
19	68.0	18.1	0.6	6.8	7.0
20	49.6	12.6	0.4	5.0	5.1
21	31.4	7.9	0.2	3.1	5.0
22	26.2	6.6	0.2	2.6	5.0
23	20.4	5.2	0.2	2.0	5.0
24	13.8	3.5	0.1	1.4	5.0
Annual total (kg/year)	317,524	96,614	3,480	31,752	

Table 7. Hourly concentrations for Eastern Ventilation Stack in 2006

Hour	CO (mg/m^3)	NOx (as NO_2) ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)	VOC (mg/m^3)
1	62.5	15745	537	6.25
2	62.5	19453	763	6.25
3	62.5	20150	808	6.25
4	62.5	25674	1128	6.25
5	62.5	23595	1014	6.25
6	62.5	16784	648	6.25
7	62.5	12748	423	6.25
8	62.5	12245	386	6.25
9	62.5	12989	428	6.25
10	62.5	13430	453	6.25
11	62.5	14873	528	6.25
12	62.5	14960	531	6.25
13	62.5	16262	601	6.25
14	62.5	16678	625	6.25
15	62.5	16125	590	6.25
16	62.5	15710	566	6.25
17	62.5	14927	519	6.25
18	62.5	13279	427	6.25
19	62.5	12344	375	6.25
20	62.5	12137	358	6.25
21	62.5	12461	372	6.25
22	62.5	12622	381	6.25
23	62.5	13144	407	6.25
24	62.5	12943	393	6.25

Table 8. Hourly and annual emission loads for Western Ventilation Stack in 2006

Hour	CO (mg/m^3)	NOx (as NO_2) ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)	VOC (mg/m^3)
1	62.5	17371	586	6.25
2	62.5	22114	877	6.25
3	62.5	23551	964	6.25
4	62.5	32752	1530	6.25
5	62.5	31649	1462	6.25
6	62.5	26005	1112	6.25
7	62.5	18862	672	6.25
8	62.5	17852	612	6.25
9	62.5	18838	673	6.25
10	62.5	19372	705	6.25
11	62.5	20409	770	6.25
12	62.5	20214	758	6.25
13	62.5	21258	823	6.25
14	62.5	22186	880	6.25
15	62.5	20996	807	6.25
16	62.5	20556	780	6.25
17	62.5	19521	717	6.25
18	62.5	17728	606	6.25
19	62.5	16586	536	6.25
20	62.5	15833	490	6.25
21	62.5	15776	487	6.25
22	62.5	15802	488	6.25
23	62.5	15966	499	6.25
24	62.5	15776	487	6.25

For congested flows the concentrations are as follows:

Eastern stack

- CO – 52 mg/m^3
- NO_x as NO_2 - 4.5 mg/m^3

Western stack

- CO – 51 mg/m^3
- NO_x as NO_2 – [illegible] mg/m^3

Attachment 6 – LCC Response 2/9/02 to DoP Regarding Representations Report

FILE COPY

Lane Cove Council

48 Longueville Road, Lane Cove NSW 2066 Tel: 9911 3555 Fax: 9911 360(

Date: 2 September 2002
Ref: R Selleck
File No. T65.85.20

The Director General
Planning NSW
Henry Deane Building
GPO Box 3927
SYDNEY NSW 2001

FILE NO:
DOC NO: 3320.
ORIGINAL TO:

REC'D - 5 SEP 2002

COPY TO FILE NO:

ACT	INFO	NO ACT. REQ'D	DATE

Dear Sir

Lane Cove Tunnel EIS, review by Planning NSW

I refer to your current review of the Representation Report by the Roads and Traffic Authority of NSW (RTA) for the proposed construction of the Lane Cove Tunnel and associated works.

Lane Cove Council compiled a comprehensive response to the RTA on the Environmental Impact Statement for the project. The Preferred Activity Statement released by the RTA in July 2002 indicates an apparent disregard for Council's response. I have delayed writing to you until I was able to meet with officers from the RTA in respect of Council's concerns. Unfortunately the RTA has not provided any clarification on their response to Council's concerns.

Council is very concerned that approval may be given for the project without due consideration of a number of important environmental aspects raised in Council's submission. Council is of the view that the following matters should be given greater consideration than they have apparently received.

Moore Street Construction Site and Temporary Access Tunnel (Site 7).

- The proposed works compound between Moore St and Epping Rd is of greatest concern. There is a lack of detail as to what is proposed at this site, but it would appear that the entire gully along the tributary to Stringybark Creek would be significantly altered.
- None of the 3 papers provide any adequate discussion of these impacts.

DOC REF.g\usd\ross\Tunnel EIS rep to Planning NSW

PO Box 20 Lane Cove NSW 1595 or DX 23307 Lane Cove
Email - lccouncil@lanecove.nsw.gov.au • Website - www.lanecove.nsw.gov.au • ABN 42 062 211 626

- The destruction of this bushland pocket and the resulting further fragmentation of the wildlife corridors would have a major impact. There are only 90 ha of bushland on public land in Lane Cove, which is held in very high regard by the local community and so any loss of this bushland is significant.

The comments below provide further detail of Council's concerns about this site in particular.

Biodiversity

Observations made do not appear to reflect the data that we have obtained form the same area.

Concerns regarding the biodiversity report are:

1. The assessment of the vegetation puts weight on the percentage weed, but this does not take into account the resilience of bushland and potential for bush regeneration. The bushland adjacent to Site 6 has been subject to some bush regeneration works. No regeneration work has been done at Site 7. This area in Site 7 of remnant vegetation has a high percentage of exotic weeds, but it is our experience that these areas are resilient and are recoverable once bush regeneration works start. This has been demonstrated in the adjacent reserves at Hands Quarry and Batten where similarly weed infested areas have responded dramatically.

2. The Threatened Species, Red-crowned Toadlet, has been recorded within 250 m from Epping Rd in one of these regenerating areas close to Site 7. The report states that there were no wet seepage areas and standing water suitable for frogs, but we have regularly observed and heard frogs (Green Tree Frog and Common Eastern Froglet) immediately adjacent to Epping Rd near Stringybark Creek. As mentioned previously, the Threatened Species, Red-crowned Toadlet, has been recorded within 250 m from Epping Rd in an area which was previously heavily weed infested but is now regenerating.

3. Locating the proposed works compound here at Site 7 will destroy the existing wildlife corridor connecting Hands Quarry Reserve with the Stringybark Creek valley, which at present it is only interrupted by Moore St (2 lanes wide). The Threatened Species, *Epacris purpurascens* var. *purpurascens* has been recorded in Hands Quarry Reserve within 250 m of the proposed works compound.

4. I am concerned about the overall impression given in this paper that the artificially planted native vegetation along the Gore Hill Freeway is

DOC REF.g\usd\ross\Tunnel EIS rep to Planning NSW

considered more highly regarded than the remnant native bushland in these areas.

Indigenous Heritage

David Watts, Council's Aboriginal Heritage Manager, has made the following comments about this section. The report's recommendations are unclear, inadequate and unworkable. The PADs (potential archaeological deposits) along Stringybark Creek require further testing.

Non Indigenous Heritage

The Lane Cove Heritage Study Landscape Heritage item L38 – the bushland on both sides of Epping Rd near Johnston Crescent – is shown in Appendix 1 Map 3 but has not been discussed further. The proposed works compound would destroy the southern half of this bushland that has been identified as being of high landscape significance.

Water Quality

There is no discussion of the impacts of the proposed work compound at Moore St on the open creek flowing through the bushland. A compound such as the one proposed would most definitely have a negative impact on the natural creek and aquatic ecosystem.

Alternative Option for Site 7

Investigation should be carried out in respect of locating Site 7 into Sam Johnson Way. The temporary access tunnel could be designed to join the main tunnel in the vicinity of Johnstone Crescent. Although this would result in an approximate increase in the length of the temporary access tunnel by about 170 m, it could be used to provide a direct access from the tunnel to Sam Johnson Way for traffic coming to and from the city and south. This alternative, although impacting on a small area of bushland near west end of Moore Street adjacent to Sam Johnson Way, would avoid destruction of the important wildlife corridor linking through to Hands Quarry.

Site offices could be located on adjacent industrial land with stockpiling only adjacent to the tunnel entrance.

Recommendation

Relocate Work Site 7 and Access Tunnel as shown on attached sketch **(Attachment 1)**.

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Bus Interchange in Longueville Road east of Parklands Avenue

While Council supports any initiative that facilitates public transport it recognises that access to these facilities is as important as the quality of design within the facility.

The overhead footbridge with provision for disabled access is supported, however, the route from the footbridge to the Lane Cove Shopping Centre is less than desirable. The attached sketch, **Attachment 4**, shows the existing and new pedestrian route to the shops.

Of particular concern is the crossing of Little Street. Little Street meets Longueville Road (Local road section) at an angle and pedestrians, particularly aged and disabled, will have difficulty checking over their shoulder for traffic coming in from Gore Hill Freeway and turning into Little Street.

Traffic signals should be installed to allow control of pedestrians and traffic at the combined intersection of Little Street and Birdwood Avenue with Longueville Road. A sketch of the intersection, **Attachment 5,** is attached.

Suggestions have been made that the air space over the bus interchange could be used for commercial development. Council would argue that this is not appropriate. Establishment of gardens in the space above the interchange and on the south west corner of the intersection would provide a gateway to Lane Cove and would balance the existing development on the other two corners of the intersection.

Yours sincerely

Ross Selleck
EXECUTIVE MANAGER
URBAN SERVICES

Azalea Beds, Longueville Road

The Azalea Beds on the north side of Longueville Road between Centennial Avenue and Parklands Avenue are of special significance to Lane Cove residents. The entire embankment incorporating the azalea plantings and formal garden of bedding plants to spell out the name of the Municipality are listed in the Lane Cove Heritage Study. The reasons for listing are that they are associated with the Municipality's urban settlement of the 1950's and 1960's. The brilliant formal display provides an important focus to the busy thoroughfare.

Drawing No. C014, issue P4, sheet 6, Typical Cross Sections of Epping Road shows typical cross sections of Epping Road between Centennial Avenue and Parklands Avenue. It indicates that in many locations the through traffic lanes are 2.8 and 2.9 metres wide and the bus lane at 3.0 metres whereas the cross section closest to the centre of the azalea plantings are 3.0 metres wide and the bus lane 3.5 metres wide. Design standards also provide that the bike lane can be a minimum of 2.8 metres wide.

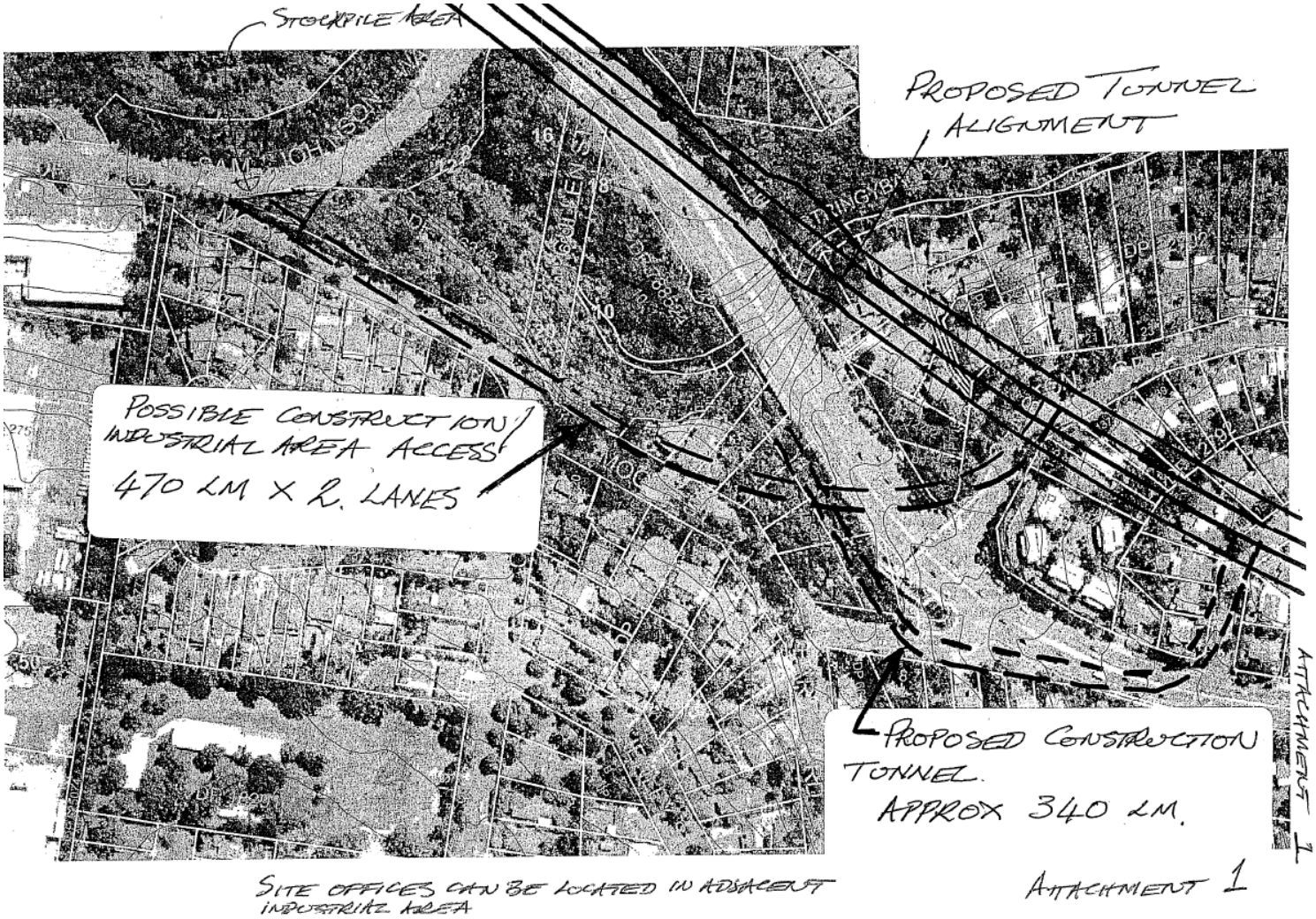
While the footpath on the north side of the road is only about 2.1 metres wide between the kerb and the wall along the base of the garden area, Council considers that the width of 3.5 metres proposed is completely unnecessary. The combination of excessive lane widths on the roadway and the excessive footpath width will take 2.85 metres off the front of the garden and will completely destroy the existing garden bed. It would result in a retaining wall between 1.5 metres and 2.5 metres high depending on whether the second wall at the top of the grassed slope falls within the new footpath area.

If the road at this location was redesigned to provide the reduced traffic lane widths of 2.8 metres, bus lanes of 3.2 metres and the bike lane at 2.8 metres, the roadway width could be reduced by 0.9 metres. A footpath width of 2.4 metres would be sufficient for this section of footpath reducing the impact on the garden bed by a further 1.1 metres. In short, the impact on the garden beds could be reduced from 2.85 metres to 0.8 metres. Although this would still necessitate the reconstruction of the formal beds spelling out "Lane Cove", they could be reconstructed in a similar style as that existing.

The concrete retaining wall shown in the EIS is not only wrong in scale (shown waist high rather than 2.0 metres) but the material proposed is completely out of character with that existing. Any reconstruction of retaining walls should be in material consistent with existing materials.

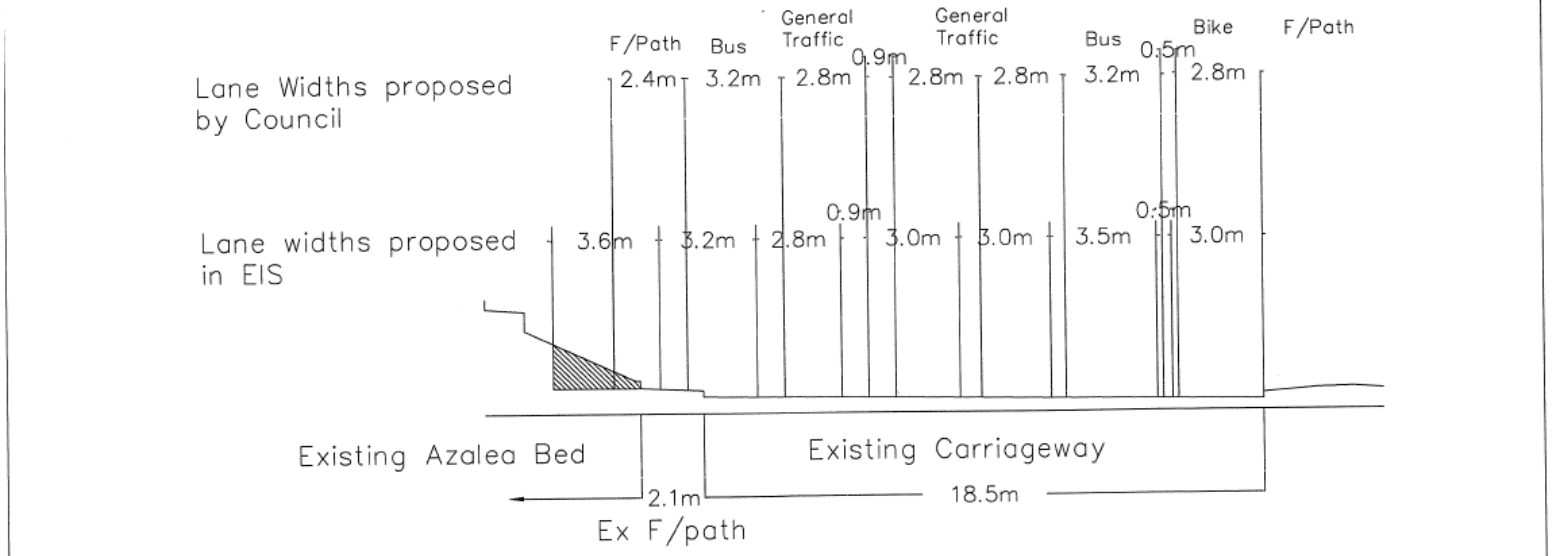
Council's alternate cross section, **Attachment 2**, will assist in the retention of the garden area. I have also attached a copy of Plan C014, **Attachment 3**, showing where lane widths of 2.8 and 2.9 metres have been proposed by the RTA.

DOC REF.giusd\ross\Tunnel EIS rep to Planning NSW



ATTACHMENT 1

ATTACHMENT 6

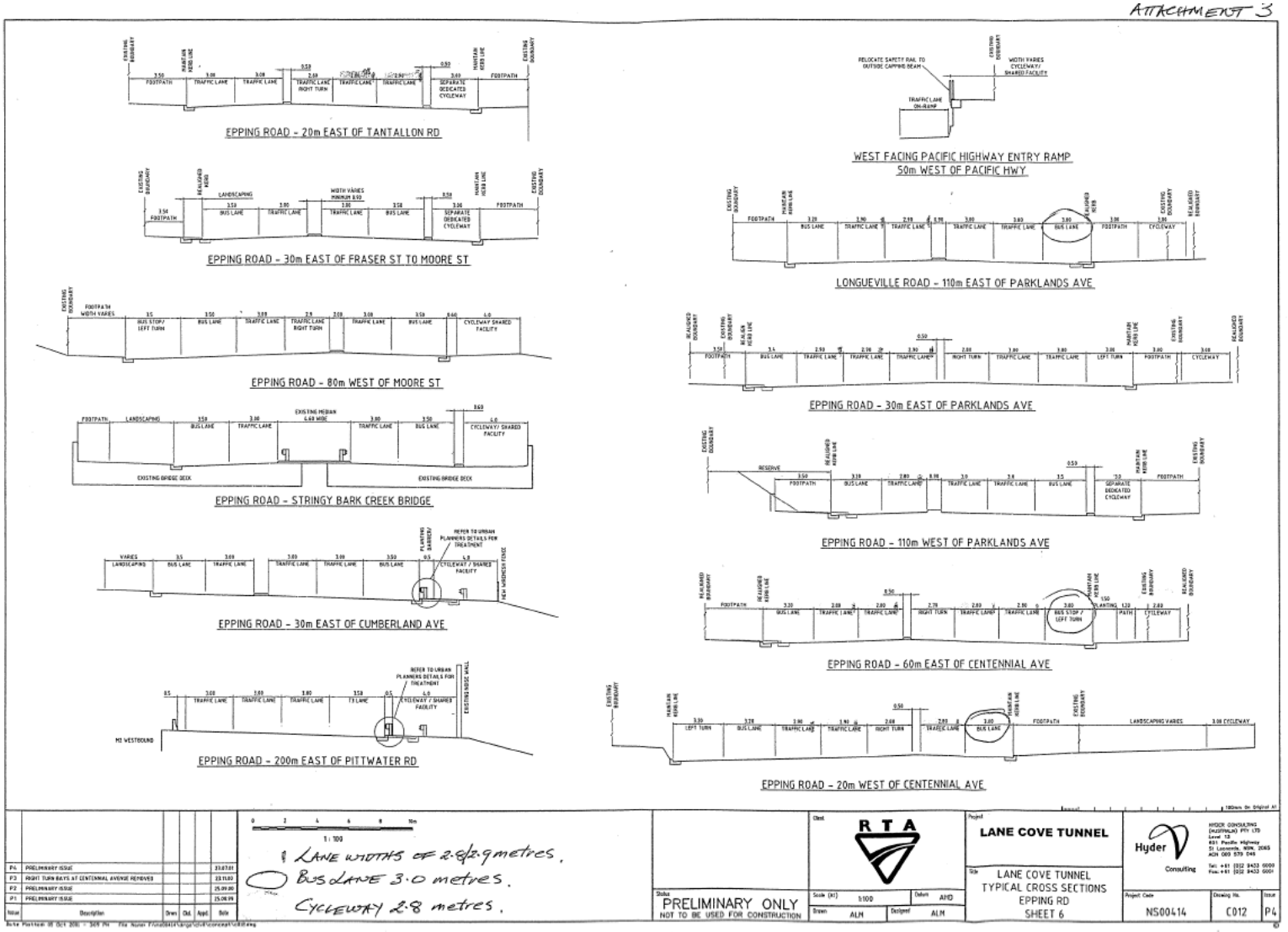


LANE COVE COUNCIL
WORKS AND URBAN SERVICES DIVISION

Epping Road
40m west of Coxs Lane
Lane Cove

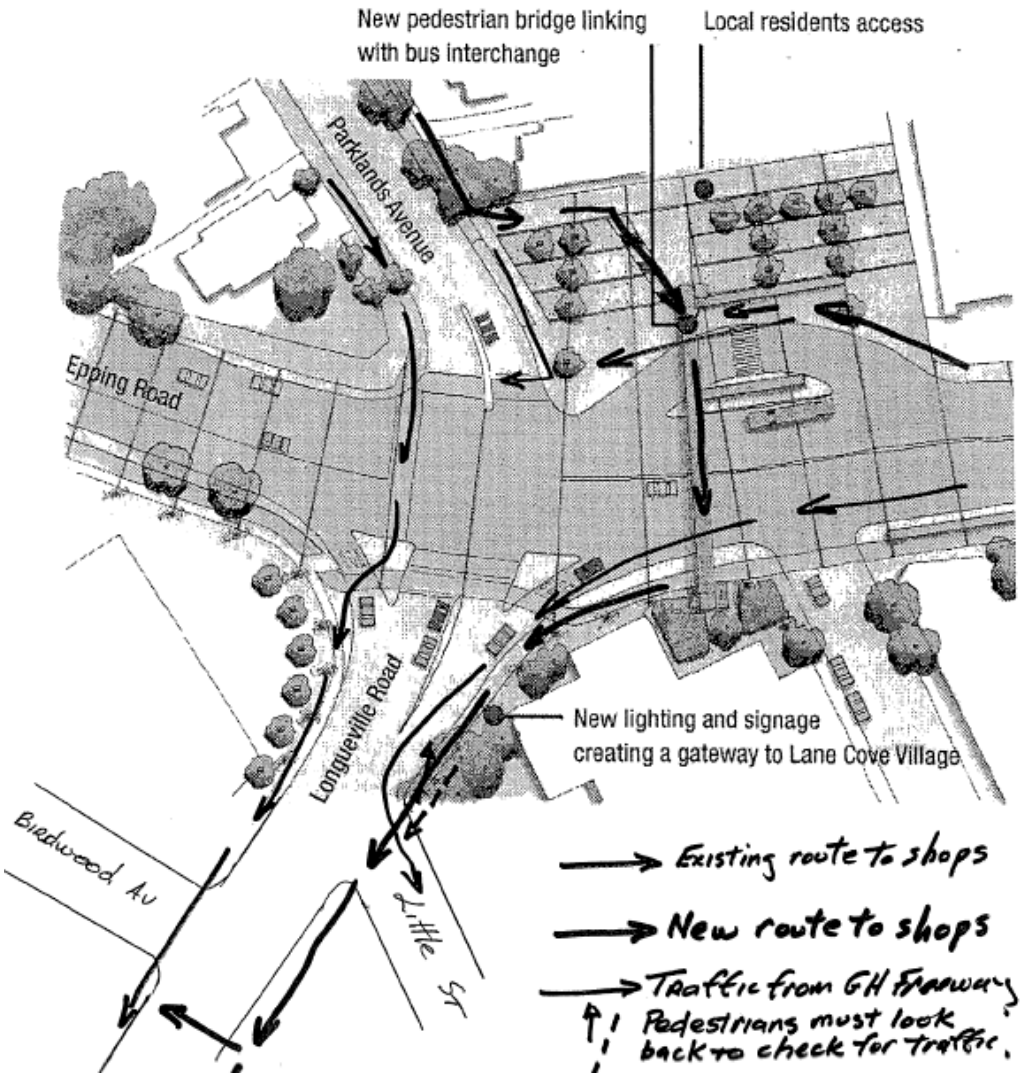
Cross Section
SCALE: NTS
DATE: SEP '02
SURVEYED: SJ
PLAN No: 534

ATTACHMENT 3



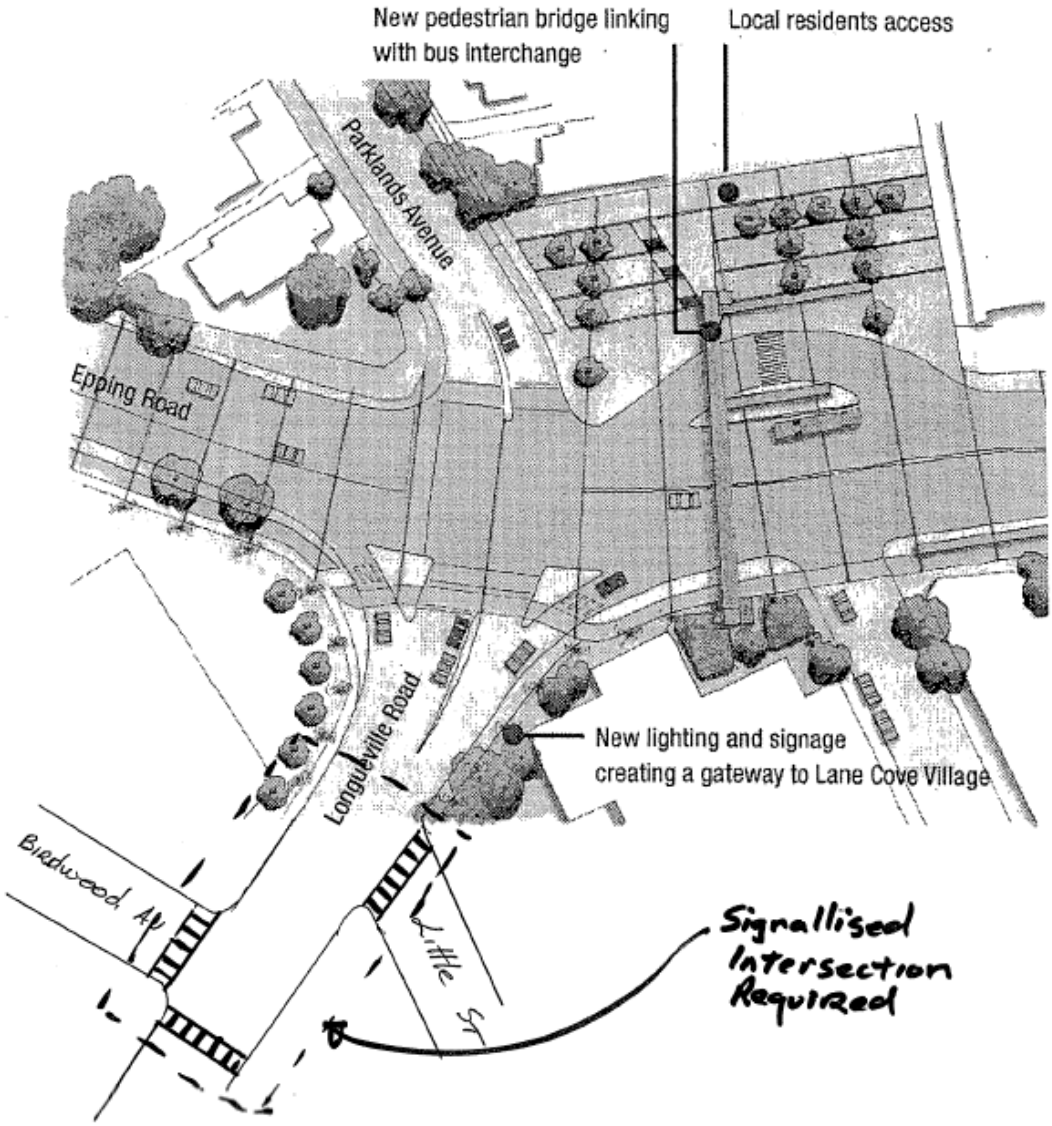
ATTACHMENT 4

New bus Interchange aerial view



ATTACHMENT 5

New bus Interchange aerial view



Attachment 7 – Extracts from DG Planning Report

FOREWORD

The Roads and Traffic Authority of NSW (RTA) proposes to develop the Lane Cove Tunnel and associated road improvements. The Proposal involves the construction of a 3.4km dual two/three lane tunnel connecting Epping Road at Mowbray Road West with the Gore Hill Freeway, an additional lane in each direction on the Gore Hill Freeway, new north facing ramps at the junction of the Warringah Expressway and Falcon Street and surface works on Epping Road including installation of bus lanes. The Proposal, estimated to cost $815 million, would be funded by private sources and likely to be recouped by the successful consortium through the imposition of a toll.

The Proposal is subject to assessment under Division 4, Part 5 of the *Environmental Planning and Assessment Act 1979* (the Act). As such, the approval of the Minister for Planning is required for the works. The RTA has sought the approval of the Minister under Section 115B of the Act. This Report has been prepared in accordance with Section 115C of the Act which requires that the Minister obtain a report from the Director-General of the Department of Planning prior to making a decision.

The purpose of this Report is to review the Environmental Impact Statement (EIS), the issues raised in representations made in response to the public exhibition of the EIS, the additional information provided by the Proponent and other relevant matters pertaining to the potential environmental impacts of the proposed works.

The scale of the Lane Cove Tunnel and associated road improvements has led to a range of complex environmental issues to resolve and the RTA has proposed a number of modifications to reduce impacts and maximise benefits. In particular, the modifications to the ventilation design to improve in-tunnel air quality and visibility, the commitment to providing a bus interchange and pedestrian overbridge on Longueville Road near the corner of Parklands Road and the provision of bus lanes on the Pacific Highway between Miller Street and Longueville Roads would maximise the long term benefits of the Proposal.

The Lane Cove Tunnel would complete the Sydney Orbital freeway/motorway network outlined in the Government's *'Action for Transport – 2010'*. The Proposal would have significant benefits in terms of improved travel times, accessibility, reduced traffic levels on a number of heavily congested roads, would provide facilities and improvements to road-based public transport and improvements for cyclists and pedestrians.

This Report concludes that the potential environmental impacts associated with the Proposal can be mitigated to an acceptable level by adopting management measures referred to in this Report and reflected in the Recommended Conditions of Approval in Chapter 12 of this Report. On that basis, it is recommended that the Proposal be approved subject to the recommended conditions.

Sue Holliday
Director-General

Department of Planning
November 2002

4.4 Summary of Modifications

4.4.1 Major Modifications

Of the 11 design modifications proposed by the RTA pre and post-PAR, five (5) major modifications were proposed. These, which are described briefly below, were the relocation of the western vent stack to Sirius Road, the provision of a bus interchange and pedestrian overbridge on the north east corner of Longueville Road/Epping Road and Parklands Avenue intersection, the revised ventilation design for the Lane Cove Tunnel and the changes at the Willoughby Road interchange.

Western Vent Stack Relocation

The proposed western vent stack would be relocated approximately 150m west from the Orion Road site to 5 Sirius Road. The location of the proposed stack is indicated in Figure 4.1. The top of stack would be approximately 30m above adjacent ground level, with a cross-section area of 38 m^2.

The RTA Proposal to change the stack location was primarily due to concerns about the affect of the stack on development potential at the Orion Road sites as a development application had been approved by Lane Cove Council for a commercial building. The Sirius Road site is currently for sale and has an unoccupied industrial/office space building. There are no current plans for redevelopment of this site.

The RTA states that this modification would provide a greater distance from the stack and sensitive receptors such as Lane Cove West residents and public schools. The site would be approximately 200m from the most sensitive elevated receptor – the Compaq building.

Bus Interchange Provision and Pedestrian Overpass – Longueville Road/Parklands Road

A bus interchange at the north eastern corner of the Longueville Road / Parklands Avenue intersection was proposed as an addition to the public transport aspects of the Proposal. This modification involves the construction of a two-platform bus interchange on residue land from four (4) properties identified for acquisition. The location and concept design for the interchange is shown in Figure 4.3.

Further detailed design components as part of the development of the residue land, would include integration of the bus interchange with a pedestrian crossing (see below). The RTA stated that the modification was proposed to improve bus patron facilities, minimise impacts on Epping Road traffic and improve the management of the bus services stopping at this location.

A pedestrian overpass at the Longueville Road/Epping Road intersection with Parklands Avenue would be provided as part of the integrated bus interchange. Due to design constraints, the new pedestrian overpass would include stairs and a lift at either end for access. The new location of the pedestrian bridge would improve north-south pedestrian access compared to the existing pedestrian bridge at Kimberley Avenue, which would be removed following completion of the new overbridge.

Revised Tunnel Ventilation Design

A substantial change to the tunnel ventilation design is proposed by the RTA. The works for the revised ventilation design involve the following:

- provision for a tunnel air extraction point in both the eastbound and westbound tunnels;
- excavation of additional exhaust tunnels to connect the tunnel air extraction points to main exhaust tunnels to the ventilation stacks;
- provision for an air intake station at ground level which provides external air to both the eastbound and westbound tunnels, and associated tunnel excavation;
- utilisation of either the Moore Street compound area or two vacant lots of land (owned by the RTA) on the southern side of Epping Road, approximately 150 metres east of Moore Street at 130 and 132 Epping Road, for provision of the air intake station;
- provision of additional exhaust fans at each of the eastern and western ventilation stacks; and
- provision of additional jet/axial fans within both the eastbound and westbound tunnels.

A schematic layout of the revised ventilation design is shown in Figure 4.6 and indicative layouts for an air intake and fan structure is contained in Figure 4.7.

The revised design was proposed to reduce the potential CO and visibility issues within the tunnel particularly during congested traffic conditions. The potential environmental impacts of the revised design were assessed in an Environmental Assessment prepared by the RTA and included in Appendix C.

Given the environmental sensitivities at Moore Street and the limited information provided by the Proponent, the Department is not satisfied that an air intake system could be installed at this location and minimise impacts. The site on Epping Road with direct access to Epping Road and situated on a large vacant block would appear to be a more logical location for the air intake facility. The Department has therefore recommended the inclusion of Condition of Approval No. 11 requiring that following consultation with local residents and the relevant Council the air intake be situated at 130-132 Epping Road unless otherwise agreed to by the Director-General.

Impact of Stack Discharge

Air quality impacts from stacks are typically considered separately for ground level receptors and elevated receptors as air quality impacts at elevated levels can be higher due to less opportunity for pollution dispersal.

Air quality impact predictions were undertaken for local residential ground level receptors. Air quality predictions were conducted for normal traffic flows in the tunnel and for congested conditions within the tunnel. The results shown that the overall concentration levels (background plus contribution from the stack) would be well below air quality goals even at the most (*i.e.* Worst case) affected residential receivers.

In addition, contributions from the ventilation stack would also be such that the overall concentration levels (background plus contribution from the stack) would be well below air quality goals at the most affected building (*i.e.* the Compac or Corinthian buildings) or at the most sensitive ground level receivers. The Department concurs with these findings.

Maximum predicted pollutant concentrations for ground level and elevated receptors are provided in the air quality assessment in Appendix C.

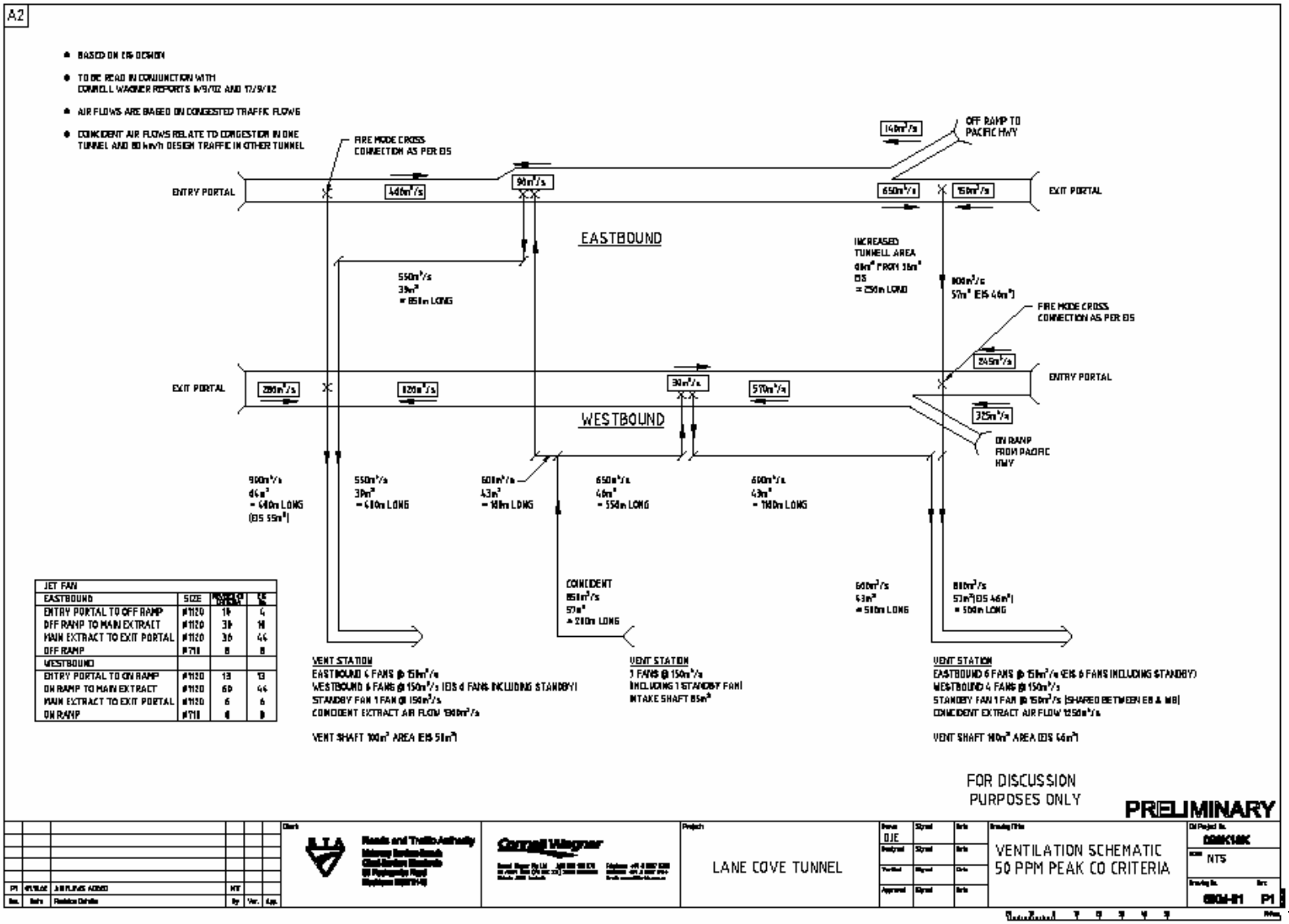
Stack Discharge Exit Velocities

Air quality predictions have been based on stack exit velocities of between 5 metres per second (m/s) and a maximum velocity of 12.7 m/s in the eastern ventilation stack and 5 m/s and a maximum of 7.8 m/s in the western ventilation stack under normal operating conditions. For congested conditions within the tunnel, stack exit velocity would be in the order of 20 m/s.

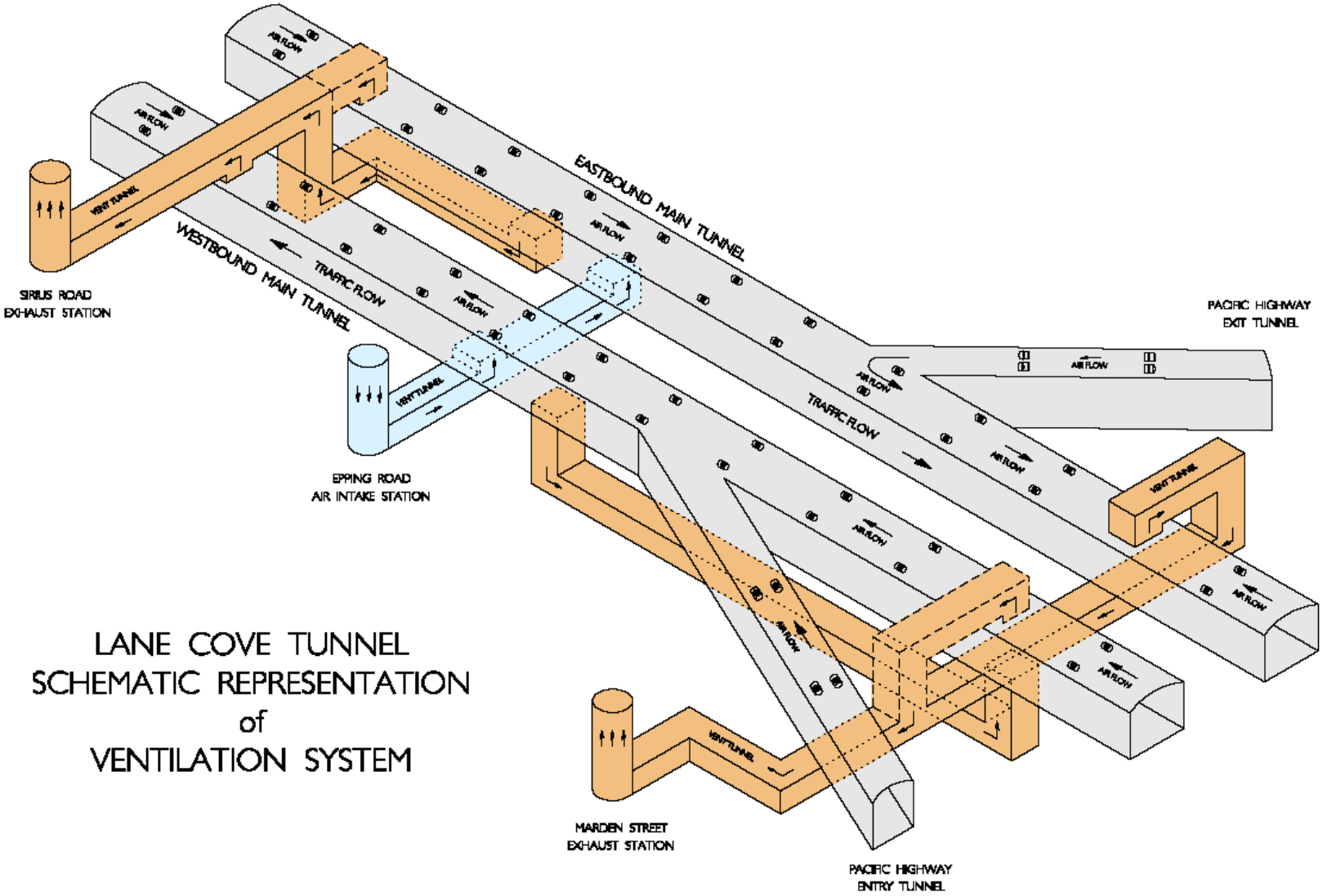
Segmentation of the ventilation stack is an option to manage the exit velocities to enable the stacks to cater for both normal and congested operating conditions. This would enable a proportion of the stack to be closed off during congested conditions to increase exit velocities. During periods of normal traffic volumes, the full stack area would be available and the exit velocities reduced.

The RTA stated that consideration was given for higher velocities up to a maximum velocity of at least 15 m/s for normal operating conditions. However, no reasons were given for not using higher stack velocities. Higher stack velocities would provide better dispersion of pollutants, however, this would need to be balanced with greater energy consumption. The Department recommends that at the detailed design stage a further investigation should be provided to optimise stack exit air velocities. This requirement is specified in Recommended Condition of Approval No. 173.

Attachment 8 – Figure 4.6 from Appendix C



Attachment 9 - RTA Schematic of Ventilation February 2003



Attachment 10 – RTA Response to Tenderer Observations 18 December 2002

RESPONSES TO OBSERVATIONS IN RESPECT OF THE RTA REPORT TITLED "ASSESSMENT OF CONGESTED TUNNEL CONDITIONS" DATED OCTOBER 2002 (INFORMATION DOCUMENT REFERENCE NO 237) AND THE DOCUMENT TITLED "FINAL DRAFT DIRECTOR-GENERAL'S RECOMMENDED CONDITIONS OF APPROVAL" DATED 5 NOVEMBER 2002 (INFORMATION DOCUMENT REFERENCE NO 243)

RTA has received from a Proponent eight observations in respect of the contents of the RTA report titled "Assessment of Congested Tunnel Conditions" dated October 2002 (Information Document Reference No 237) and the related condition in the document titled "Final Draft Director-General's Recommended Conditions Of Approval" dated 5 November 2002 (Information Document Reference No 243).

The observations, related conditions and RTA's responses to the observations are as follows:

Ref.	*Observation*	*Related Condition*	*RTA Response*
1.	Section 2.0 "Background" - the top of the stack nominated for the Sirius Road vent has been sited lower than the top of the tallest building in the area (18-20 Orion Road).	152	The attention of Proponent's is drawn to Request for Proposals, Attachment 10 "Planning Minister's Approval" (refer Addendum No. 30 Item 1).
2.	Section 2.0 "Background" - the calculation of the level of the top of the stack at Marden Street with respect to the top of the Corinthian Building appears to be in error (refer Condition 152 of the document titled "Final Draft Director-General's Recommended Conditions Of Approval" dated 5 November 2002).	152	The attention of Proponent's is drawn to a) Request for Proposals, Attachment 10 "Planning Minister's Approval" (refer Addendum No. 30 Item 1). b) The attention of Proponent's is drawn to amended version of the RTA report titled "Assessment of Congested Tunnel Conditions" dated October 2002 (Information Document Reference No 270).
3.	Table 2 "Summary of Potential Incidents - the logic associated with the prediction of Lane Cove Tunnel closures based on Sydney Harbour Tunnel is not consistent when comparing single lane closures and full tunnel closures		The attention of Proponent's is drawn to amended version of the RTA report titled "Assessment of Congested Tunnel Conditions" dated October 2002 (Information Document Reference No 270).

Ref.	*Observation*	*Related Condition*	*RTA Response*
4.	Table 5 "Predicted Hourly and annual emission loads for Proposed Ventilation Stacks 2006" - hourly CO concentrations for a number of hours during the day substantially exceed the maximum adopted in the Draft Conditions, and are in conflict with the "hourly concentration limits" nominated in Table 6 of RTA report titled "Assessment of Congested Tunnel Conditions" dated October 2002.	176	The attention of Proponent's is drawn to a) Request for Proposals, Attachment 10 "Planning Minister's Approval" (refer Addendum No. 30 Item 1). b) The attention of Proponent's is drawn to amended version of the RTA report titled "Assessment of Congested Tunnel Conditions" dated October 2002 (Information Document Reference No 270). Table 5 refers to pollution emission loads, whereas the Planning Minister's Approval refers to pollution concentration.
5.	Table 5 "Predicted Hourly and annual emission loads for Proposed Ventilation Stacks 2006" - the numbers for the eastern and western tunnels are counter-intuitive as traffic numbers in the tunnels are the reverse of the pollutions generated.	176	The attention of Proponent's is drawn to amended version of the RTA report titled "Assessment of Congested Tunnel Conditions" dated October 2002 (Information Document Reference No 270). The numbers in the tables are influenced by a number of factors such as grade, traffic numbers, traffic mix, layout of the ventilation system and flow rates.

Ref.	*Observation*	*Related Condition*	*RTA Response*
6.	Table 6 "Predicted Hourly concentrations for Proposed Ventilation Stacks 2006" - the CO concentration in both tunnel are shown as being constant through the day. If these are intended to be "hourly concentration limits for each pollutant under normal traffic flor conditions", the logic of a single value in itself is valid, but is inconsistent with varying values of NO_x and PM_{10}. The "Max Levels" shown in Table 6 appear to have been adopted for the draft conditions (refer Condition 176 of the document titled "Final Draft Director-General's Recommended Conditions Of Approval" dated 5 November 2002).	176	The attention of Proponent's is drawn to amended version of the RTA report titled "Assessment of Congested Tunnel Conditions" dated October 2002 (Information Document Reference No 270). The numbers in the tables are influenced by a number of factors such as grade, traffic numbers, traffic mix, layout of the ventilation system and flow rates.
7.	Table 6 "Predicted Hourly concentrations for Proposed Ventilation Stacks 2006" - apart from the issue of logic in 6. above, the maximum values of NO_x and PM_{10} 6 are shown to occur between the hours of 3am and 6am during the day, and such values are counter-intuitive and need to be reconsidered.	176	The attention of Proponent's is drawn to amended version of the RTA report titled "Assessment of Congested Tunnel Conditions" dated October 2002 (Information Document Reference No 270). The numbers in the tables are influenced by a number of factors such as grade, traffic numbers, traffic mix, layout of the ventilation system and flow rates.
8.	Table 6 "Predicted Hourly concentrations for Proposed Ventilation Stacks 2006" - the logic identified in 6 above applies also to the VOC values, and need reconsideration.	176	The attention of Proponent's is drawn to amended version of the RTA report titled "Assessment of Congested Tunnel Conditions" dated October 2002 (Information Document Reference No 270). The VOC levels are consistent with the stated assumptions in the report.

Attachment 11 – RTA Assessment of Congested Conditions dated October 2002

LANE COVE TUNNEL
AND ASSOCIATED ROAD IMPROVEMENTS

ASSESSMENT OF CONGESTED TUNNEL CONDITIONS

Prepared by Roads and Traffic Authority of NSW

Date: October 2002

AMENDED

TABLE OF CONTENTS

AMENDED

LANE COVE TUNNEL AND ASSOCIATED ROAD IMPROVEMENTS

ASSESSMENT OF CONGESTED TUNNEL CONDITIONS

1.0 PURPOSE OF REPORT

This report has been prepared to assess the impact on the ventilation design, pollutant loads and ambient air quality for the Lane Cove Tunnel to meet a carbon monoxide (CO) criteria for in-tunnel air quality of 50 parts per million (ppm) over a 30-minute period.

2.0 BACKGROUND

In December 1999, following extensive feasibility assessment over several years, a preferred option for the Lane Cove Tunnel project was released for community comment through an Environmental Overview Report.

In relation to the Tunnel the design provided for:

1) twin two lane tunnels, approximately 3.4 kilometres long
2) access ramps to and from the Pacific Highway, connecting to the Tunnel
3) a single ventilation stack at the western end of the project near the Lane Cove River

Following the release and consultation on the Environmental Overview Report the Environmental Impact Statement (EIS) for the project was commenced in January 2000. The completed EIS was placed on display in October 2001 for public comment.

The Director-Generals requirements, provided by the Department of Planning at the commencement of the EIS process, required the in-tunnel ventilation design criteria for CO of 87 ppm over a 15 minute period.

The concept design for the Tunnel and ventilation system was undertaken considering:

1) the in-tunnel CO criteria
2) modelled traffic flows in the Tunnel and the surrounding road network
3) implications of incidents in the Tunnel; and
4) potential for congested in the Tunnel from the surrounding road network

Several amendments were made to the concept design as a result of further studies undertaken by the traffic, design and air quality consultants, which comprised:

1) extension of the diverge lane for the exit ramp to the low point in the eastbound Tunnel to limit effect of the long upgrade (3.25%) on heavy vehicles;
2) provide an access from the exit ramp to the Gore Hill Freeway Transit Lanes to reduce traffic accessing the general traffic lanes on the Gore Hill Freeway and potential for queuing from the merging of Tunnel traffic with Longueville Road and Pacific Highway traffic
3) provide a continuous third lane in the westbound tunnel from the connection of the Pacific Highway entry ramp with the mainline tunnel to the western portal. This will remove the need for merging of traffic from the Pacific Highway with the traffic from the Gore Hill Freeway
4) the concept design for the proposal included provision for traffic management on both approaches to the Tunnel and the surrounding road network to minimise the potential for congestion within the Tunnel
5) provide two ventilation stacks one at the western end, within the Lane Cove West Industrial area, at 18-20 Orion Road and at the eastern end in the Artarmon Industrial Area, at 6 Marden Street.

See Figure 1 for details of the EIS design for the Tunnel.

The conclusions from the environmental assessment indicated that the CO goal of 87 ppm over a 15-minute averaging period could be achieved and that with the two proposed ventilation stacks the EPA air quality goals would not be exceeded.

The EIS reported the maximum ground level concentrations resulting from dispersion of tunnel air from the proposed ventilation stack locations as:

CO (ppm)		NO2 (pphm)		PM10 (micrograms/m3)	
1-hour max	8-hour max	1-hour max	Annual	24-hour Max	Annual Peak
0.9	0.5	4.1	0.06	3.0	0.2

The reduction in traffic on the surrounding surface roads, particularly Epping Road and Mowbray Road West, as a result of opening the tunnel will generally improve the ambient air quality would through the Epping Road corridor between the Lane Cove River and the Gore Hill Freeway.

Included in the submissions to the EIS several alternative locations for the western ventilation stacks were proposed. An assessment of these new sites, and a review of the sites proposed in the EIS was undertaken. During this assessment a further alternative site was identified at 5 Sirius Road, which was included in the assessment.

The results of this assessment concluded that the site at 5 Sirius Road was preferred.

The westbound vent is proposed to be located at Sirius Road 328280 m E and 6257400 m N (AMG coordinates used throughout this document). Local ground-level at this site is 32 m Australian Height Datum (AHD) and the height of the vent stack is to be 30 m above local ground level making the top of the stack 62 m AHD. The highest point on the tallest building in this area (formerly known as the Compaq Building, 18 to 20 Orion Road) is 71 m AHD and the top balcony level is at 63 m AHD. This closest corner of this building is located 200.4 m east-northeast of the proposed stack.

The vent stack for the eastbound tube is to be located near the Corinthian Building 401 Pacific Highway 331314 m E and 6256724 N. Local ground level at the base of the stack is approximately 80 m AHD. This point is in the base of a abandoned quarry. The land immediately to the west rises "vertically" to 98 m AHD, which is the level of the Pacific Highway in this area. The vent stack is proposed to rise to 36 m above this 98 m AHD level, making the top of the stack at 134 m AHD. The closest building is the Corinthian Building the highest point of which is at 18 m above the level of the Pacific Highway. The top of the Corinthian Building would therefore be 18 m below the level of the stack.

Table 11. Summary of stack parameters

Parameter	Western ventilation stack	Eastern ventilation stack
Location AMG coordinates and AHD for base of stack	Sirius Road 328280 mE 6257400 mN 32 m AHD	401 Pacific Highway 331314 mE 6256724 mN 80 m AHD
Height above local ground-level (m)	30	54 m above base of quarry 36 m above Pacific Highway
Effective diameter at exit point (m)	8.74 (cross-sectional area is 60 m^2)	7.43 (cross-sectional area 43.3 m^2)
Minimum exit velocity (m/s)	5	5

3.0 REVISED IN-TUNNEL CRITERIA AND DESIGN ASSUMPTIONS

During the assessment period of the EIS submission the RTA were requested to assess impacts on ventilation design and air quality as a result of:

1) congested operating conditions in the Tunnel; and
2) an in-tunnel CO exposure goal of 50 ppm averaged over 30 minutes.

Connell Wagner were engaged to undertake the ventilation design, Holmes Air Sciences undertook the ambient air quality assessment and Masson Wilson Twiney provided an assessment of the projected traffic flows under congested conditions.

3.1 Tunnel Traffic Volumes under Congested Conditions

As part of Holmes Air Sciences investigations into estimating emission rates for congested conditions information was sourced from US EPA data. The lowest speed for which emission data was available was provided for 2.5 mph (4 kph). The 2.5 mph speed is based upon "stop/start" traffic with a minimum speed of 0 kph and a maximum of 16 kph. Based upon the speed vs traffic flow relationship at a traffic speed of 4 kph the lane capacity is reduced to 520 vehicles per hour per lane and 440 vehicles per hour with 10% heavy vehicles (for further details see Section 3.2 of Holmes Air Sciences report in Appendix 1).

This preliminary assessment of traffic volumes was provided to Masson Wilson Twiney (MWT) for review and further advice. Calculations were undertaken by MWT based upon potential headway for traffic and average vehicle lengths. The results of this assessment were:

vehicle length 5 metres and 2 sec headway	643 vehicles per hour per lane; and
vehicle length 4.5 metres and 1.5 sec headway	759 vehicles per hour per lane

The scenario with a 1.5 sec headway is an extremely congested condition and MWT advised that this headway could not be maintained for an extended period of time.

The conditions under which this type of congested would occur would be consistent with an incident directly outside the Tunnel exit which would restrict traffic flow for two of the three lanes, resulting in queuing for all three lanes within the Tunnel.

Previous traffic modelling undertaken to assess the impacts of incidents within the Tunnel indicate that the impact on traffic flows were minimal and would not result in travel speeds equivalent to the congested conditions being assessed.

Based upon the above research on traffic flows under congested conditions in the Tunnel the potential traffic flows in the Tunnels with a three lane tunnel situation would be between 1920 and 2160 vehicles per hour. As MWT advised that a 1.5 sec headway would be difficult to maintain over an extended period a total traffic volume of 2,000 vehicles per hour in either Tunnel was assumed for wither Tunnel.

3.2 In-Tunnel CO Concentrations

The revised in-tunnel CO goal of 50 ppm over 30 minutes was provided as an exposure level for motorists within the Tunnel.

To ensure compliance with the goals and to limit exposure levels for motorists with a disabled vehicle or workmen operating within the Tunnel, the ventilation concept design has been based upon 50 ppm over 30 minutes at any point within the Tunnel.

Holmes Air Sciences and Connell Wagner separately calculated the pollutant concentrations in the Tunnel and confirmation was provided between both parties of consistent results.

The main features of the revised design are:

1) The eastbound tunnel requires an intermediate ventilation shaft to extract vitiated air from the tunnel. The concept design provides for this shaft to be located adjacent to the diverge lane. This shaft would be required to operate under all traffic conditions to meet the 50 ppm/30 minute CO goal
2) The westbound tunnel has been modelled at 80 kph, 20 kph and 5 kph. Under traffic flows of 80 and 20 kph, by increasing the main ventilation shaft extraction to 900 m3/s the peak CO level in the tunnel remains below the CO criteria. Under congested conditions (5 kph) an intermediate shaft is required around Chainage 2400 to remove vitiated air.
3) Intermediate ventilation stations replace vitiated air from the tunnel with fresh air. The extract shafts are separated from the supply shafts by 50m. To maintain air quality in the section of the tunnel between the exhaust shafts and inlet points, the air supply will be greater than the air extracted to allow a small quantity of air to flow against the traffic direction.

The potential locations along the Corridor for construction of the air intake have been investigated. Two sites have been identified:

1) the Moore Street compound area
2) two vacant blocks of land on the southern side of Epping Road, approximately 150 metres east of the Moore Street compound.

Figure 2 identifies the two proposed locations.

Figure 3 details a schematic arrangement of the revised ventilation concept design.

A discussion of the impacts of these alternative sites is contained in Section 6.5

4.2 Ambient and High Level Receptor Air Quality Modelling

Modelling undertaken by Holmes Air Sciences on the EIS scheme for a longitudinal ventilation scheme confirmed that the proposal would not meet the revised EPA criteria and excessive air velocities in the stack would be required.

Following development of the revised longitudinal ventilation design by Connell Wagner, Holmes Air Sciences undertook ambient air quality modelling and determination of pollutant loads from the ventilation stack.

Table 3 contains details of the ground level and high receptor pollutant concentrations.

Table 4 contains details of Hourly and annual emission loads for he Eastern and Western Ventilation Stack

In consideration of the order of accuracy of both the traffic and air quality modelling a contingency factor of 10% has been added to the proposed emission loads and rates.

The background levels indicated in the following tables are actual pollutant concentrations measured at the Longueville Road and Mowbray Road West monitoring stations. These stations were established for the preparation of the environmental impact statement. For the modelling of the congested tunnel scenario the background levels used from the monitoring stations were determined by the location of the highest pollutant concentrations. The measured concentrations from the Longueville Road site have been used where the highest stack concentrations from the modelling occur on or very near to surface roads, whereas the Mowbray Road West concentrations have been used where the concentration levels are removed from the roadways. This method has been used as the Longueville Road site provides an background concentration level for locations which are influenced by surface traffic emissions, while the Mowbray Road West site is not influenced as greatly. The following table details the concentration levels of each pollutant at each site.

~~Table5 shows~~Tables 5 and 5(a) show the hourly and annual average emission loads for CO, NO_x and PM_{10} for the eastern and western ventilation stacks respectively. These have been calculated by Holmes Air Sciences using the PIARC methodology. The final ventilation design is being done by Connell Wagner and using the same methodology and so should yield similar results. VOC emissions cannot be calculated with PIARC and these have been assumed to be 10% of CO emissions.

The predicted exit velocities are also detailed in Table 5 with a maximum velocity of 12.7 m/s in the eastern ventilation stack and 7.8 m/s in the western ventilation stack. Consideration has been given to providing a maximum velocity of at least 15 m/s.

The exit velocities indicated in Table 5 are for a tunnel operating under normal conditions. Under congested condition the exit velocity of the stacks would be in the order of 20 m/s. To enable the ventilation stacks to cater for both the normal and congested operating conditions segmentation of the ventilation stack is an option to manage the exit velocities.

During periods of low traffic flows, and low air flows from the ventilation stack, a proportion of the stack would be closed off to enable increased exit velocities and subsequently during periods of high traffic volumes the full stack area would be made available. Should a requirement for a maximum exit velocity of at least 15 m/s be required further work would be undertaken during the detailed design stage.

Table 5 – Predicted Hourly and annual emission loads for Proposed Ventilation Stacks 2006, under Normal Traffic Flow Conditions

	EASTERN VENTILATION STACK					WESTERN VENTILATION STACK				
Hour	CO(kg/h)	NOx(kg/h)	PM(kg/h)	VOC(kg/h)	Exit velocity (m/s)	CO(kg/h)	NOx(kg/h)	PM(kg/h)	VOC(kg/h)	Exit velocity(m/s)
1	10.1	2.6	0.1	1.0	5.0	8.0	2.2	0.1	0.8	5.0
2	5.1	1.6	0.1	0.5	5.0	3.0	1.1	0.0	0.3	5.0
3	3.7	1.2	0.0	0.4	5.0	1.9	0.7	0.0	0.2	5.0
4	4.2	1.7	0.1	0.4	5.0	2.1	1.1	0.1	0.2	5.0
5	7.6	2.9	0.1	0.8	5.0	3.3	1.7	0.1	0.3	5.0
6	28.6	7.7	0.3	2.9	5.0	10.2	4.2	0.2	1.0	5.0
7	95.9	19.6	0.6	9.6	9.8	32.6	9.8	0.4	3.3	5.0
8	111.3	21.8	0.7	11.1	11.4	51.0	14.6	0.5	5.1	5.2
9	111.5	23.2	0.8	11.2	11.4	51.2	15.4	0.6	5.1	5.2
10	103.4	22.2	0.7	10.3	10.6	46.8	14.5	0.5	4.7	5.0
11	84.4	20.1	0.7	8.4	8.7	41.8	13.6	0.5	4.2	5.0
12	86.5	20.7	0.7	8.7	8.9	44.0	14.2	0.5	4.4	5.0
13	90.8	23.6	0.9	9.1	9.3	47.7	16.2	0.6	4.8	5.0
14	91.3	24.4	0.9	9.1	9.4	52.7	18.7	0.7	5.3	5.4
15	92.5	23.9	0.9	9.2	9.5	54.6	18.3	0.7	5.5	5.6
16	101.0	25.4	0.9	10.1	10.4	62.3	20.5	0.8	6.2	6.4
17	111.4	26.6	0.9	11.1	11.4	71.1	22.2	0.8	7.1	7.3
18	123.6	26.3	0.8	12.4	12.7	76.3	21.6	0.7	7.6	7.8
19	112.6	22.2	0.7	11.3	11.6	68.0	18.1	0.6	6.8	7.0
20	78.8	15.3	0.5	7.9	8.1	49.6	12.6	0.4	5.0	5.1
21	48.6	9.7	0.3	4.9	5.0	31.4	7.9	0.2	3.1	5.0
22	41.2	8.3	0.3	4.1	5.0	26.2	6.6	0.2	2.6	5.0
23	31.4	6.6	0.2	3.1	5.0	20.4	5.2	0.2	2.0	5.0
24	20.0	4.1	0.1	2.0	5.0	13.8	3.5	0.1	1.4	5.0
Annual total (kg/year)	582,422	131,979	4,501	58,242		317,524	96,614	3,480	31,752	
10% increase in annual total (kg/year)	640,664	145,177	4,951	64,062		349,276	106,275	3,828	34,927	

Table 5(a) - **Predicted Hourly and Annual Emissions Loads for Proposed Ventilation Stacks 2006, under Congested Traffic Flow Conditions for 7 Hours per day**

	EASTERN VENTILATION STACK					WESTERN VENTILATION STACK				
Hr	CO (kg/h)	NOx (kg/h)	PM10 (kg/h)	VOC (kg/h)	Exit velocity (m/s)	CO (kg/h)	Nox (kg/h)	PM10 (kg/h)	VOC (kg/h)	Exit velocity (m/s)
1	10.13	2.55	0.09	1.01	5.00	7.96	2.21	0.07	0.80	5.00
2	5.09	1.59	0.06	0.51	5.00	3.03	1.07	0.04	0.30	5.00
3	3.71	1.20	0.05	0.37	5.00	1.86	0.70	0.03	0.19	5.00
4	4.22	1.73	0.08	0.42	5.00	2.12	1.11	0.05	0.21	5.00
5	7.55	2.85	0.12	0.76	5.00	3.33	1.68	0.08	0.33	5.00
6	28.63	7.69	0.30	2.86	5.00	10.21	4.25	0.18	1.02	5.00
7	299.91	23.25	2.80	29.99	30.76	215.31	16.31	1.99	21.53	15.95
8	298.60	19.64	2.42	29.86	30.63	215.03	15.61	1.91	21.50	15.93
9	299.70	22.51	2.73	29.97	30.74	215.88	17.76	2.15	21.59	15.99
10	103.42	22.22	0.75	10.34	10.61	46.84	14.52	0.53	4.68	5.00
11	84.43	20.09	0.71	8.44	8.66	41.78	13.64	0.51	4.18	5.00
12	86.51	20.71	0.73	8.65	8.87	43.96	14.22	0.53	4.40	5.00
13	90.83	23.63	0.87	9.08	9.32	47.75	16.24	0.63	4.77	5.00
14	91.33	24.37	0.91	9.13	9.37	52.65	18.69	0.74	5.27	5.00
15	92.46	23.85	0.87	9.25	9.48	54.60	18.34	0.71	5.46	5.00
16	301.66	27.70	3.31	30.17	30.94	217.26	21.24	2.55	21.73	16.09
17	300.36	24.25	2.93	30.04	30.81	216.35	18.94	2.29	21.64	16.03
18	298.33	18.91	2.33	29.83	30.60	214.83	15.09	1.85	21.48	15.91
19	297.17	15.88	2.00	29.72	30.48	213.87	12.67	1.57	21.39	15.84
20	78.85	15.31	0.45	7.88	8.09	49.62	12.57	0.39	4.96	5.00
21	48.59	9.69	0.29	4.86	5.00	31.36	7.92	0.24	3.14	5.00
22	41.16	8.31	0.25	4.12	5.00	26.22	6.63	0.20	2.62	5.00
23	31.39	6.60	0.20	3.14	5.00	20.40	5.21	0.16	2.04	5.00
24	19.99	4.14	0.13	2.00	5.00	13.76	3.47	0.11	1.38	5.00
Annual Total (kg/year)	1,067,269	127,271	9,266	106,727		717,587	94,939	7,121	71,759	

Hourly concentration limits for each pollutant under normal traffic flow conditions are provided in Table 6.

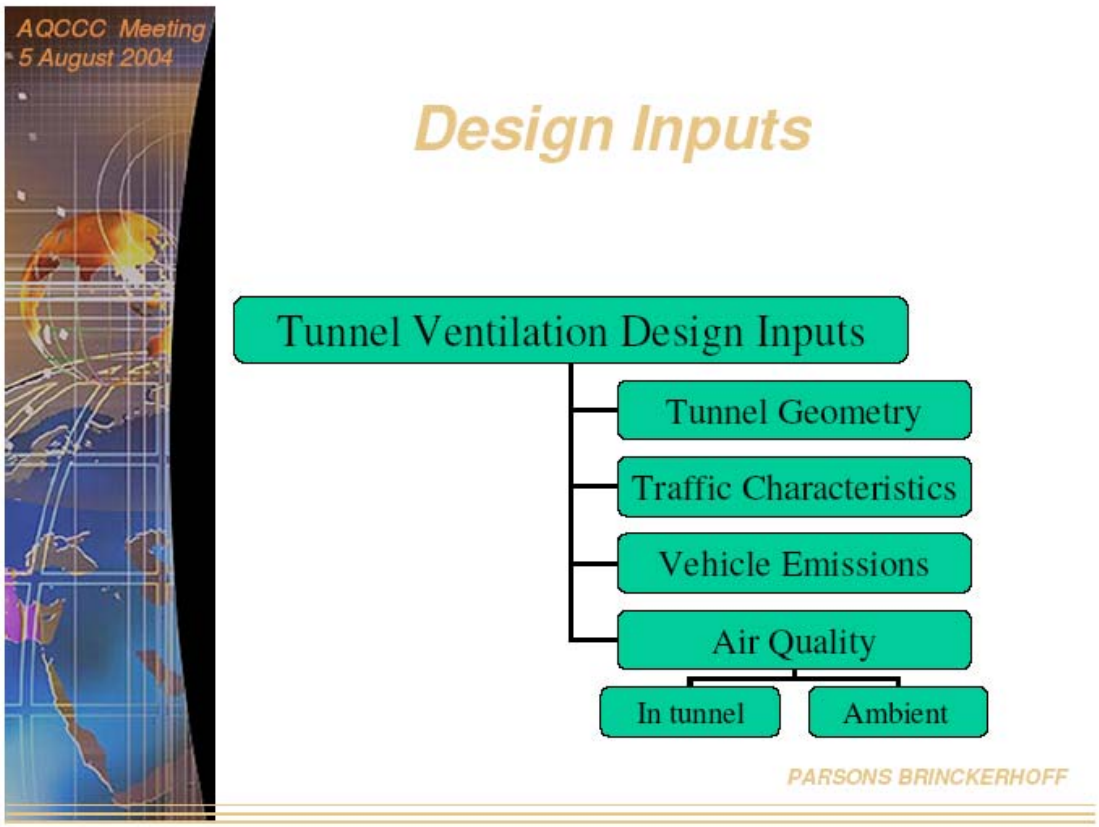
Table 6 – Predicted Hourly concentrations for Proposed Ventilation Stacks 2006

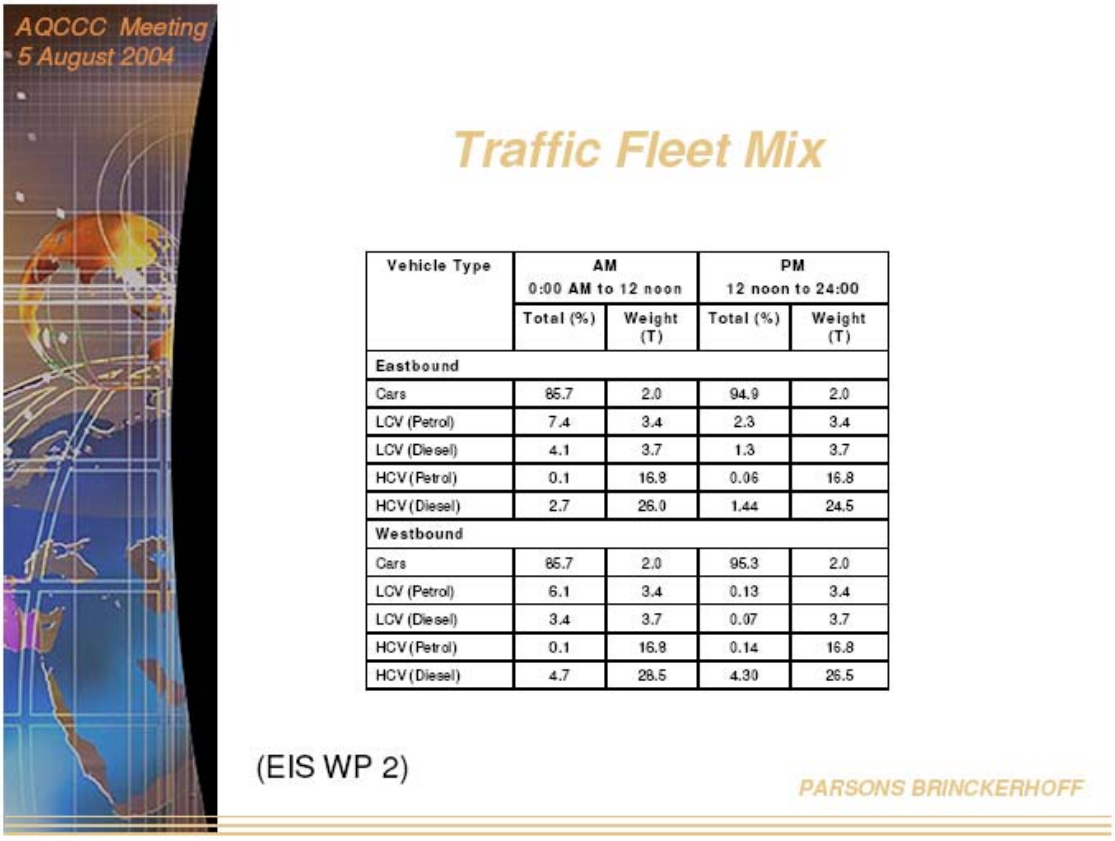
	EASTERN VENTILATION STACK				WESTERN VENTILATION STACK			
Hour	CO (mg/m^3)	NOx (as NO_2) ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)	VOC (mg/m^3)	CO (mg/m^3)	NOx (as NO_2) ($\mu g/m^3$)	PM_{10} ($\mu g/m^3$)	VOC (mg/m^3)
1	62.5	15745	537	6.25	62.5	17371	586	6.25
2	62.5	19453	763	6.25	62.5	22114	877	6.25
3	62.5	20150	808	6.25	62.5	23551	964	6.25
4	62.5	25674	1128	6.25	62.5	32752	1530	6.25
5	62.5	23595	1014	6.25	62.5	31649	1462	6.25
6	62.5	16784	648	6.25	62.5	26005	1112	6.25
7	62.5	12748	423	6.25	62.5	18862	672	6.25
8	62.5	12245	386	6.25	62.5	17852	612	6.25
9	62.5	12989	428	6.25	62.5	18838	673	6.25
10	62.5	13430	453	6.25	62.5	19372	705	6.25
11	62.5	14873	528	6.25	62.5	20409	770	6.25
12	62.5	14960	531	6.25	62.5	20214	758	6.25
13	62.5	16262	601	6.25	62.5	21258	823	6.25
14	62.5	16678	625	6.25	62.5	22186	880	6.25
15	62.5	16125	590	6.25	62.5	20996	807	6.25
16	62.5	15710	566	6.25	62.5	20556	780	6.25
17	62.5	14927	519	6.25	62.5	19521	717	6.25
18	62.5	13279	427	6.25	62.5	17728	606	6.25
19	62.5	12344	375	6.25	62.5	16586	536	6.25
20	62.5	12137	358	6.25	62.5	15833	490	6.25
21	62.5	12461	372	6.25	62.5	15776	487	6.25
22	62.5	12622	381	6.25	62.5	15802	488	6.25
23	62.5	13144	407	6.25	62.5	15966	499	6.25
24	62.5	12943	393	6.25	62.5	15776	487	6.25
Max Levels	62.5	26.67	1.13	6.25	62.5	32.75	1.53	6.25
10% increase on Max Levels	68.8	29.3	1.3	6.3	68.8	36	1.68	6.3

For congested flows the maximum concentrations are:

Eastern Stack	CO	52 mg/m3	Western Stack	CO	51 mg/m3
	NOx as NO2	4.5 mg/m3		NOx as NO2	5.1 mg/m3

Attachment 12 – Extract from PB Ventilation Design Presentation to AQCCC 5/8/04





Vehicle Type	AM 0:00 AM to 12 noon		PM 12 noon to 24:00	
	Total (%)	Weight (T)	Total (%)	Weight (T)
Eastbound				
Cars	85.7	2.0	94.9	2.0
LCV (Petrol)	7.4	3.4	2.3	3.4
LCV (Diesel)	4.1	3.7	1.3	3.7
HCV (Petrol)	0.1	16.8	0.06	16.8
HCV (Diesel)	2.7	26.0	1.44	24.5
Westbound				
Cars	85.7	2.0	95.3	2.0
LCV (Petrol)	6.1	3.4	0.13	3.4
LCV (Diesel)	3.4	3.7	0.07	3.7
HCV (Petrol)	0.1	16.8	0.14	16.8
HCV (Diesel)	4.7	28.5	4.30	26.5

AQCCC Meeting
5 August 2004

Traffic Density

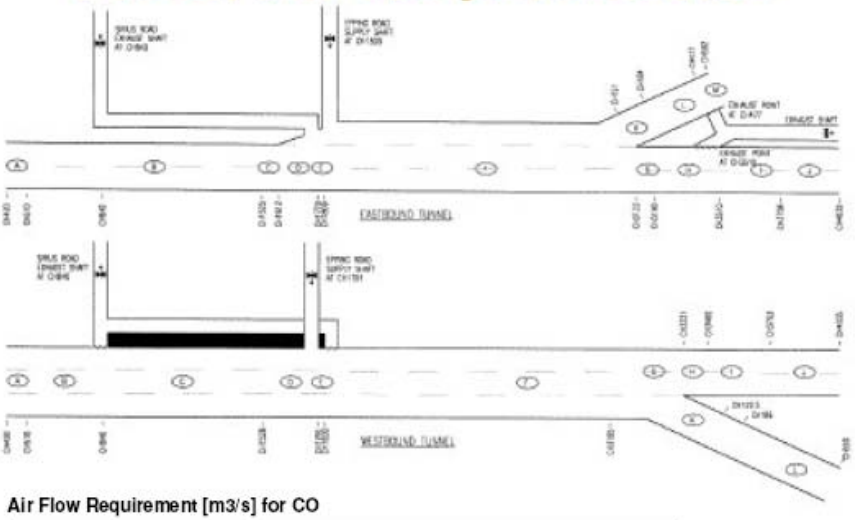
Traffic Speed, (km/h)	Traffic Throughput, (PCU/h per lane)	Traffic Density (PCU/km/lane)	Traffic Density (Vehicle/km/lane)
0	0	165	155.9
5	600	120	113.4
10	1000	100	94.5
20	1600	80	75.6
30	1950	65	61.4
40	2200	55	52.0
50	2200	44	41.6
60	2200	36.67	34.6
70	1800	25.71	24.3
80	1400	17.50	16.5
90	1000	11.11	10.5

(PIARC recommendation for urban tunnels)

PARSONS BRINCKERHOFF

AQCCC Meeting
5 August 2004

Fresh Air Requirements



Air Flow Requirement [m3/s] for CO

Vehicle speed [km/h]	0	5	10	20	30	40	50	60	70	80	90
TOTAL Eastbound	400	1044	806	676	471	455	412	443	417	369	316
TOTAL Westbound	452	942	691	526	447	397	332	299	242	195	155

Air Flow Requirement [m3/s] for PM10

Vehicle speed [km/h]	0	5	10	20	30	40	50	60	70	80	90
TOTAL Eastbound	146	171	190	276	264	277	261	249	197	151	110
TOTAL Westbound	213	229	247	339	404	412	393	362	286	220	160

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Total Annual Emission Limits, 2006

Ventilation Stack Pollutant Limits

Year of Consideration	Tunnel	CO	VOC	PM_{10}	NO_x
		[Tonne/year]	[Tonne/year]	[Tonne/year]	[Tonne/year]
2006	Eastbound	430	43.0	3.7	89
	Westbound	202	20.2	4.0	70
	Total	632	63.2	7.7	159
Stack Emission Limit	Eastbound + Westbound	1530	153	14	229

1. or method approved by EPA's Chief Scientist

(MCoA 173)

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Emission Loads for CO & PM10 – Weekdays, 2006

Eastbound Tunnel - Normal Traffic Flow

Hour	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total Daily
CO [kg/h]	10.7	6	4	3.8	6.4	52.3	83.6	83.6	83.6	83.6	83.6	83.6	69.7	66.6	66.1	70.4	66.9	76	70	60.5	42.7	35.8	30.2	21.7	1261.5
PM10 [kg/h]	0.1	0.1	0	0	0.1	0.5	1	1	1	1	1	1	0.5	0.4	0.4	0.4	0.5	0.5	0.5	0.4	0.2	0.2	0.2	0.1	11.3

Westbound Tunnel - Normal Traffic Flow

Hour	0	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	Total Daily
CO [kg/h]	7.7	4.1	2.7	2	2.2	4.4	14.6	29.2	32.9	30.7	28.6	29.5	31.2	36.7	37.5	41.1	44	46.2	45.3	37.2	29.3	24.1	20	15.9	597.2
PM10 [kg/h]	0.2	0.1	0.1	0	0.1	0.1	0.3	0.7	0.8	0.7	0.7	0.7	0.6	0.7	0.7	0.8	0.8	0.9	0.9	0.7	0.5	0.4	0.4	0.3	12

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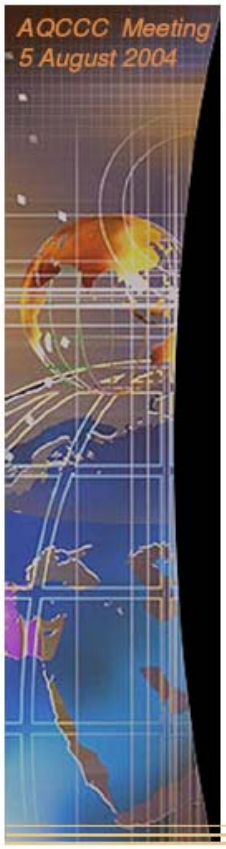

Emission Loads for CO & PM10 – Abnormal (Congested) Traffic, 2006

LCT		Speed	Traffic Throughput	Vent Stack	CO	VOC	PM	NOx
		[kph]	[PCU/hr/lane]		[kg/hr]	[kg/hr]	[kg/hr]	[kg/hr]
Eastbound	AM	5	600	Sirius Rd	54.6	5.5	0.25	3.4
				Marden	143.1	14.4	0.67	10.7
	PM	5	600	Sirius Rd	59.6	6.0	0.14	2.3
				Marden	156.1	15.7	0.39	7.2
Westbound	AM	5	600	Sirius Rd	181.4	18.2	1.23	16.5
	PM	5	600	Sirius Rd	196.9	19.7	1.08	15.9

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Attachment 13 – Council Analysis of the % Air Flows Based on Exit Velocity Eastern Stack

Calculate the % air flow in the tunnel to achieve a constant concentration of CO at 62.5 mg/m3

Concentrations mg/m3

Hour	Hour	Exit Velocity m/sec	CO kg/hr	% Air flow to Exit Velocity	% Air Flow to max Concentration	CO	NOx	PM10
0-1	1	5	10.13	39.4%	8.2%	62.5	15.745	0.537
1-2	2	5	5.09	39.4%	4.1%	62.5	19.423	0.763
2-3	3	5	3.71	39.4%	3.0%	62.5	20.15	0.808
3-4	4	5	4.22	39.4%	3.4%	62.5	25.674	1.128
4-5	5	5	7.55	39.4%	6.1%	62.5	23.595	1.014
5-6	6	5	28.63	39.4%	23.2%	62.5	16.784	0.648
6-7	7	9.8	95.9	77.2%	77.6%	62.5	12.748	0.423
7-8	8	11.1	111.3	87.4%	90.0%	62.5	12.245	0.386
8-9	9	11.2	111.5	88.2%	90.2%	62.5	12.989	0.428
9-10	10	10.6	103.42	83.5%	83.7%	62.5	13.43	0.453
10-11	11	8.7	84.43	68.5%	68.3%	62.5	14.873	0.528
11-12	12	8.9	86.51	70.1%	70.0%	62.5	14.96	0.531
12-13	13	9.3	90.83	73.2%	73.5%	62.5	16.262	0.601
13-14	14	9.4	91.33	74.0%	73.9%	62.5	16.678	0.625
14-15	15	9.5	92.46	74.8%	74.8%	62.5	16.125	0.59
15-16	16	10.4	101	81.9%	81.7%	62.5	15.71	0.566
16-17	17	11.4	111.4	89.8%	90.1%	62.5	14.927	0.519
17-18	18	12.7	123.6	100.0%	100.0%	62.5	13.279	0.427
18-19	19	11.6	112.6	91.3%	91.1%	62.5	12.344	0.375
19-20	20	8.1	78.85	63.8%	63.8%	62.5	12.137	0.358
20-21	21	5	48.59	39.4%	39.3%	62.5	12.461	0.372
21-22	22	5	41.16	39.4%	33.3%	62.5	12.622	0.381
22-23	23	5	31.39	39.4%	25.4%	62.5	12.144	0.407
23-0	24	5	19.99	39.4%	16.2%	62.5	12.943	0.393

Attachment 14 - Increase in PM_{10} Concentrations under Congested Traffic Conditions

				CO				NO			PM10			
Eastbound Hour	Hour	cars	Trucks	Normal CO kg/hr	Congested	% change in mass	% change in air flow	Normal NOx	Congested NOx	% change in mass	Normal PM10	Congested PM10	% change in mass	% change in concentration
0-1	1	265	17	10.13	10.13	1	1	2.6	2.6	1	0.09	0.09	1	
1-2	2	154	22	5.09	5.09	1	1	1.6	1.6	1	0.06	0.06	1	
2-3	3	120	20	3.71	3.71	1	1	1.2	1.2	1	0.05	0.05	1	
3-4	4	135	30	4.22	4.22	1	1	1.7	1.7	1	0.08	0.08	1	
4-5	5	253	51	7.55	7.55	1	1	2.9	2.9	1	0.12	0.12	1	
5-6	6	1021	103	28.63	28.63	1	1	7.7	7.7	1	0.3	0.3	1	
6-7	7	3476	181	95.9	299.91	3.13	3.14	19.6	23.25	1.19	0.6	2.8	4.67	48.68
7-8	8	3741	103	111.3	289.6	2.61	2.76	21.8	19.64	0.90	0.7	2.42	3.46	25.28
8-9	9	3741	141	111.5	299.7	2.69	2.74	23.2	22.51	0.97	0.8	2.73	3.41	24.33%
9-10	10	3480	157	103.42	103.42	1	0.96	22.2	22.22	1.0	0.7	0.7	1	
10-11	11	2757	175	84.43	84.43	1	1	20.1	20.1	1	0.7	0.7	1	
11-12	12	2799	181	86.51	86.51	1	1	20.7	20.7	1	0.7	0.7	1	
12-13	13	2898	244	90.83	90.83	1	1	23.6	23.6	1	0.9	0.9	1	
13-14	14	2806	213	91.33	91.33	1	1	24.4	24.4	1	0.9	0.9	1	
14-15	15	2815	198	92.46	92.46	1	1	23.9	23.9	1	0.9	0.9	1	
15-16	16	3016	176	101	301.66	2.99	2.9	25.4	27.7	1.09	0.9	3.31	3.68	23.62
16-17	17	3277	146	111.4	300.36	2.70	2.70	26.6	24.25	0.91	0.9	2.93	3.26	20.46
17-18	18	3705	92	123.6	298.33	2.41	2.41	26.3	18.91	0.72	0.8	2.33	2.91	20.88
18-19	19	3416	52	112.6	297.17	2.64	2.63	22.2	15.88	0.72	0.7	2	2.86	8.74
19-20	20	2349	31	78.85	78.85	1	1	15.3	15.3	1	0.5	0.5	1	
20-21	21	1430	28	48.59	48.59	1	1	9.7	9.7	1	0.3	0.3	1	
21-22	22	1219	30	41.16	41.16	1	1	8.3	8.3	1	0.3	0.3	1	
22-23	23	920	32	31.39	31.39	1	1	6.6	6.6	1	0.2	0.2	1	

This table combines data from tables 5 and 5a and 6 from **Attachment 11** on page 76.
Under Congested conditions there is an increase in mass of CO and PM10 and an increase in air flow corresponding to the mass increase in CO.

This table shows the change in concentration of PM10

Attachment 15 - Correspondence between Council and RTA about Errors in Appendix C.

Date: 21ST July 2004
Doc Ref: RTA.210704

Mr Garry Humphrey
General Manager Motorway Services
Roads and Traffic Authority
260 Elizabeth Street
SURRY HILLS NSW 2010

Dear Mr Humphrey,

Re: Ventilation and Air Quality Assessments

Despite a number of requests to John Anderson to make provide assessments undertaken in respect of the changes in tunnel design which involves significant changes to the approved ventilation arrangements, he has refused to make them public.

As you know certain documents were provided to the NSW Parliament under Parliamentary Order. One such document obtained by Council was the RTA's Changes to Tunnel Design - Consistency Assessment and Environmental Review dated April 2004.

After examining that document against the RTA's undated submission to the Department of Planning on 25.10.2002 included in the Director General's Report on the Lane Cove Tunnel entitled Proposed Lane Cove Tunnel and Associated Road Improvements Volume 2 November 2002 as Appendix C – *Environmental Assessment for the Revised Tunnel Ventilation Design for the Lane Cove Tunnel (RTA)* (Approved Ventilation Design) a number of questions arise.

At the Ordinary Meeting of the Council on 19th July, Council resolved to write to you to seek additional information on the assessments on air quality undertaken with some explanation on a number of matters.

To be able to fully answer those questions, Council would appreciate the RTA providing Council a full copy of:

a) The EIS air quality assessment, to the extent not already published in Working Paper 9

E-mail Address: lccouncil@lanecove.nsw.gov.au

b) the Holmes Air Science Report used in the 2002 Revised Tunnel Ventilation Design assessment; (HAS2002)

c) a full copy in colour of the Holmes Air Science Report dated March 2004 (HAS2004) used in the Consistency Assessment; and

d) a copy of the earlier assessment by Holmes Air Science referred to on Page 2 of the HAS2002 Report.

Council would appreciate an explanation, preferably from Holmes Air Science, about the following information as presented in HAS2002:

a) The hourly emissions in Tables 5 and Table 6 appear to have been summed and multiplied by 365 to give annual emission load estimates for CO, NOx, PM_{10} and VOC calculated using PIARC methodology for the vehicle fleet in 2006 being assessed as the worst case scenario for the eastern and western stacks respectively.

   Do these hourly and annual estimates relate to the expected combination of congested and uncongested conditions likely to be encountered during the course of a year? If not can the basis of tables 5 and 6 be provided?

b) Tables 7 and 8 are quoted as providing the hourly concentrations for each pollutant under normal traffic flow conditions.

   Is normal traffic flow conditions a combination of congested and uncongested conditions likely to be encountered during the course of a year? If not can the basis of tables 5 and 6 be provided?

c) Table 8 refers to "Hourly and annual emission loads for the Western Ventilation Stack in 2006". Is there any significance in the table heading or is this incorrectly titled?

d) In Tables 7 and 8, the highest NOx (as NO_2) and PM10 concentrations appear to concurrently occur generally in the period between hours 3 and 5.

   What are the factors which would determine the highest NOx and PM10 concentrations concurrently occurring generally in the period between hours 3 and 5?

e) In Tables 7 and 8, the CO and derived VOC concentrations do not vary from 62.5 mg/m^3 (50ppm) throughout the day.

   This would suggest that the upper limit for CO is present under all averaged hourly traffic scenarios 24 hours a day. Is this correct?

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f) After Table 8, the CO levels for the Eastern and Western stack are quoted under congested conditions as 52 mg/m^3 and 51 mg/m^3 respectively.

Are the concentrations of CO lower during congested conditions?

Similarly for NOx, the concentrations at 4.5 - 5.1 mg/m^3 seem much lower than the hourly concentrations shown in table s7 and 8. Is there an explanation for this?

g) In Tables 7 and 8, the hours 1 to 24 in the left hand column suggest the hours of the day with hour 1 being 1 am and 24 being midnight.

Is this correct?

h) What emission rates were used for free flowing and congested conditions?

i) In Tables 7 and 8, the relative hourly concentrations of NOx and PM_{10} from the Eastern and Western Stacks do not appear to reflect the relativity in emission loads (which were much higher at the Eastern Stack).

j) Can you please explain why the western stack (relative to the eastern stack) would have consistently higher hourly concentrations of pollutants yet consistently lower hourly emission loads for NOx and PM_{10}?

Council would also appreciate an explanation, preferably from Holmes Air Science, about the following information as presented in HAS2004:

a) In HAS2002, 2006 was identified as the worst case scenario. In HAS2004, 2006 was ignored as the tunnel would not be open in 2006.

   i) As the tunnel is expected to open in late 2006 or early 2007, what increase in reported emissions would result if emissions in 2007 were determined under a variety of congested conditions using the M5 East in 2004 and adjusted down for changes in fleet emission rates between 2004 and 2007 using the methodology of Charles Xu of NSW EPA ? and
   ii) What would the emission rates then be for 2007?

b) In the EIS, the 2016annual emission load for NOx was estimated at 528 t/year. In HAS 2004 the 2016 annual emission loads for NOx are now predicted at 180 t/year.

Can you please explain why the total annual NOx emission load has more than halved with no change to the base traffic volumes used in the EIS?

c) Figures 1-3 graphically show hourly emission loads for CO, NOx and PM_{10}.

Can you please explain the basis of these figures?

d) 700 vph/lane at 5 km/hour was used as a worst congestion case What is the decay relationship for emissions in gm/km/vehicle between 5 and 20 km/hr for grades applicable to the Lane Cove Tunnel?

e) The contours for changes in maximum concentrations presented in Figures 4-9 are at a scale hard to read.

i) Is it possible to have each figure reproduced on A3 page? and
ii) Is it also possible to provide the contours of maximum concentrations due to the stack alone for both HAS 2002 and HAS 2004?

If any aspect of Council's request is not clear, please discuss with the writer on 02 99113564. As we are soon to be presented detailed design information by TJH for the changed ventilation design, Council would appreciate a response by the 6th August 2004.

Yours faithfully,

John Lee
PROJECT MANAGER, LANE COVE TUNNEL COORDINATION

E-mail Address: lccouncil@lanecove.nsw.gov.au

C:\Documents and Settings\LCCUser\My Documents\Lane Cove Tunnel\lct enquiry\RTA210704.doc

File No. 02M5256
Contact Garry Humphrey 88142006

13 August 2004

Mr Peter Brown
General Manager
Lane Cove Municipal Council
PO Box 20
LANE COVE NSW 2066

Dear Peter

Re: Lane Cove Tunnel – Changes to Lane Cove Tunnel and Related Matters

I refer to your letter of 1 July 2004 to John Anderson, RTAs Project Manager for the Lane Cove Tunnel and the letter from Council's John Lee dated 21 July 2004 addressed to myself, regarding changes made to the Lane Cove Tunnel Project between planning approval and contract award and related matters. A response to the queries raised in these letters is provided using the headings in your letter.

1. Changes to the Lane Cove Tunnel

With respect to grading of the tunnel, the RTA's presentations to the Community Liaison Groups (CCLG's) 2 and 3, on changes made to the project between planning approval and contract award states:

"The maximum tunnel gradient has been reduced from 6.5% to 4.6% between Lane Cove River and Stringybark Creek."

As shown on the drawings referenced in your letter, the changes in tunnel grade occur west of approximately Ch 1550 (ie at Stringybark Creek) with, as stated in the presentation, the maximum gradient reduced from 6.5% to 4.6%.

The proposed ventilation system in the EIS met the requirements of:

- Traffic at 20 kph in one tunnel / 80 kph in the other tunnel
- CO in tunnel exposure limit of 87ppm, rolling 15 minute average.

Following the display of the Preferred Activity Report for the project, RTA proposed a modification to the ventilation concept to provide an improved environment for tunnel users, meeting the stricter environmental criteria of:

- Congestion in one tunnel / 80kph in the other tunnel.
- CO in tunnel exposure limit of 50ppm, rolling 30 minute average

As the EIS ventilation proposal did not comply with the more stringent in-tunnel CO requirement, a schematic layout of a ventilation system, clearly marked "preliminary" and " for discussion purposes only" was developed

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to demonstrate that, provision of an intermediate exhaust point (and adjacent fresh air intake) in each tunnel, would allow development of a ventilation system to comply with the more stringent CO requirements.

Subsequently the Minister for Planning approved the Lane Cove Tunnel subject to 259 conditions including detailed physical, air quality (in-tunnel, in-stack and ambient), monitoring and operational requirements for the tunnel.

The Lane Cove Tunnel Company (LCTC) is now preparing a detailed tunnel design to meet the requirements of the project approval conditions.

It is noted that LCTC briefed Council Officers on the detailed concept for the tunnel ventilation system on 29 July 2004.

RTA as proponent, will ensure that the detailed design, construction and operation of the tunnel complies with the project approval.

The statement in your letter that the approved project only requires one tunnel to be considered congested with the other tunnel free flowing is correct. As stated at CCLG 3, subsequent to project approval, RTA required in addition, that the ventilation design have the capacity to manage the worst case scenario of vehicles travelling simultaneously in both tunnels at a speed of 5 kph. This is a theoretical loading case unlikely to occur in practice. This requirement added to the cost of the project but provides a ventilation system able to manage vehicles emissions under the worst possible scenario without any traffic management intervention.

With respect to comments on traffic management, the Lane Cove Tunnel and adjacent roads will be managed on a network basis to minimise traffic congestion and provide improved conditions for public transport, pedestrians and cyclists. Traffic management systems to be built into the project include moveable medians on Epping Road, Gore Hill Freeway and M2. Ramp metering will also be established on entry ramps, to be activated when required to appropriately manage traffic flow on the network. This management strategy is in accordance with Condition of Approval 157 and is not a change to the project.

Traffic management is not required to maintain CO pollutant limits in the tunnels. Should the worst case scenario of concurrent congestion occur in both tunnels, the ventilation system has the capacity to maintain CO exposure limits in accordance with the Conditions of Approval without any traffic management intervention.

However, traffic conditions will be monitored to ensure that traffic movement is safe and efficient. Should this monitoring indicate the need for intervention, appropriate traffic management would be initiated.

Air quality modelling undertaken by Holmes Air Sciences indicates that the changes to the approved ventilation concept design from planning approval to contract award would result in insignificant impacts on operational air quality as noted in the last slide of the presentation to CCLG 2 and CCLG 3. This assessment was undertaken using the same modelling approach that was used to assess the effects of the ventilation concept design during the environmental assessment phase of the project. As such, all parameters, except those that changed as a result of the revisions to the approved ventilation concept design have been kept the same. The modelling was undertaken for the worst case of congestion concurrently in both tunnels with a traffic speed of 5 kph.

It is also noted that the EIS predicts a general improvement in air quality in the Lane Cove area.

2. Vehicle Emissions

RTA has consistently stated, for the worst case scenario of congestion in both tunnels (noting that the project approval only requires consideration of congestion in one tunnel and free-flow in the other tunnel), that as a result of the changes between project approval and project award, there would be an emissions increase in the western stack and decrease in the eastern stack. RTA has also, relative to the EIS, consistently stated that dispersion modelling has concluded that changes to ambient air adjacent to both stacks, as a result of the changes, for the above worst case scenario, would be insignificant.

As outlined in the RTA's presentations, the cumulative impact on operational air quality resulting from the revisions to the approved ventilation concept design has been assessed. The appropriate test for consistency is not to assess individual contributions of separate changes in isolation but to assess the changes on a cumulative basis in accordance with the requirements of section 115BA(4) of the Environmental Planning and Assessment Act.

3. Safety

Both the vertical and horizontal alignment in the tunnel will be designed to the relevant design standards.

Reduction in grade from 6.5% to 4.6%, will improve traffic flow, particularly in the westbound tunnel.

4. Consistency Assessment and 5. Consistency Tests

The changes made to the project between planning approval and contract award have been assessed by RTA under the requirements of Section 115BA(3) of the *Environmental Planning and Assessment Act, 1979* and determined to be consistent with the Minister for Planning's Approval. Section 115BA(3) states:

> *A proponent does not need to obtain the Minister's modification of an approval if the activity as modified will be consistent with the approval.*

In relation to your statement that in testing for consistency "significant weight must be given in Condition 1 of the approval as the Director General's Report... has the second highest priority ahead of the Representations Report and the EIS", it is noted that Condition 1 requires the project to be carried out in accordance with the EIS as modified by the Representations Report and, where relevant, the Director General's Report and the conditions of the Minister's Approval. However, in the event of any inconsistency, the conditions of Approval prevail. The Director General's Report is referred to in Condition 1 in the context of any modification recommended to the project described in the EIS. Once approval is granted by the Minister, the conditions of Approval prevail over the EIS and the Director General's Report to the extent of any inconsistency.

The assessment required under section 115BA(4) is to compare the activity as approved with the activity as proposed to be modified. The modification is to be assessed for consistency in the context of the approved activity compared to the modified activity taken as a whole.

The focus of environmental impact assessment is the consistency of the relative change in impact. A summary of the environmental assessment was provided as part of the RTA's presentations to CCLGs 2 and 3. The RTA's assessment identified a number of impacts resulting from the changes including:

- short term increases in construction noise and traffic generation;
- insignificant change in operational air quality;
- reduced visual impact and greater opportunities for urban design enhancement; and
- slight improvements in operational noise impacts.

The overview of impacts included in your letter appears to focus solely on operational air quality impacts, which are just one of the environmental impacts which must be considered in determining whether changes are consistent with the Minister's approval.

Your and Mr Lee's letters of 1 and 21 July 2004 also include issues relating to the revisions to the ventilation concept design made prior to planning approval. In this regard it should be noted that the significant change of including an intermediate exhaust and fresh air intake in each tunnel were made specifically to meet the more stringent in-tunnel CO limits, which were later specified in Condition of Approval 160 and 161. The assessment include in Appendix C of the Director General's Report was completed to demonstrate that these more stringent CO goals could be achieved.

It should also be noted that the ventilation design, currently being designed by LCTC, must meet all Conditions of Approval, including those referred above and Condition of Approval 168 which references the ambient air quality assessment undertaken on the ventilation preliminary concept design prior to the Minister for Planning's approval.

Yours sincerely

Garry Humphrey
General Manager
Motorway Construction

Mr Peter Brown
General Manager
Lane Cove Council
PO Box 20
LANE COVE NSW 1595

27 SEP 2004

Dear Mr Brown

I refer to your letter dated 23 August 2004 regarding the Lane Cove Tunnel.

I also refer to my response dated 13 August 2004 that referenced your letter dated 1 July 2004 and Council's letter dated 21 July 2004.

Environmental Assessment Phase of Project

The RTA, under the provisions of Division 4, Part 5 of the Environmental Planning and Assessment Act, examined the environmental impact of the proposed Lane Cove Tunnel, considered representations made in respect of the project and submitted a Representations Report to the Director General of the then Department of Planning.

The environmental assessment was based on a conservative preliminary ventilation system developed to demonstrate that a ventilation system was available, using intermediate exhaust points (and adjacent fresh air intake) in each tunnel, that could be developed during detail design to comply with the proposed stringent in-tunnel CO requirements, including the limit for CO of 50ppm rolling 30 minute average.

As noted in my letter dated 13 August 2004 the schematic layout of a ventilation system in Appendix C of the Director General's Report is clearly marked "preliminary" and "for discussion purposes only".

Subsequently the Minister for Planning approved the project subject to 259 conditions including specific conditions for operation of the ventilation system.

The project has now entered the implementation phase with the Lane Cove Tunnel Company (LCTC) and their contractor Thiess John Holland (TJH) undertaking the detailed design of the tunnel ventilation system.

Consequently the analysis undertaken during the environmental assessment phase, while relevant at the time, is now superseded by the detailed design currently being undertaken by LCTC. The detailed design must be developed in accordance with the project conditions of approval.

RTA's focus and obligation as proponent during the implementation stage of the project is to ensure that the detailed design, construction and operation of the tunnel is in compliance with the outcomes required in the project approval.

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RTA does not propose to revisit the preliminary design as this is superseded by the detailed design.

However RTA remains available to discuss any comments Council may have on the detailed ventilation design currently being prepared by LCTC.

Vehicle Emissions

The air quality assessment in the EIS conservatively used the emissions inventory in the Metropolitan Air Quality Study (MAQS).

The hourly traffic and emission rates for the tunnel with twin stacks (Tables E3 and E4 in Working Paper 9) is conservatively based on the MAQS data.

MAQS provides information on the local fleet but does not easily allow estimates for different grades and speeds

During consideration of the project proposal by the Department of Planning and the then EPA, the preliminary ventilation system concept in the EIS was assessed for a more stringent requirement of in-tunnel exposure limit of 50ppm over a rolling 30 minute average.

Following discussion with the EPA on appropriate scenarios for considering congestion, further dispersion modelling was undertaken.

The dispersion model, consistent with the design of the ventilation system, used PIARC emissions for normal and congested flow taking into account the traffic mix and grades within the tunnel. Because of the flexibility of addressing any combination of grade and speed the PIARC emissions are more appropriate (than the MAQS data) for tunnel design.

The results, documented in the various tables in Appendix C of the Director Generals Report, are appropriate to the Lane Cove Tunnel but are less conservative than the results tabulated in the EIS for the ambient air quality assessment which used MAQS data.

The results of this analysis are reflected in Condition 173 of the project approval that sets concentration and mass pollutant limits discharged from the ventilation stacks.

The ventilation preliminary concept and the associated air dispersion modelling assumed congestion in one tunnel and 80kph in the other tunnel.

As previously advised to Council, in addition to the position in the environmental assessment that one tunnel is to be considered congested with the other tunnel free flowing, RTA subsequent to project approval has required that the ventilation design have the capacity to manage the worst case scenario of vehicles travelling simultaneously in both tunnels at a speed of 5kph.

Detailed Ventilation Design

As confirmed to Council Officers, the design year being used for the detailed design of the ventilation system has been conservatively adopted as 2006.

Lane capacity and vehicle emission rates for different grades, vehicle types and speed are in accordance with PIARC adapted for the New South Wales vehicle fleet.

The LCTC concept for the ventilation system, including tunnel geometry, traffic characteristics, vehicles emissions and air flow requirements, has been presented to Council Officers and the AQCCC.

The air quality assessment for the detailed tunnel design concept including the model approach, inputs and modelling results for dispersion of emissions from the ventilation stacks has also been presented to the AQCCC.

Air Quality Contours

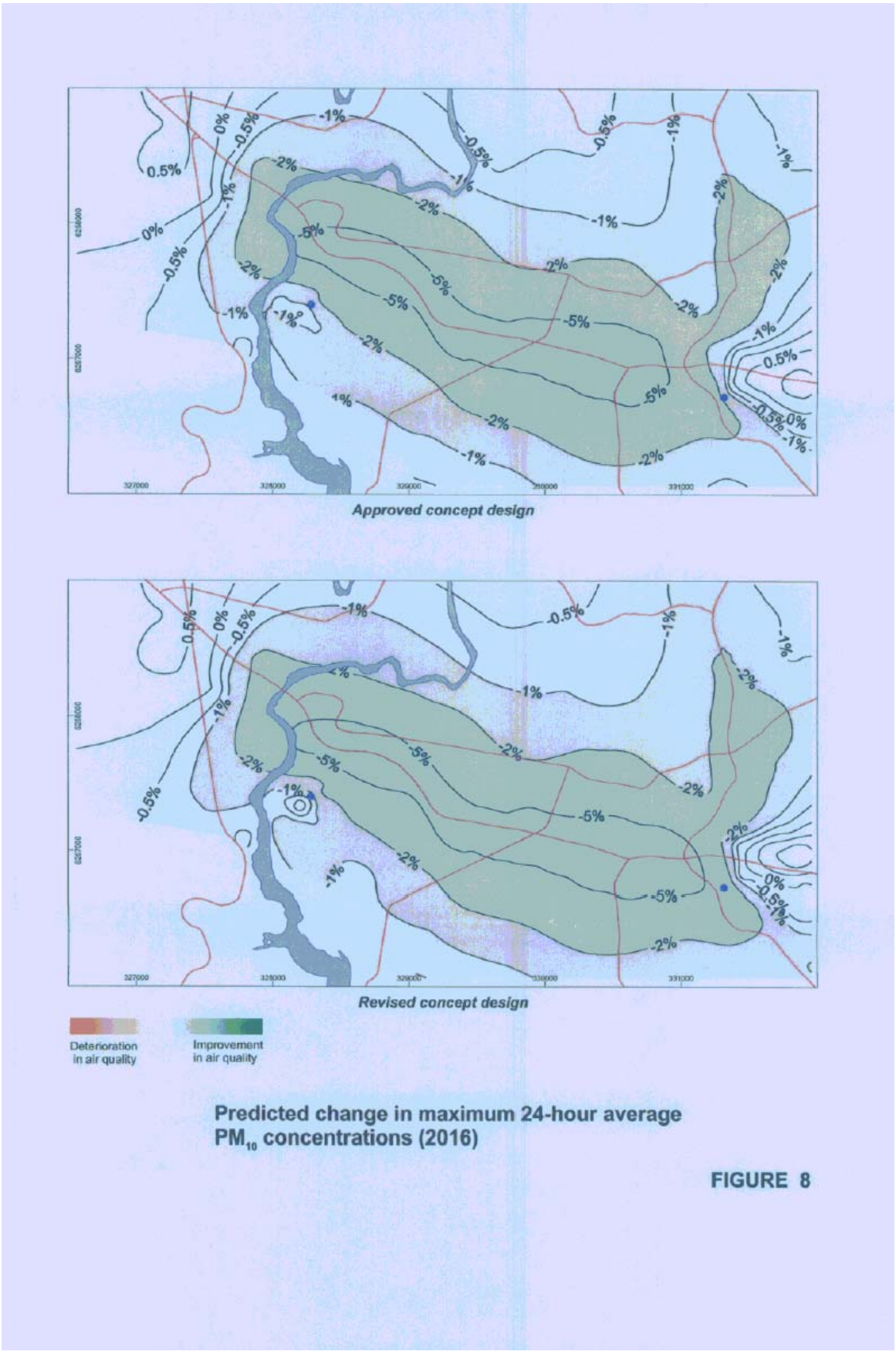
Contours of maximum concentrations due to the stack alone (ie reductions in_emissions for local roads not included) for the detailed design has been provided by TJH.

Copies of Figures 8 and 9, in colour, are attached for Councils information as requested.

As noted above RTA remains available to discuss any comments Council may have on the detailed ventilation design.

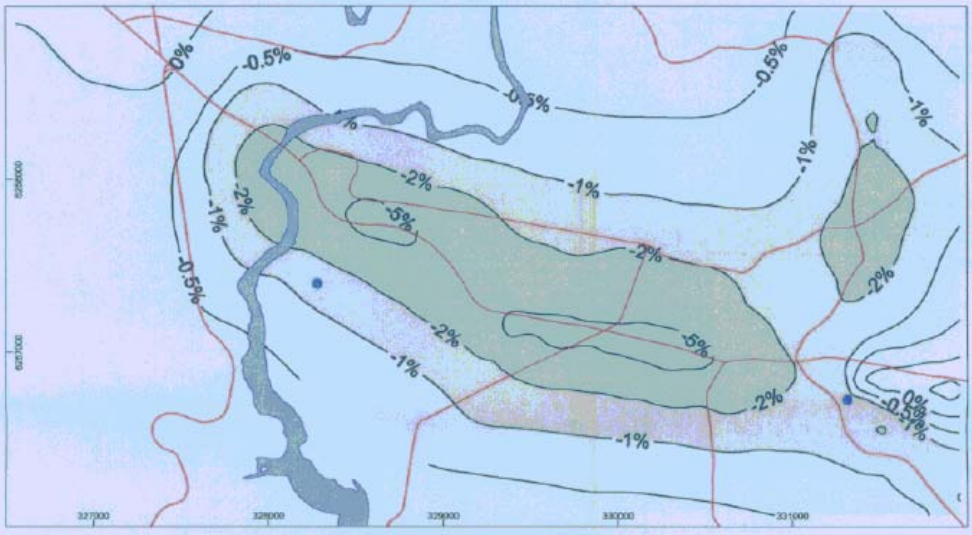
Your Sincerely

Garry Humphrey
General Manager
Motorway Construction

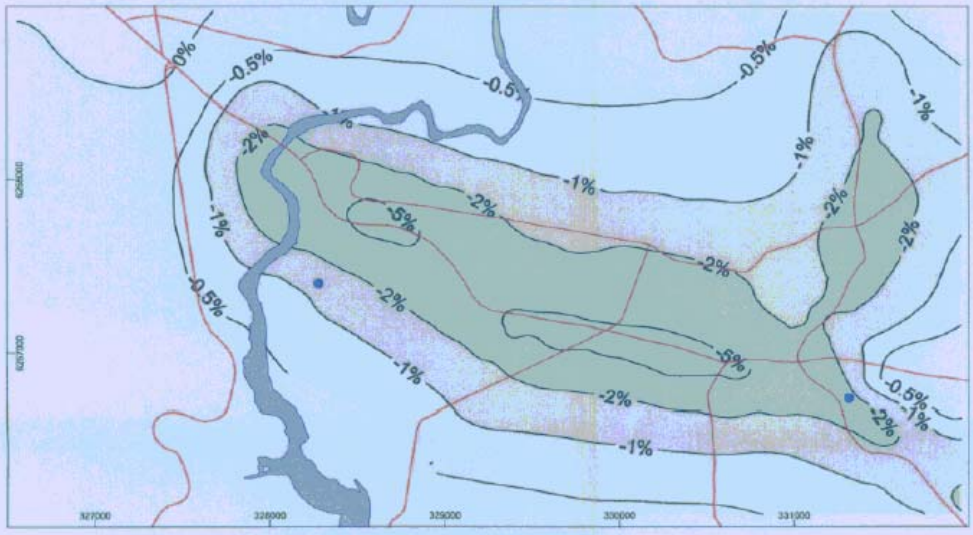


Predicted change in maximum 24-hour average PM_{10} concentrations (2016)

FIGURE 8



Approved concept design



Revised concept design

Deterioration in air quality

Improvement in air quality

Predicted change in annual average PM_{10} concentrations (2016)

FIGURE 9

Attachment 16 – LCC Correspondence Sent to Tenderers 13 May 2003
Similar correspondence sent to all tenderers

COPY

Lane Cove Council

48 Longueville Road, Lane Cove NSW 2066 Tel: 9911 3555 Fax: 99

Date: 13 May 2003
Ref: R Selleck

Mr Chris Herbert
Lane Cove Tunnel Consortium
Locked Bag 26
DARLINGHURST NSW 2010

Dear Sir

Lane Cove Tunnel, Air Quality

You will no doubt be aware of the high level of community concern regarding air quality following the opening of the proposed Lane Cove Tunnel. Council, in responding to these concerns, commissioned an independent review of the air quality assessment carried out as part of the EIS for the project.

This *"Review of Lane Cove Tunnel PM10 Impact Issues"*, carried out by Dr Peter Best, Katestone Group, concludes, inter alia, that background levels of PM10 have been underestimated in the Lane Cove Tunnel EIS by 11–40%, dependent on season, meteorological and air quality conditions. **As a result, air quality goals set out in Condition 169 of the Conditions of Approval will be exceeded, especially in winter.**

Council considers that, having regard to Dr Best's findings, action should be taken immediately to ensure that the air quality goals set out in the conditions of approval will be met.

Council has written to the Premier, Minister for Infrastructure and Planning and Minister for Natural Resources, Minister for Roads, their departmental heads and the Auditor General seeking an urgent joint meeting in respect of this matter. Council seeks to have proper filtration fitted to the tunnel so that air quality goals can be met.

I enclose a copy of the report by Doctor Best for your information.

Should you wish to discuss the matter please contact me on 9911 3560.

Yours sincerely

Ross Selleck
EXECUTIVE MANAGER
URBAN SERVICES

DOC REF.g\wus\ross\rs tunnel consortia air quality 4

LANE COVE TUNNEL CONSORTIUM

LCTC:CHe:M001

30 May 2003

Mr Ross Selleck
Executive Manager
Urban Services
Lane Cove Council
48 Longueville Road
LANE COVE NSW 2066

Dear Mr Selleck

Lane Cove Tunnel

Thank you for your letter of 13 May 2003 and your invitation to hold further discussions.

The matter of the Minister for Planning Approval Conditions is regarded most seriously by our consortium, as is our relationship with primary stakeholders, particularly Lane Cove Council.

I would be pleased to hold discussions with you on the project, our role, and your concerns over air quality. In that regard I will call you next week to arrange a time.

Yours sincerely

Chris Herbert
General Manager
Lane Cove Tunnel Consortium

8 Tunnel Ventilation System

In addition to meeting all other requirements of the Deed, the Company must;

(a) design, construct, operate, maintain, and repair the tunnels, to provide a tunnel ventilation system with the capacity to ventilate the tunnels, without any other operational intervention including traffic management, to ensure that no individual person, either travelling in the tunnel or stationary at a location in the tunnels is exposed to carbon monoxide (CO) concentrations exceeding;

  (i) 87 ppm (rolling 15 minute average);

  (ii) 50 ppm (rolling 30 minute average); and

  (iii) 200 ppm (rolling 3 minute average).

(b) design, construct, operate, maintain and repair the tunnel, including the tunnel ventilation system, to ensure that the visibility requirements of the PIARC publications are fully complied with;

(c) design, construct, operate, maintain and repair the tunnel, including the tunnel ventilation system, to avoid discharge of tunnel air from the portals, except during emergency situations and/or where emergency personnel are involved with accidents and breakdowns inside the tunnels;

(d) comply with paragraphs (a) to (c) above for:

  (i) all ambient conditions for all intake air;

  (ii) for all possible traffic conditions including, vehicles concurrently occupying the total lengths (or any parts thereof) of both the eastbound and westbound carriageways for all variations of traffic speed conditions;

(e) for the purpose of (d)(ii) above, variations of traffic speed conditions include the range from:

  (i) stationary within the tunnels (with engines running); to

  (ii) travelling within the tunnels at all combinations of vehicle speeds up to the design speed specified in Appendix 17 of the Scope of Works and Technical Criteria.

(f) ensure that compliance with paragraphs (a) to (d) above applies to all vehicle generated emissions, including tail pipe emissions and road dust;

null points to occur in the air flow and do not permit uncontrolled short circuiting from the air inlets to air extracts within the tunnel. Computer modelling analysis must be undertaken to demonstrate avoidance of null points or locations of low velocity and uncontrolled short circuiting;

(h) design, construct, operate, maintain and repair the tunnels to provide a tunnel ventilation system with an installed exhaust ventilation capacity, excluding installed standby fans, of not less than 2,250m^3/s;

(i) during design of the tunnel ventilation system develop a strategy to operate the tunnel to minimise the occurrence of visible haze, including in areas of low air flows;

(j) demonstrate during detailed design how it will comply with the requirements of paragraph (h) above; and

(k) comply with the following requirements for air intake structures and buildings:

(i) the high point on any structures associated with air intakes must be at or below ground level;

(ii) the high point on any buildings associated with air intakes must be not more than 3.5m above ground level; and

(iii) air intakes must comply with the Company's Architectural and Landscape Design included in Appendix 22 to the Scope of Works and Technical Criteria.

Attachment 18 – RTA Briefing to LCC 12 May 2004 on Changes to the Project between Approval and Contract

Revisions to Concept Design of Project

Revision	Comment
1. The Delhi Road/Epping Road intersection to provide an additional left turn lane to Epping Road.	To accommodate increase in traffic between M2 and Epping Road. Revision provides improved efficiency of operation of the intersection.
2. Main carriageway located centrally at Reserve Road.	▪ Improves operation of merges and weaves allowing safer traffic flow. ▪ Reduces visual impact with improved urban design opportunities. ▪ Provision for future eastbound and westbound lanes with minimal impact on Reserve Road ramps.
3. Construction access to the main tunnels from Mowbray Road will go under Mowbray Road rather than be constructed by cut and cover.	Reduces any potential impact on traffic on Mowbray Road and construction noise during construction.
4. Motorway Control Centre moved from Marden Street to Sirius Road.	Relocation of the Motorway Control Centre to Sirius Road provides opportunities to enhance the urban design outcomes at 5 Sirius Road.
5. Ventilation tunnel from Marden Street moved from beneath to adjacent to Corinthian Building.	Better addresses geotechnical conditions with the ventilation tunnel leaving the Marden Street site beneath 395 rather than 401 Pacific Highway.
6. An exhaust ventilation tunnel will connect the Pacific Highway exit ramp directly to the ventilation tunnel to the Marden Street ventilation building.	Eliminates need to force exhaust air against traffic flow down to the mainline tunnels.
7. Exit to eastbound tunnel and entrance to westbound tunnel relocated further to east and moved together.	Overcomes the need to have the portals separated by on/off ramps to Longueville Road. Improves overall amenity and reduces noise impact.
8. The exhaust ventilation tunnel connecting approximately the mid-point of the westbound tunnel has been redirected from the eastern to the western ventilation building.	Reduces length of exhaust tunnels and associated spoil disposal and construction traffic.
9. The maximum tunnel gradient has been reduced from 6.5% to 4.6% between Lane Cove River and Stringybark Creek.	Improves traffic speed for westbound traffic travelling up-grade to western portal of westbound tunnel.

Attachment 19 - RTA Briefing Note on its Meeting with Council on 12 May 2004

BRIEFING NOTE

LANE COVE TUNNEL

ISSUE

Changes to the Lane Cove Tunnel project.

BACKGROUND

In accordance with Condition 11 of the Project Approval Conditions, an advertisement is to be placed in the Sydney newspapers on Saturday 15 May 2004, advertising changes to the project between the Minister's project approval and financial close with the Lane Cove Tunnel Company (LCTC).

RTA/LCTC/TJH briefed Lane Cove Council officers on the changes on Wednesday 12 May 2004. A copy of a schedule of changes handed to Council officers is attached.

TIMING of ADVERTISEMENT

Council expressed the view that RTA should have consulted Council on the changes when they occurred ie during the tender process.
RTA responded that it was not appropriate for probity and commercial in confidence reasons to discuss proponent's proposals with external parties during the tender process.
For this reason the Project Approval Conditions (specifically Condition 11) requires that all relevant residents and businesses are informed of physical change to the project one month prior to substantial construction.
Most of the changes were included in the April newsletter distributed by TJH.
Detailed design of the ventilation system has also now been developed sufficiently by LCTC/TJH to confirm the changes to the ventilation system.

PHYSICAL CHANGES

Council did not raise any significant issues with Items 1 to 6.

Council's position with Items 7 and 8 (changes to the ventilation system) is that these changes together with changes to air flow in the LCTC/TJH ventilation system result in the tunnel ventilation system being downgraded. Council reached this conclusion by comparing the airflow capacity of the LCTC/TJH design with the RTA design prepared by Connell Wagner included in the Director General's assessment report. Item 9 reduces emissions in the tunnels.

The position was put to Council that the RTA design in the Environmental Assessment phase of the project was a preliminary concept design and that the LCTC/TJH detailed design has to meet all of the Conditions of Approval and, in addition, the more stringent requirement of congestion in both tunnels.

It was agreed that RTA/LCTC/TJH would prepare a technical response to Council's concerns and further brief Council on this issue.

It is expected that the technical response being prepared by LCTC/TJH will be available early next week for briefing Lane Cove Council.

Although the changes are technically not significant, Council is likely to continue to view them as significant.

It is understood that a joint Council Press Conference calling for filtration of the Lane Cove Tunnel is to be held at 11.30 am on Friday 14 May 2004.

Being aware of this proposed event, TJH requested at the meeting that Council consider the technical response to the ventilation issues raised by Council before alarming the community without the correct technical facts.

TECHNICAL BACKGROUND

In the Environmental Impact Statement, the preliminary concept for the ventilation system for the Lane Cove Tunnels, was developed for the following requirements:

- 20 km/hr vehicle speed in one tunnel
- 80 km/hr vehicle speed in the other tunnel
- Carbon Monoxide (CO) level of 87ppm - 15 minute rolling average

During assessment of the proposal by the then Department of Planning, in response to community input, RTA reviewed the ventilation design to include a more stringent CO goal of 50ppm - 30 minute rolling average.

In addition, one tunnel was assumed to be fully congested with the other tunnel having a vehicle speed of 80km/hr.

Subsequent to project approval on the 3 December 2002, the RTA further increased the tunnel design requirements to include the ventilation system to be designed for simultaneous congestion in both tunnels – the worst possible design scenario. All four proponents involved in the tender process were required to provide concept designs that met the more stringent conditions.

The ventilation system being designed for the Lane Cove Tunnels by LCTC/TJH must therefore meet the following more stringent requirements of:

- fully congested conditions in both tunnels
- carbon monoxide (CO) level of 87ppm - 15 minute rolling average and
- carbon monoxide (CO) level of 50ppm - 30 minute rolling average

In accordance with the Project Approval conditions, air quality will be monitored within the tunnels to demonstrate that the goals are met.

The project will also have traffic management systems built into the tunnel and approach roads to regulate traffic flow into the tunnels including the ability to divert traffic before the tunnel entrances.

Although the ventilation system has the capacity to meet the CO air quality goals for the fully congested scenario, the likelihood of both tunnels being concurrently fully congested is unlikely as:

- the eastbound tunnel has two lanes at the entrance developing into three lanes inside the tunnel with two lanes proceeding to Gore Hill Freeway and one to Pacific Highway
- the westbound tunnel has two lanes at the entrance with a third lane developing inside the tunnel to provide for the westbound on-load ramp from Pacific Highway. At the tunnel exit a further lane develops with two lanes proceeding to the M2 and two to Epping Road. This

additional capacity is provide by construction of a fourth lane on Epping Road between the tunnel and Wicks Road

- should the broader network be congested, the operation of the tunnel would be managed to avoid as far as possible the situation were both tunnels are concurrently congested.

EMISSIONS FROM THE VENTILATION STACKS

Impact of the changes on ambient air was not specifically discussed at the meeting.

However, for information only, it is noted that the changes to the ventilation system of increase in tunnel length and both mid-tunnel exhaust points being direct to the western ventilation stack are partly compensated for by the reduction in tunnel grade from 6.5% to 4.6%.

A recent analysis undertaken for the RTA by Holmes Air Science, by running the dispersion model from the Environmental Assessment and including the changes to the tunnel design (to compare apples with apples) for the case of congestion in both tunnels has shown a decrease in emissions from the eastern stack and a relatively minor increase in emissions for PM_{10} and NO_x from the western stack.

Dispersion modelling has concluded that changes to ambient air adjacent to both stacks, as a result of the changes to the ventilation system for the case of congestion in both tunnels, would be insignificant.

ENVRONMENTAL BENEFITS

The changes to the tunnel design:

- improve the visual amenity and urban design opportunities at the eastern end of the tunnel
- lower noise levels during operation of the tunnel at the eastern end
- reduces spoil disposal and truck movements during construction

WAY FORWARD

Following preparation of the technical response, Council will be briefed early next week on the Lane Cove Tunnel ventilation system. Arrangements for this meeting will be made on Thursday 13 May 2002.

Attachment 20 – Correspondence May 2004 between Council and RTA relating to Changed Ventilation in Contract

From: John Lee
To: ANDERSON John Raymond
Date: Thu, May 27, 2004 11:01 AM
Subject: RE: Revisions to ventilation design

John
1 You agreed to provide the details of the changes to the Ventilation design you outlined to Ross Selleck and myself at Council offices.
These changes related to those made between Ministerial approval and Financial closure. **We expect you to honour that agreement.**

2 The changes you outlined are not minor.
It is extreme arrogance for the RTA to advise us after the deletion of 1600m of air tunnels, a reduction in fan capacity and the redistribution of polluted air under congested conditions via the western stack that the change is minor, especially when the DG Planning described the addition of the ventilation tunnels, and increased fan capacity as a major modification. Coupled with the increase in tunnel length of 145 m being about 6% increase in tunnel pollutant loading, the modifications to ventilation of the Lane Cove Tunnel are **NOT MINOR**

3 There is no commercial confidence issues relating to the disclosure of technical details used by the RTA to depart from the approved "Revised Ventilation Design" submitted to DEP 25.10.02 and assessed by the DG. What we are asking is for you to advise the tunnel ventilation arrangements the RTA contracted the LCTC to deliver as at 3 December 2003.

Please don't tell us there is no logic in comparing what the RTA submitted to DIPNR and what RTA contracted with LCTC. We want transparency from the RTA over air quality issues.

Please therefore advise this Council as a matter of urgency on the details of the ventilation arrangements which the RTA contracted with the LCTC at Financial Closure.

Council will accept a further detailed concept design briefing when completed.

Regards,
John Lee
Project Manager Lane Cove Tunnel Coordination

John Lee
Project Manager, Lane Cove Tunnel Coordination
http://www.lanecove.nsw.gov.au
Phone 02 9911 3564
Mobile 0402 937478
Fax 02 99113532

>>> ANDERSON John Raymond <John_Raymond_ANDERSON@rta.nsw.gov.au> 25/05/2004 12:49:42 pm >>>
John,
As discussed it is not appropriate during a tender process to discuss tenderers proposals with external parties. Nor is it appropriate for RTA to provide details of tenderers commercial in confidence proposals.

The revisions to the tunnel concept are minor and consistent with the project approval.

The project concept in the DG's report is a preliminary concept undertaken to demonstrate a solution is available to address the increased requirement addressed in the DG's report of providing a ventilation system with the capacity to manage an in-tunnel CO exposure limit of 50 ppm over 30 minutes with coincident congestion in one tunnel and 80kph traffic in the other tunnel.

As discussed there is no engineering logic in comparing the preliminary concept in the DG's report, in terms of air flows, fans etc with the LCTC detailed design concept.In a design and construct environment, LCTC are preparing a detailed design concept that must meet all of the outcomes set out in the Project Conditions of Approval.
In fact, as discussed, the requirements for the design have been further increased by RTA to include the design case of coincident congestion in both tunnels.

As discussed above LCTC are now undertaking a detailed concept design which must meet all of the Minister's Conditions of Approval.
LCTC have agreed to brief Council on its detailed design concept for the ventilation system for the Lane Cove Tunnel.
LCTC have advised that the detailed concept design is currently being finalised in Hong Kong and as the detailed concept design will be available in four to five weeks LCTC proposes to brief Council in late June 2004.
This is an appropriate way forward to present and discuss the detailed design concept for the Lane Cove Tunnel.
Happy to discuss.
Regards John

-----Original Message-----
From: John Lee [mailto:JLee@lanecove.nsw.gov.au]
Sent: Tuesday, 18 May 2004 17:11 PM
To: ANDERSON John Raymond
Cc: Ross Selleck
Subject: Ventilation Changes

John,
I refer to our lengthy discussion today.

I have discussed with Ross Selleck your proposition that Council wait for 4 weeks to allow TJH to complete the Ventilation Design and then [resent to Council.

Ross's response is he wants what was agreed at the meeting last week for a comparison of the air flows fans and tunnel arrangements in a similar format to the Connell Wagner schematic shown in Fig 4.6 of the DG Report.

If changes are made to the ventilation design post a trip by the designers to Hong Kong, an update of the changes (in 4 weeks time) would also be provided to Council.

We do not accept that the engineering calculations which the RTA must have accepted when it contracted with the Lane Cove Tunnel Company to

The project concept in the DG's report is a preliminary concept undertaken to demonstrate a solution is available to address the increased requirement addressed in the DG's report of providing a ventilation system with the capacity to manage an in-tunnel CO exposure limit of 50 ppm over 30 minutes with coincident congestion in one tunnel and 80kph traffic in the other tunnel.

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If changes are made to the ventilation design post a trip by the designers to Hong Kong, an update of the changes (in 4 weeks time) would also be provided to Council.

We do not accept that the engineering calculations which the RTA must have accepted when it contracted with the Lane Cove Tunnel Company to

"Lane Cove Council."
""
"Information transmitted via email may be subject to corruption by the "
"process. Information contained in this email should not be relied upon "
"where loss, damage or injury is possible. Verified information should be "
"obtained in writing directly from the authorised Council officers."
""
"This footnote also confirms that this email message has been swept by"
"MIMEsweeper for the presence of computer viruses."
""
"**********"

CC: Ian Hunt; John Wassermann; Ross Selleck; Sue Netterfield

Attachment 21 - LCC Internal Briefing Note Re RTA meeting 3 June 2004

From: John Lee
To: Ross Selleck
Date: Mon, May 31, 2004 4:41 pm
Subject: RTA re ventilation design

Confirming the meeting with John Anderson and Caitlin Richards Thursday 3 June 2pm.

John Anderson Rang me today in regard to emails re ventilation design.

John argues that the changes are minor and LCTC will provide a design that will meet the limits criteria set in the conditions.

I pointed out to him that the changes deleting 1600m and reducing fan capacities cannot be classed as minor when the order of criteria set out in condition 1 is:
Ministers conditions which refers to the RTA design of 25.10.02
DG Report which goes into great detail to discuss the "major modifications in the revised ventilation design"
Preferred activity report and
EIS

I pointed out to John that our meeting dealt with the changes up to the financial closure of LCTC/RTA on 3 December 2003, and that he had agreed with you to provide the details of the ventilation design.

He advised me that after that meeting he discussed this with LCTC and decided not to provide that information as the only important information is the final design by TJH.

I stressed that he should keep his agreement with you.

I asked John if an assessment was done before financial closure, and he said he wouldn't discuss what took place during tender negotiations.

Unless John on behalf of the RTA can be open, the details must be obtained under a FOI. As discussed the other day, I will pursue this option.

You should enjoy Caitlin, ex DIPNR and doing her PhD with a slant to environmental processes.

John

John Lee
Project Manager, Lane Cove Tunnel Coordination
http://www.lanecove.nsw.gov.au
Phone 02 9911 3564
Mobile 0402 937478
Fax 02 99113532

Attachment 22 – LCC Meeting Note with RTA 3 June 2004

Meeting Note

Attendees	LCC -Ross Selleck, John Lee RTA – Caitlan Richards, John Anderson
	Committee Room, 2:00 – 3:10pm
Date:	3 June 2004
Subject:	Ventilation Design

Background
This meeting was called by John Anderson in relation to emails between John Lee and John Anderson dated 18th, 25th and 27th May 2004 in relation to ventilation changes and to John Andersons refusal to provide technical details.

JA outlined that the purpose of the meeting was to split the process used by the RTA to change the ventilation design from the TJH ventilation design.

CR provided a 2 page assessment and approval process handed to CLG's and outlined that unless a condition explicitly prohibits changes then changes can be made.
Where the extent of change is inconsistent with an approval a REF would need to be exhibited for a period of 14 days.
RTA has determined the changes to the ventilation design as minor, as it has:

- 13500 m3 less spoil from the project
- Less traffic impact on Lane Cove
- Less number of residents affected by tunnelling regenerated noise

CR outlined other changes to the eastern portal provided more room for urban landscaping, reduced noise impacts after the cut and cover tunnel was completed.

JL asked JA and CR if they had reviewed the RTA assessment of the changes made to the ventilation design prior to December 2003, CR indicated she had, and JA said he was part of the review team, and that the documentation exists.

We explained our issue with changes to the eastern portal adding 145 m of tunnel was the impact on ventilation, not on the surface impacts.

JA advised that after Approval, since their design in Fig 4.6 was based on 50 ppm and congestion in one tunnel, and they had to meet 50ppm with congestion in both tunnels, RTA asked all tenderers to review their design for congestion in both tunnels.

JA confirmed that the LCTC design has less emissions to the eastern stack and more to the western stack.

RS reminded JA that he had previously stated that there would be an improvement when in fact more pollutants would be discharged from western stack.

JA indicated that their modelling showed no significant impact change in contours from either stack, and that the air quality is made up of background, local impact and stack impact

RS referred JA back to the December 03 meeting with the LCTC attended by JA and Chris Herbert and to discussions about filtration and opportunities to reduce air volumes. CH had advised that they were locked into the approved design and had little room to move. RS considered that there had been sufficient discussion at that meeting for the RTA to have advised of changes to the Fig 4.6 design to the LCTC contracted design.

JL tabled the significant number of references in the DG report to the RTA revised ventilation design of 25.10.02 and that her approval was based on that design, and referred to in condition 168. JA noted that had they not submitted the 25.10.02 revised ventilation design, it was unlikely that DIPNR would have approved the project!

JL pointed out that condition 1 set out the hierarchy which included the DG report, and as the DG Report was based on the revised ventilation design, it could not be classed as a minor modification especially when the DG report discussed the additional exhaust tunnels and the additional tunnel and vent fans. JA wanted to agree to disagree on this point.

Other Issues
CCLG2 Chair
JL raised the conduct of CLG2 meeting 6 and said that something needed to be done in relation to the unacceptable conduct of the chair (Philip Mandidis). JA since telephoned and advised he referred this to Ian Hunt CEO of LCTC.

Date of Substantial Construction
JL discussed the english meaning of a date and referred to the email sent to TJH, setting out the triggers for advising of substantial construction. We do not accept TJH advice that it would happen shortly after commencement.
JA since telephoned advising that DIPNR had approved plans to allow substantial construction from Mowbray Park and Marden Street subject to works being contained within those sites and under Mowbray Road.

Limits vs Goals
JL reminded RTA that the conditions of approval set limits for noise which were not to be exceeded and that the CNIS / CMS should not be used for overriding those limits except for specific circumstances.

John Lee

Attachment 23 – Alternate Ventilation Designs Submitted by LCTC

Note:

Pages 4, 5, 6 and 8 did not appear to have been included in the documents tabled under Parliamentary Orders

Extracted from LCTC- Vol8A.
Lane Cove Tunnel Consortium

Volume 8 – Options

Volumes 2 to 7 of the Bid Submission set out in detail the Lane Cove Tunnel Consortium (**LCTC**) Conforming Base Case Offer to RTA. This Volume 8 provides details of additional Options offered to RTA by LCTC which provide alternatives and enhancements to the Conforming Base Case Offer.

The Options provided in this volume are the result of detailed consideration and due diligence performed by LCTC, Financiers, the D&C Contractor and the O&M Contractor. Each Option has been progressed with the philosophy and objective of continuing to maintain the value for money and quality underpinning the Conforming Base Case Offer should RTA wish to pursue them.

All Options presented here represent offers which LCTC stands ready and committed to progressing with RTA.

Options presented to RTA in Volume 8 are summarised in the following schedule of options

Section	Option Name
8.1	**Ventilation Alternative to PMA 156/157**
8.2	**Enhanced Project Access Options**
8.2.1	Enhanced Project Access Option
8.2.2	Enhanced Project Access Option – Lane Cove Road Ramps Tolled
8.3	**Differential Heavy Vehicle Tolling – Base Case**
8.4	**Differential Heavy Vehicle Tolling – Enhanced Access**
8.5	**RTA Requested D&C Options**
8.5.1	Widening of GHF at Naremburn
8.5.2	Spoil Disposal by Barge
8.5.3	Removal of Bus Interchange
8.5.4	Falcon Street Diamond Interchange
8.6	**LCTC Non Traffic Related Options**
8.6.1	GHF Pedestrian Bridge Option
8.6.2	Use of SHT Tunnel Control Room
8.6.3	Amalgamation of RTA Toll Operation
8.6.4	Remote Central Processing Services

LCTC has focussed on three underwritten cases:

- Conforming Base Case;
- Ventilation Alternative to PMA 156/157; and
- Enhanced Project Access Option.

To this, LCTC has assessed the impact of overlaying an amended tolling regime by applying a premium toll of 2.5 times to the Base Case toll levied on heavy vehicles:

- Differential Heavy Vehicle Tolling – Base Case; and

- Differential Heavy Vehicle Tolling – Enhanced Access Option.

LCTC has provided for the RTA Requested D&C Options and has evaluated the incremental impact of implementing the same.

LCTC has also included the assessment of a number of non traffic related options for further consideration by RTA.

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8.1 Ventilation Alternative to PMA 156/157

(a) Introduction

The Ventilation Alternative to PMA 156/157 (**Ventilation Alternative**) is a proposal conforming with the RTA's Information Document 239, Revised Ventilation Design for the Lane Cove Tunnel, however, exceeding the requirements as laid out in the Planning Minister's Approval. The RTA's Revised Design has adopted an approach that assumes that the tunnel can suffer congestion to the point of the perceived worst case of having stationary vehicles fully occupying the total length of the tunnel carriageways, with engines running.

LCTC believes that this occurrence could result in non-compliance with PMA Condition 156/157. These require the Operator to administer a traffic management regime for the tunnel which will effectively prevent such an occurrence. The PMA puts the onus back on the Operator to manage the tunnel in a way that will avoid risk associated with prolonged stationary vehicles and engines running.

While this option is capable of indefinitely maintaining a maximum in-tunnel CO concentration of 50ppm to deal with the occurrence of stationary vehicles, this capability is of no benefit beyond 30 minutes as lower WHO guidelines for longer exposure times start to apply (eg. 25ppm CO for 1 hour). Accordingly, even the precautionary approach requires traffic and incident management to limit the exposure of motorists or other personnel to unacceptable CO concentrations, and the equipment cannot be wholly relied on for life safety.

Notwithstanding this position, the Ventilation Alternative has been fully assessed and includes a ventilation design change by limiting CO concentration anywhere in the tunnel to 50ppm for continuous operation for stationary vehicles occupying the total tunnel, with engines running. In concurrence with RTA's approach, congestion is allowed in either tunnel, but not in both simultaneously. Fresh and exhaust air vent functionality can be switched between tunnels.

(b) Changes to Project Deed

No material changes are proposed to the operative provisions of the Project Deed, although changes to the scope or description of the works or land will need to be reflected in the appropriate Schedules and Exhibits attached to the Deed.

Land

As identified above, the requirement to provide a fresh air vent to the substation in the region of Canberra Street will require inclusion of the surface stratum of the surface footprint of this vent and its protection. Details of this will be developed by survey for the Motorway Stratum, and it will contained within the existing road reservation of Canberra Street.

This option requires utilisation of 130-132 Epping Road land, which is not required in the Conforming Base Case.

Drawings

The following drawings are included in this section and provide details of the proposed option.

- Figure 1 – Air Flow Requirements @ 0 kph
- Figure 2 – Concept Tunnel Ventilation Design

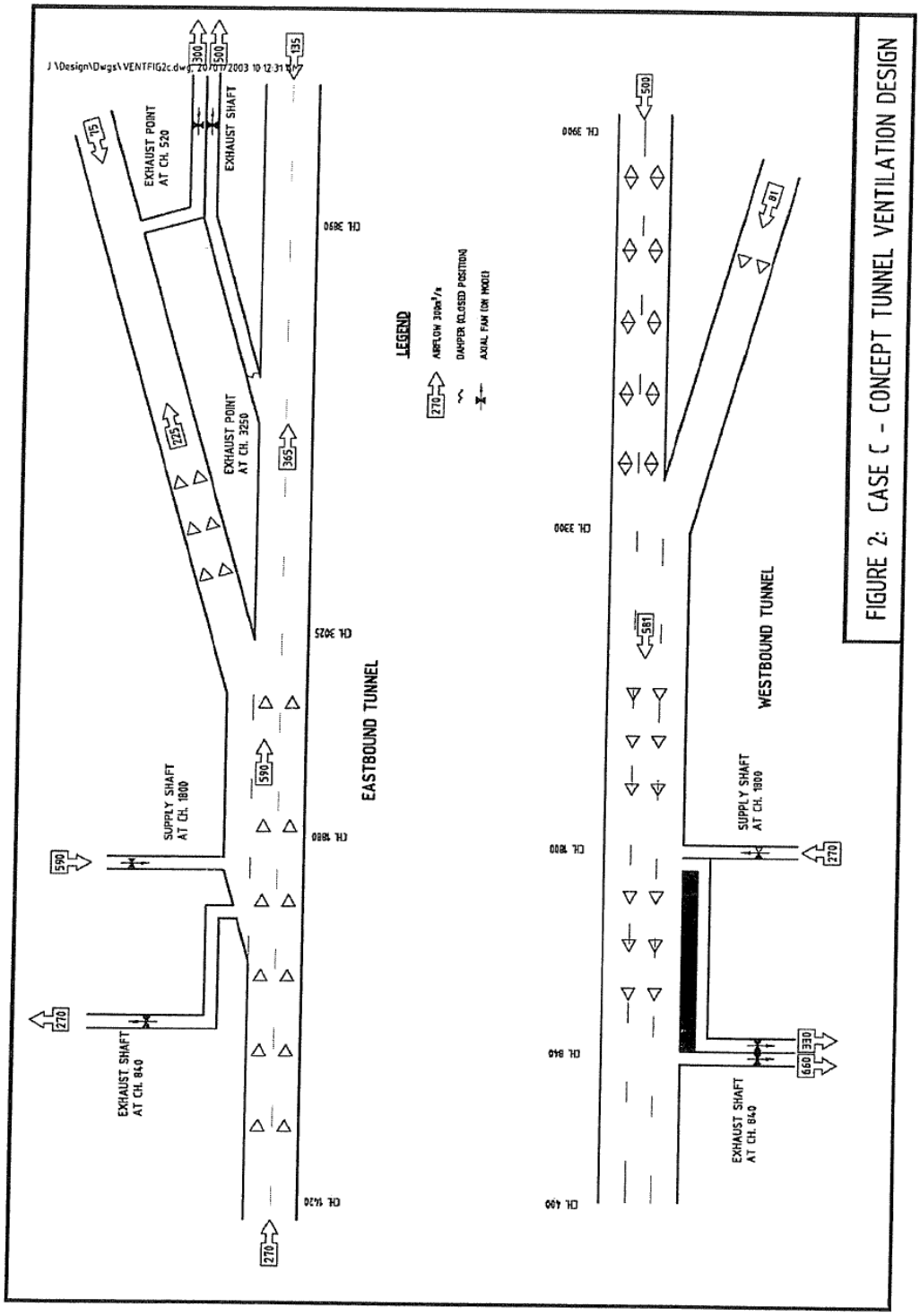

Figure 2 – Concept Tunnel Ventilation Design

Attachment 24 - Alternate Ventilation Designs Submitted by Other Tenderers

Add-On T12 Particulate and Gaseous Filtration / Treatment of Tunnel Exhaust

Introduction
This add-on is an innovative proposal for superior treatment of particulate and gaseous emissions which would address some community concerns about current treatment options.

The add-on deals with a concept treatment system for the tunnel exhaust, designed as a bolt-on system to the tunnel ventilation system which would deliver significant environmental benefits. Clearly, further development will be required before the offer can be firmed up.

Description
A detailed system description of the proposal, which is the subject of a patent application, is included in T12: Attachment A.

The scheme incorporates a gas turbine generator, electricity from which would be used by the tunnel with any excess being available for export to the public network.

Key Benefits

- reduced emission of particulates, CO, and NO_X
- net reduction in emissions of CO_2
- enhanced dispersion of exhaust air
- improved external air quality, both particulate and gaseous
- increased power supply reliability provided by 90MW of embedded generation capacity
- net revenue gain from generated power
- reduction in greenhouse gas production in NSW attributable to tunnel operations
- environmental benefit from carbon credits.

Changes to Project Deed
The changes to the Project Deed submitted with our other offers would apply. Other changes, if required, would be subject to discussion with RTA.

Operation and Maintenance
The Operator's Operation and Maintenance Plan would be substantially amended to include the operation and maintenance of the air treatment plant and associated equipment, including power generation plant.

D&C Program
With the addition of exhaust air filtration to the ventilation station works during Stage 1, we do not envisage any significant departure from the D&C program submitted with our Conforming Offer.

Financial Impact
The Proponent would provide additional technical details and financial modelling of this proposal for further discussion should RTA be interested. We are currently investigating the possibility of carbon credits providing an offset to the capital cost.

Environmental Approval Process
Provision within the tunnel design for future installation of pollution control systems to treat air emissions is incorporated in PM Condition of Approval No.153. Accordingly, we do not envisage additional environmental approvals are required to proceed with this option.

Financial Arrangements / Model
Specific enhancement to the corporate structure and financial structure of the Proponent is anticipated to accommodate the capital cost of this facility and operational profile in a manner that provides incremental value to all stakeholders. Senior Lenders and Mezzanine Lenders would be required to revisit respective underwriting commitments with the benefit of due diligence into the facility. Lenders to the project are experienced in assessing such technical solutions which provides a high level of comfort that the necessary level of additional funding would be forthcoming.

The financial model would be expanded to reflect the income and operational profile of the generation facility.

ATTACHMENTS

T12: Attachment A	System Description
T12: Attachment B	Scope of Supply
T12: Attachment C	Drawings.

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Hyder Consulting

3 System Description

3.1 Introduction

The tunnel exhaust treatment system proposed is an innovative solution to the needs of the modern urban environment. It combines a number of proven technologies to reduce emissions of particulates, NO_x, and CO from the tunnel exhaust and also enhances dispersion to minimise local impacts. The system offers a net reduction in emissions of CO_2 which are implicated in global warming.

The system can be provided as an "add-on" to the existing tunnel ventilation with minimal modification although there are opportunities to enhance the benefits by integrating the ventilation and treatment system more closely.

The system proposed has been jointly developed by local companies Hyder and Burns and Roe Worley who hold a provisional patent (patent application no. 2002951255). We believe it also has the potential for application on many other existing and proposed road tunnels worldwide.

3.2 Benefits of Proposal

Based on preliminary designs, the proposed tunnel exhaust treatment system has the following key benefits:

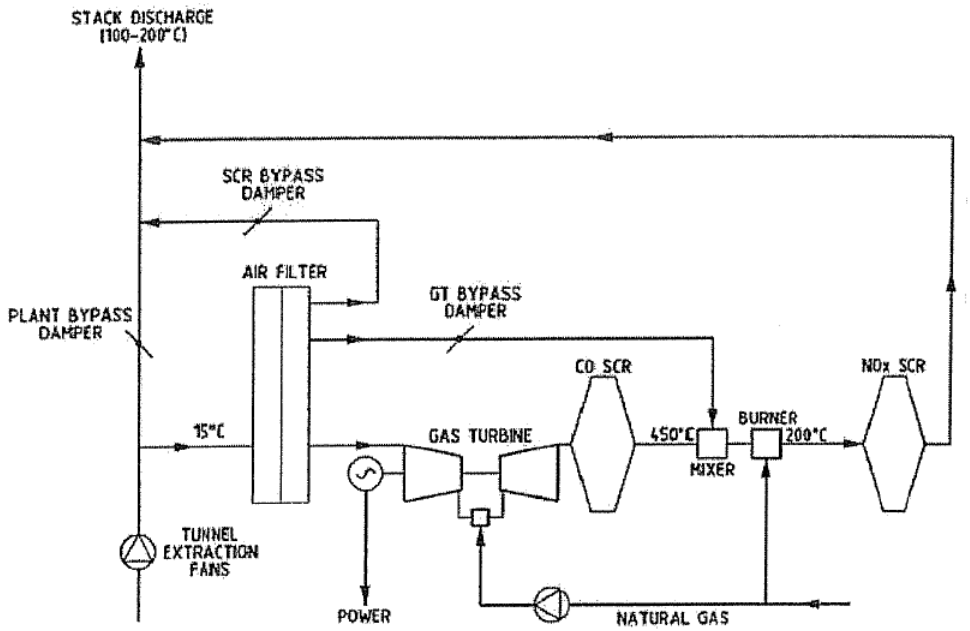
- Up to 50% reduction in weekday ground level concentrations of tunnel exhaust emissions at local receptors due to elevated temperature and consequent increased buoyancy of the exhaust.
- 119,000 tonnes/year reduction of CO_2 compared with conventional power generation from black coal, making a substantial contribution towards the NSW government target of achieving 1990 CO_2 emission levels for the electricity industry.
- 14% mass reduction in weekday NO_x emissions.
- 17% mass reduction in weekday CO emissions.
- 99% mass removal of PM10 particulates and 80% mass removal of PM2.5 particulates from tunnel ventilation air. Stack PM10 emissions are from clean burning natural gas only and expected to be undetectable using US EPA Method 5.
- Increased reliability of electrical supply to tunnel ventilation and safety systems.
- 90 MW of embedded generation capacity within the Sydney distribution network resulting in reduced supply upgrade costs, reduced transmission losses and increased supply reliability.
- Potential for cogeneration, providing process heat to local industry with consequent further economic and environmental benefits.

- Opportunity for the RTA to provide international leadership in air quality management.

3.3 Description of Proposal

The proposed treatment systems would be located at either or both of the two tunnel exhaust stations. Key system components are an air filter, a gas turbine (burning natural gas and generating electrical power) and selective catalytic reducers (SCRs). A flow diagram for the system follows.

Exhaust Treatment System Flow Diagram



All tunnel exhaust air, up to the average daily peak flow, would be drawn through a conventional multi-stage, self-cleaning barrier filter of the type commonly used for gas turbine installations. The dust burdens anticipated are similar to other urban and industrial applications.

After filtering, air would be drawn through up to 3 parallel paths:

- The first path enters a conventional stationary gas turbine generator set. The gas turbine generator would be fuelled by natural gas and generate electricity. The proposal is based on a General Electric LM6000 Sprint model providing up to 45 MW of power at each tunnel exhaust. A number of similar LM6000 machines operate successfully in Australia. The air exits the gas turbine at a temperature of around 450 ^{O}C and is passed through a platinum based catalyst which converts CO to CO_2.
- The second air path bypasses the gas turbine and is mixed with the hot exhaust to produce a combined stream of around 200 ^{O}C. This

combined flow then passes though a selective catalytic reduction system (SCR) comprising a honeycomb of vanadium catalyst which is sprayed with ammonia to reduce NO_x to N_2. This type of SCR is commonly installed on gas turbine power plants in USA and Japan.

- The third air path bypasses both the gas turbine and the SCR, recombining all the air before a final noise attenuator. Air then discharges from a steel-lined exhaust stack at between 100 and 200^{O}C.

For tunnel incident conditions, where a flow greater than the average daily peak is required, an additional bypass around the treatment plant would divert the excess directly to the stack. A conventional natural gas fired burner is included within the duct before the SCR to provide heat input and maintain treatment in circumstances when the gas turbine is not able to run.

The gas turbine generator would be installed in a standard noise attenuating enclosure at grade along with auxiliaries including lubricating oil system, gas compressors and demineralised water plant. Power generated would be stepped up to 33 kV in a dedicated transformer and then supplied to the tunnel distribution system with surplus exported to the local grid.

Natural gas would be provided to each exhaust treatment plant through buried pipe connections to existing nearby natural gas distribution mains.

The treatment system at each end of the tunnel would be self-contained and suitable for unmanned operation under the supervision of trained operators in the central tunnel control room. Installation of the systems could be staged and the benefits demonstrated with the first before implementation of the second.

Routine maintenance of mechanical and electrical plant including pumps, filters and heat exchangers would be conducted overnight or at the weekend by local technicians. The gas turbines require several days shutdown every 2-3 years for inspection and overhaul. This can be scheduled for public holidays or other periods of low traffic flow. Gas turbine maintenance would be contracted to the manufacturer or other specialist provider under a long term service agreement.

Attachment 25 – RTA Assessment of Tenders

This Extract included in Documents provided under Parliamentary Orders would appear to be part of the RTA assessment of options provided by Tenderers including 3 full lanes in the tunnel in each direction.

ENVIRONMENTAL ASSESSMENT OF FEASIBLE OPTIONS

COPY, [signature] 13/5/03

1. Assessment is based upon Three Lane Tunnel Feasible options
2. LCTC Proposal includes the conforming ventilation design provided as an Option
3. TunnelLink Proposal includes the westbound Transit Lane provided as an Option
4. No other Options from the Proponents have been included in this assessment

IMPACT ASSESSMENT	LANE COVE MOTORWAY	TUNNELLINK	LANE COVE EXPRESSWAY	LANE COVE TUNNEL CONSORTIUM
CONCEPT DESIGN				
Tunnel Design	Feasible option provides for three lanes eastbound and westbound along full length of tunnel. A fourth lane is developed in the eastbound tunnel near the eastern tunnel portal to provide access to Pacific Highway.	Feasible option provides for three lanes eastbound from western portal to the diverge lane for access to the Pacific Highway. Two lane tunnel from diverge lane to eastern portal	Feasible option provides for three lanes eastbound from western portal to the diverge lane for access to the Pacific Highway. Two lane tunnel from diverge lane to eastern portal. The Pacific Highway exit ramp, which provides access to the Pacific Highway and the Gore Hill Freeway, includes an additional general traffic lane from the exit tunnel to the Gore Hill Freeway in addition to the transit lane connection provided in the EIS.	Feasible option provides for three lanes along full length. Third eastbound Tunnel lane provides dedicated access to Reserve Road
Surface Roads	Revised design for Pacific Highway interchange provides access to and from the Tunnel and surface roads at single intersection. Access between Tunnel and Epping Road/Longueville Road is not provided at the eastern end.	No impact	The merging of the additional general traffic lane from the Pacific Highway Exit ramp may increase congestion on the Gore Hill Freeway eastbound.	No impact
Impact Assessment	Significant due to revised interchange arrangement.	Minor	Minor	Minor
TRAFFIC AND TRANSPORT				
Tunnel Volumes (AADT)				
Eastbound (EIS 48147)	49484 (+ 3%)	48930 (+2%)	48930 (+2%)	48930 (+2%)
Westbound (EIS 59652)	56452 (-5%)	59634 (-0.03%)	59634 (-0.03%)	59634 (-0.03%)
Total (EIS 107799)	105936 (-2%) **Note: Traffic Figures are based on RTA Trip Tables shows an overall reduction in Tunnel traffic. Proponents traffic modelling would be expected to show an increase.**	108564 (+0.7%)	108564 (+0.7%)	108564 (+0.7%)
Local Traffic Longueville Road				
Eastbound (EIS 30317)	26440 (-12%)	30274 (-0.1%)	30274 (-0.1%)	30274 (-0.1%)
Westbound (EIS 32267)	27679 (-14%)	32291 (0%)	32291 (0%)	32291 (0%)
Total (EIS 62584)	54119 (-13%)	62565 (0%)	62565 (0%)	62565 (0%)
Mowbray Road West				
Eastbound (EIS 19502)	19139 (-2%)	19373 (-0.6%)	19373 (-0.6%)	19373 (-0.6%)
Westbound (EIS 17152)	19382 (+13%)	17183 (+0.2)	17183 (+0.2)	17183 (+0.2)
Total (EIS 36654)	38521 (+5%)	36556 (-0.3%)	36556 (-0.3%)	36556 (-0.3%)
Impact Assessment	Minor due to limited increase in Tunnel traffic movement with reduction in traffic movement on Longueville Road, as access between Tunnel and Lane Cove is removed.	Minor due to limited increase in Tunnel traffic and minor changes on local road.	Minor due to limited increase in Tunnel traffic and minor changes on local road.	Minor due to limited increase in Tunnel traffic and minor changes on local road.
Regional Traffic (Screenlines) See attached Screenline data.	Traffic in AM peak across the western screenline is increased but reduced along the eastern screenline. This indicates a nominal increase in trips are generated, however these have destinations within the Lane Cove area. This redistribution is a result of no provision for access between the Tunnel and the Lane Cove area. Traffic in the PM peak indicates a nominal reduction across the screen lines probably as a result of a preference for the Pacific Highway rather than the Tunnel. The potential for induced traffic across the screen lines is reduced due to the increase in traffic movements on the approach roads. There are some reductions in traffic on the Gore Hill Freeway with this proposal, however, this traffic is generally redistributed to the Pacific Highway north and southbound.	AM screenlines indicate a redistribution of traffic from parallel routes, including Victoria Rd, Delhi Rd and Mowbray Road, to the Epping Road/Tunnel route. Nominal increase in the traffic across the screenlines are indicated. PM screenlines indicate minimal change in the traffic distribution. The potential for induced traffic across the screen lines is reduced due to the increase in traffic movements on the approach roads. However, this may result in increased congestion on the approach and departure sides of the Tunnel.	AM screenlines indicate a redistribution of traffic from parallel routes, including Victoria Rd, Delhi Rd and Mowbray Road, to the Epping Road/Tunnel route. Nominal increase in the traffic across the screenlines are indicated. PM screenlines indicate minimal change in the traffic distribution. The potential for induced traffic across the screen lines is reduced due to the increase in traffic movements on the approach roads. However, this may result in increased congestion on the approach and departure sides of the Tunnel.	AM screenlines indicate a redistribution of traffic from parallel routes, including Victoria Rd, Delhi Rd and Mowbray Road, to the Epping Road/Tunnel route. Nominal increase in the traffic across the screenlines are indicated. PM screenlines indicate minimal change in the traffic distribution. The potential for induced traffic across the screen lines is reduced due to the increase in traffic movements on the approach roads. However, this may result in increased congestion on the approach and departure sides of the Tunnel.
Impact Assessment	Moderate for increased traffic on Longueville Road (E/B and W/B) and Pacific Highway. Impacts reduced slightly by minor reduction in traffic on Gore Hill Freeway E/B, however, Freeway will remain congested	Minor impact due to redistribution of traffic	Minor impact due to redistribution of traffic	Minor impact due to redistribution of traffic
AMBIENT AIR QUALITY ASSESSMENT	Due to minimal changes in tunnel and surface traffic movements the ambient air quality assessment from the EIS assessment are not considered significant.	Due to minimal changes in tunnel and surface traffic movements the ambient air quality assessment from the EIS assessment are not considered significant.	Due to minimal changes in tunnel and surface traffic movements the ambient air quality assessment from the EIS assessment are not considered significant.	Due to minimal changes in tunnel and surface traffic movements the ambient air quality assessment from the EIS assessment are not considered significant.
Impact Assessment	Minor as changes in tunnel traffic and surface traffic will result in little or no change in the ambient pollutant levels in the study area.	Minor as changes in tunnel traffic and surface traffic will result in little or no change in the ambient pollutant levels in the study area.	Minor as changes in tunnel traffic and surface traffic will result in little or no change in the ambient pollutant levels in the study area.	Minor as changes in tunnel traffic and surface traffic will result in little or no change in the ambient pollutant levels in the study area.
URBAN DESIGN	Significant change to the EIS in relation to the eastern tunnel portal with provision for land bridges and revised Pacific Highway intersection arrangement. The revised arrangement has significant visual impact see attached photomontage of interchange design. **Urban Design Assessment Commentary -** Significant redevelopment of proponent's proposal is required from an urban design perspective. Does not meet the RTA Benchmark and would not comply with the Conditions of Approval in current form.	Impacts generally as per the RTA EIS Concept Design. **Urban Design Assessment Commentary -** Would require some redevelopment of proposal from an urban design perspective.	Impacts generally as per RTA EIS Concept Design. Additional paved area with the additional lane on the Gore Hill Freeway from the Pacific Highway Exit ramp. **Urban Design Assessment Commentary -** Meets the RTA benchmark standards	Impacts generally as per the RTA EIS Concept Design. **Urban Design Assessment Commentary -** Meets the RTA benchmark standards
Impact Assessment	Significant due to changes in the Pacific Highway interchange. Note that proponents urban design proposal would require significant modification before it could be included in a displayed environmental assessment. However it is assumed that the urban design would be upgraded to an acceptable level prior to inclusion in a SEIS.	Neutral. However, the proponents urban design proposal would require some modification before it could be included in a displayed environmental assessment.	Neutral	Neutral
SOCIAL IMPACT	Increased impact due to severance of Meriton Apartments with revised Pacific Highway intersection arrangements. Access between Tunnel and Longueville Rd not provided which impacts on local traffic movements.	No impact	No impact	No impact
Impact Assessment	Moderate due to effect on Meriton Apartments and Shore Apartments	Neutral	Neutral	Neutral
PROPERTY IMPACTS	Revised Pacific Highway arrangement removes impact on Alto property, but has significant impact on the frontage of Shore Apartments with removal of large trees and loss of parking spaces.	No additional property impact for additional tunnel works identified.	No additional property impact for additional tunnel works identified.	No additional property impact for additional tunnel works identified.
Impact Assessment	Moderate	Neutral	Neutral	Neutral

ENVIRONMENTAL ASSESSMENT OF FEASIBLE OPTIONS

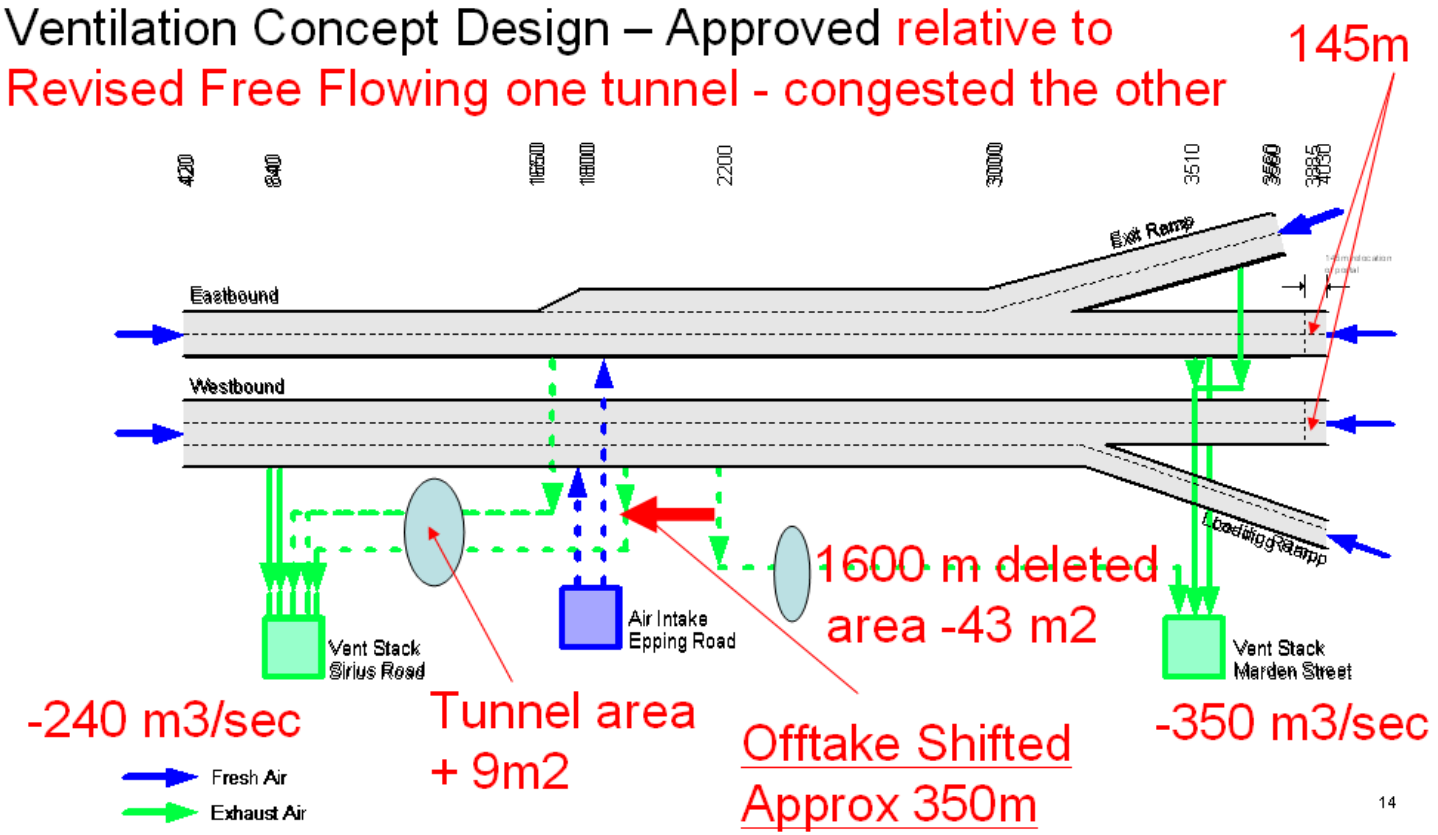
1. Assessment is based upon Three Lane Tunnel Feasible options
2. LCTC Proposal includes the conforming ventilation design provided as an Option
3. TunnelLink Proposal includes the westbound Transit Lane provided as an Option
4. No other Options from the Proponents have been included in this assessment

IMPACT ASSESSMENT	LANE COVE MOTORWAY	TUNNELLINK	LANE COVE EXPRESSWAY	LANE COVE TUNNEL CONSORTIUM
WASTE MINIMISATION AND MANAGEMENT (EIS 750,000 m3)	Estimated volume 700,000 m3. Feasible option includes three lanes for full length. Lower estimated volume of waste material due to shorter tunnel.	Estimated volume 900,000 m3. Estimated increase with three lane tunnel 37,000 m3.	Estimate Volume 800,000 m3. Estimated increase with three lane tunnel 20,000 m3.	Estimated Volume 800,000 m3. Estimated increase with three lane tunnel 24,000 m3.
Impact Assessment	Minor improvement as tunnel is shorter resulting in reduced spoil. However potentially, for the purpose of impact assessment, it is assumed that the lower estimated volume of waste material is offset by additional truck movements for construction and urban design requirements of the landbridges.	Moderate as spoil amounts 20% higher than EIS levels, although minimal increase for three lane tunnel, this will result in a reasonable increase in truck movements	Minor as spoil amounts similar to EIS levels and minimal increase for three lane tunnel will result in only minor increase in truck movements	Minor as spoil amounts similar to EIS levels and minimal increase for three lane tunnel will result in only minor increase in truck movements
NOISE AND VIBRATION	Minor potential increase in vibration during construction due to additional excavation. Proposal indicates a reduction in noise levels.	Minor potential increase in vibration during construction due to additional excavation. Minimal change in noise levels during construction and operation.	Minor potential increase in vibration during construction due to additional excavation. Minimal change in noise levels during construction and operation.	Minor potential increase in vibration during construction due to additional excavation. Minimal change in noise levels during construction and operation.
Impact Assessment	Minor	Minor	Minor	Minor
VENTILATION DESIGN				
In-Tunnel Air Quality	The minimal change in the AADT traffic volumes indicate no change in the impacts for in-tunnel air quality.	The minimal change in the AADT traffic volumes indicate no change in the impacts for in-tunnel air quality.	The minimal change in the AADT traffic volumes indicate no change in the impacts for in-tunnel air quality.	The minimal change in the AADT traffic volumes indicate no change in the impacts for in-tunnel air quality.
Stack Emissions	The minimal change in the AADT traffic volumes indicate no change in the impacts for stack emissions from the Tunnel.	The minimal change in the AADT traffic volumes indicate no change in the impacts for stack emissions from the Tunnel.	The minimal change in the AADT traffic volumes indicate no change in the impacts for stack emissions from the Tunnel.	The minimal change in the AADT traffic volumes indicate no change in the impacts for stack emissions from the Tunnel.
Impact Assessment	Neutral or very minor impact as tunnel volumes do not change significantly	Neutral or very minor impact as tunnel volumes do not change significantly	Neutral or very minor impact as tunnel volumes do not change significantly	Neutral or very minor impact as tunnel volumes do not change significantly
HERITAGE	No impact	No impact	No impact	No impact
Impact Assessment	Neutral	Neutral	Neutral	Neutral
FLORA AND FAUNA	Impact with the removal of large trees from the frontage of the Shore Apartments	No impact	No impact	No impact
Impact Assessment	Minor	Neutral	Neutral	Neutral
CONSTRUCTION	The Feasible Option can be constructed within the original project timeframe. The construction of the revised Pacific Highway interchange could be anticipated to result in significantly increased impacts on the Pacific Highway and Gore Hill Freeway and the surrounding community.	The Feasible Option can be constructed within the original project timeframe	The construction of the Feasible Option would increase the construction duration by 2 months from 37 months to 39 months.	The construction of the Feasible Option may increase the construction duration by one (1) month from 38 months to 39 months. This advice is provided by the Proponent based upon acceptance of the three lane eastbound tunnel in association with works included in other Options.
Impact Assessment	Moderate due to construction at Pacific Highway	Neutral	Very minor	Very minor
PUBLIC TRANSPORT	Potential minor modal shift from public transport to motor vehicle transport.	Potential minor modal shift from public transport to motor vehicle transport.	Potential minor modal shift from public transport to motor vehicle transport.	Potential minor modal shift from public transport to motor vehicle transport.
Impact Assessment	Very minor	Very minor	Very minor	Very minor
OTHER COMMENTS	Consideration by Proponent on environmental assessment required for the revised Pacific Highway interchange indicates a Review of Environmental Factors would be adequate and an EIS is not required.	Tunnellink, on advice, undertake action to obtain environmental approval. Anticipates 9 months for EIS based upon full Enhanced Proposal.		Consideration by Proponent on environmental assessment required for the relocation of the Reserve Road ramps indicates a Review of Environmental Factors would be adequate and an EIS is not required..

NOTE:

Development of the link between the M2 and the Gore Hill Freeway has evolved over 10 years of consultation with the community. During this period the project has progressed from surface road options to providing a full length tunnel with 2 lanes at the tunnel entrance portals. The community has had a long standing position of preferring a three lane tunnel configuration, as it is anticipated that this would further remove traffic from Epping Road/Longueville Road in Lane Cove. Gore Hill Freeway residents primary issue is management of existing and future noise levels. Increased capacity/traffic in the tunnel (albeit of minimal significance) is likely to result in a perception of reduced air quality from increased emissions leading to greater public demand for filtration.

Attachment 26 – Diagram Outlining Changes in Ventilation



Attachment 27 – List of Modifications Approved by Minister April 2004

03.034 LCT

Dep
Infr

ref: para 107a

Cove Tunnel Lobbying

Contact:
Phone:
Fax: 02 9762 8707
Email: lisa.mitchell@dipnr.nsw.gov.au

Our ref: S03/02765
Your ref:
File: notification letter Forward.doc

Mr Paul Forward
Chief Executive
Roads and Traffic
PO Box K198
HAYMARKET NSW

Dear Mr Forward

Subject: Proposed Modification to the Minister's Approval for the Lane Cove Tunnel

I refer to your letter concerning modification under Section 115BAA of the Environmental Planning and Assessment Act 1979 to the approval for the proposed Lane Cove Tunnel and Associated Road Infrastructure.

I have prepared a report about the proposal for the Minister's consideration. Please find enclosed a copy of the report for your information. It recommends that the proposed modification be approved.

In making his decision on the proposed modification, the Minister will take into account the Director General's Report.

Yours sincerely

SHaddad

Sam Haddad
Deputy Director General
Department of Infrastructure, Planning and Natural Resources

8.3.2004

Henry Deane Building 20 Lee Street GPO Box 3927 SYDNEY 2000
Phone 9762 8000 www.dipnr.nsw.gov.au

Office of Sustainable Development Assessments and Approvals

DIRECTOR-GENERAL'S REPORT – MINOR MODIFICATION TO APPROVAL FOR LANE COVE TUNNEL

Background

The NSW Roads and Traffic Authority (RTA) has requested minor modifications to the approval for the *Lane Cove Tunnel and Associated Road Improvements* granted by the Minister on 3 December 2002. Modifications are sought to amend minor editorial errors and apparent misdescriptions in a number of conditions relating to pre-construction requirements. There is also an apparent misdescription relating to emergency discharge (of emissions) from the tunnel. The RTA's request is attached, tagged "A". This Director-General's report is prepared in accordance with Section 115C (1B) of the *Environmental Planning and Assessment Act 1979.*

Editorial Errors

The RTA requested that editorial errors be amended in Conditions of Approval Nos 117, 155, 164, 174, 178 and 226. These are all related to incorrect cross-referencing to figures, conditions, tables and EPA Approved Methods. The proposed amendments as outlined in Table 1 would provide clarity and reinforce the intended outcome of the conditions.

Construction Commencement Related Conditions

The existing instrument of approval defines the term "substantial construction". This was intended to enable minor site preparation works to proceed ahead of substantial construction where no or minimal environmental impact is likely. Numerous conditions require sub plans or other mitigation measures to be prepared or implemented prior to **construction**, the intent was that these plans be in place prior to those activities which could have a significant environmental impact rather than any construction activities. Unchanged, this could cause major delays to construction commencement and programming.

The requested changes to the approval would result in sub-plans being required prior to "substantial construction" instead of prior to construction as currently stated. The glossary to the Instrument of Approval defines "substantial construction" as follows:

> *"does not include survey, acquisitions, fencing, test drilling/test excavations, building/road dilapidation surveys, minor surveys, minor clearing except where endangered ecological communities or threatened flora and fauna species would be impacted, establishment of site compounds in generally cleared, highly disturbed or non-environmentally sensitive areas, minor access roads, minor adjustments to services/utilities, noise mitigation measures and other minimal environmental/community impact activities."*

The intent of including this definition was to allow those activities with low environmental risk to proceed prior to determination and implementation of mitigation measures and safeguards required to manage the impacts of "substantial construction". In drafting the conditions, the term "construction", which is not defined, has been mistakenly used. By using this term in the conditions outlined in Table 2, it suggests that these should be fulfilled prior to ANY works commencing on site. However, these conditions generally relate to the preparation of environmental management plans and sub-plans or installation of measures to manage impacts, these clearly would not be required until prior to commencement of "substantial construction" when impacts are anticipated to occur.

Therefore, the Department considers these to be minor errors. The amendment of the conditions as outlined in Table 2 refer to "substantial construction" rather than construction would clarify the intent of the conditions.

Condition 152

clarification is required for the conditions under which portal emissions are permitted. To this end, the RTA has suggested the following modification with the proposed amendments shown in **bold**:

"152. *The tunnel ventilation system shall be designed, constructed and operated to avoid emissions of tunnel air from the portals. Portal emissions are not permitted except in the following circumstances:*

(a) emergency situations and/or where emergency personnel are involved;
(b) accidents and genuine breakdowns inside the tunnel;
(c) major maintenance periods where it can be demonstrated that the in-tunnel CO requirements specific in Table 2 cannot be met; and
(d) any other situations approved by the Director-General in consultation with the DoH, EPA and the AQCCC.

If portal emissions are required as a result of any of the above events occurring, all practical measures shall be taken to minimise ***air quality impacts and the period (duration) of portal emissions shall be limited to that necessary until normal traffic operations resume."***

The Department concurs with the proposed modification which requires that any portal emissions would be limited to particular events relating to maintenance, emergency situations and incidents. In the event of any of these circumstances occurring, the Proponent must put in place all practical measures to minimise air quality impacts.

Condition 175

The RTA also identified an apparent misdescription in Condition of Approval No. 175. The condition currently reads:

"175. *Conditions 169 and 170, do not apply:*

(a) in an emergency to prevent damage to life or limb other than an emergency arising from a negligent act or omission from the Proponent. The Proponent shall as soon as is reasonably practicable, notify the Director-General and the EPA of any such discharge.

(b) as a result of an incident (not including congestion in the tunnel), which is beyond the control of the Proponent or the tunnel operator and could not have been prevented by taking those steps which a prudent, experienced and competent operator would have taken.

Condition 160 and 161 apply in (a) but NOT in (b).

The Proponent shall, as soon as reasonably practicable, notify the Director-General and the EPA of any such discharge.

"

Note:	*Any exceedance of the goals or limits in conditions 160, 161, 169 and 170 which result from a negligent act by the Proponent/Company irrespective of potential damage to life or limb is a breach of these Conditions of Approval.*

As currently written this condition states that in-tunnel individual and single point exposure criteria for carbon monoxide **do apply** in an emergency unless the proponent is at fault **but do not apply** during an incident (except traffic congestion) which is beyond the control of the operator and could not have been prevented by a competent operator.

The RTA contends that there is an apparent error in the reference "*Condition 160 and 161 apply in (a) but NOT in (b)*" that permits in-tunnel air quality limits to be exceeded in the context of an incident but not in an emergency and that this is anomalous. It is submitted that the intention of the condition

was to remove the application of the limits specified in Condition 160 and 161 in emergency

The Department concurs with the RTA's submission that the intention of the condition was to remove the application of the limits specified in Conditions 160 and 161 in the case of a fire emergency attended by the emergency services but not under any other circumstances. To correct the misdescription, the RTA proposes the following modification to Condition 175 as follows (with amendments shown in **bold)**:

"175. Conditions 169 and 170, do not apply:

(a) in an emergency to prevent damage to life or limb other than an emergency arising from a negligent act or omission from the Proponent or tunnel operator.

(b) as a result of an incident (not including congestion in the tunnel), which is beyond the control of the Proponent or the tunnel operator and could not have been prevented by taking those steps which a prudent, experienced and competent operator would have taken.

Condition 160 and 161 apply in (a) ***but not in a fire emergency attended by the emergency services and in (b) including for situations of congestion in the tunnel.***

The Proponent shall , as soon as reasonably practicable, notify the Director-General and the EPA of any such discharge."

Note:	*Any exceedence of the goals or limits in conditions 160, 161, 169 and 170 which result from a negligent act by the Proponent/Company irrespective of potential damage to life or limb is a breach of these conditions of approval.*

Conclusion

In the case of conditions 117, 155, 164, 174, 178 and 226, the editorial amendments will have no impact upon the desired outcomes but will seek to rectify the errors in cross-referencing.

It is considered that the changes requested to those conditions relating to construction commencement would serve to reflect the purpose of the various conditions by ensuring that all mitigation measures and safeguards have been considered and implemented prior to substantial construction commencing, when impacts are anticipated to occur. The Department considers that the proposed amendments requested are minor in nature and closely reflect the purpose and intent of the Conditions of Approval.

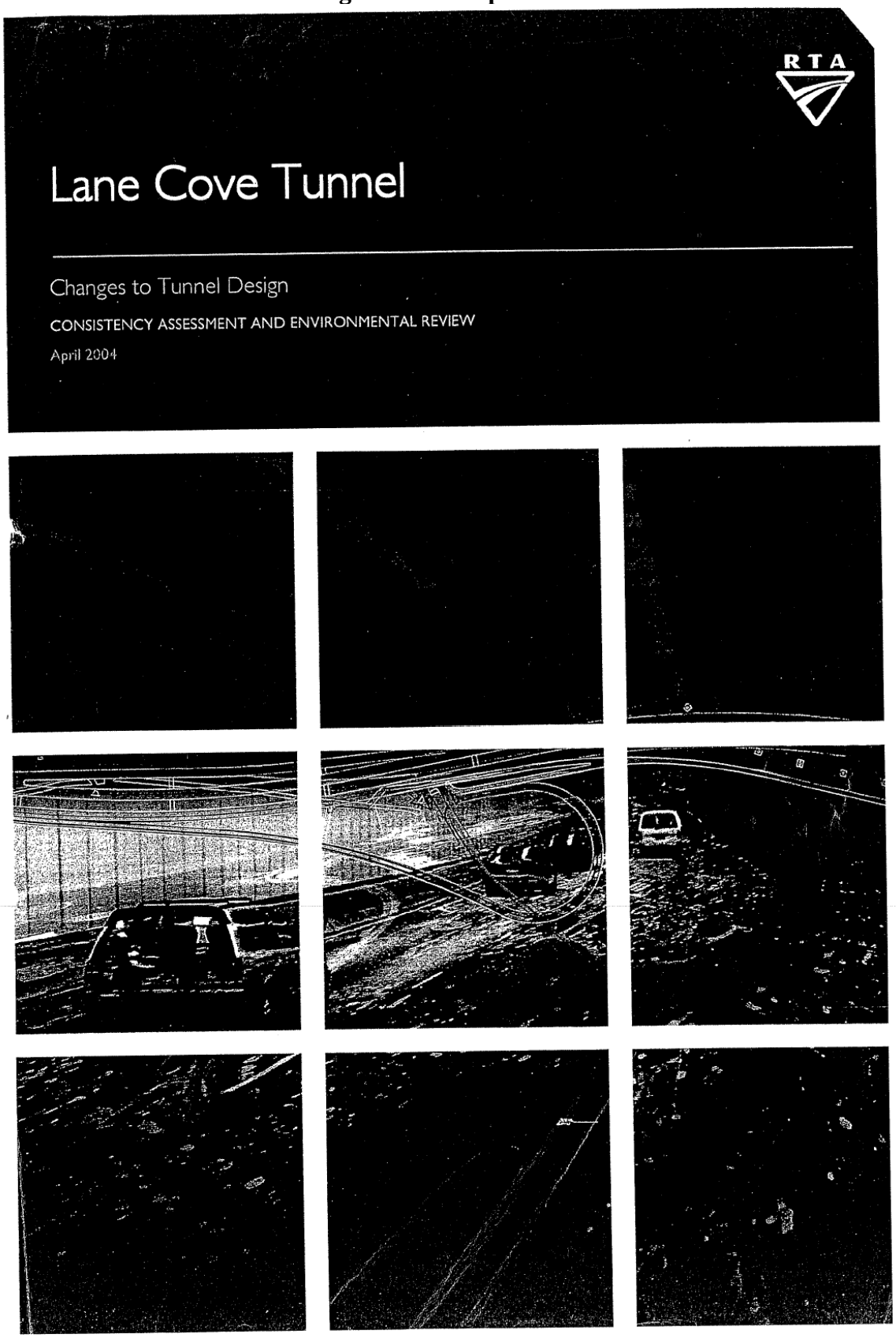
Proposed amendments to condition 152 would clarify the circumstances under which portal emission would be permissible and how these should be managed.

Proposed changes to condition 175 would rectify an apparent misdescription by requiring that in-tunnel carbon monoxide (CO) individual and single point exposure criteria (conditions 160 and 161) be met at all times, except in the case of a fire emergency which is attended by the emergency services.

Sam Haddad
Deputy Director General
Department of Infrastructure, Planning and Natural Resources
as delegate for the Director General

Table 2 not included

Attachment 28 - RTA Consistency Assessment and Environmental Review Changes to Tunnel Design dated 28 April 2004



COPY

Document Controls

Business Unit	Lane Cove Tunnel Team		
Project No.			
Document description	Lane Cove Tunnel – Tunnel Changes Consistency Assessment and Environmental Review.		
	Name	Signed	Date
Reviewing Manager	Geoff Cahill		27.4.04
Approving Manager	John Anderson		28.4.04

Person managing this document	Person(s) writing this document
Geoff Cahill	Caitlin Richards

Location	File
G:/Environmental Management/Additional Environmental Assessments/Reserve Road	04M5 Pt 1

Client Reference	Status	Date
	Final	15 April 2004

Prepared for:	Prepared by:
John Anderson Project Services Manager Lane Cove Tunnel 7 Sirius Road, Lane Cove West	Client Environmental Services 81 Flushcombe Road, Blacktown

1. Introduction

1.1 Background

This Consistency Assessment and Environmental Review addresses the potential environmental impacts of a proposal to:

- Redirect the exhaust ventilation tunnel, connecting to approximately the mid point of the westbound tunnel, from the eastern ventilation stack to the western ventilation stack and construct a new ventilation tunnel connecting the Pacific Highway exit ramp directly to the ventilation tunnel connecting to the eastern ventilation stack;
- Achieve flatter mainline tunnel gradients between the Lane Cove River and Stringybark Creek; and,
- Relocate the eastern tunnel portals 145 metres to the east.

The Lane Cove Tunnel project contract includes the design, construction, maintenance and operation of a 3.6 km twin two to three lane tunnel from Mowbray Rd West to the Gore Hill Freeway, Artarmon. All approved works are detailed in Section 7 of the Lane Cove Tunnel Representations Report (RTA 2002) (the Representations Report) and duplicated within the Preferred Activity Report (the PAR) for the project dated July 2002.

With relevance to this Consistency Report, the main focus of the proposed design change involves improving the operation and level of service of the mainline tunnels, reducing the amount of spoil generated by tunnelling and minimising geotechnical and constructability issues.

The Lane Cove Tunnel is an activity under Part 5 of the Environmental Planning and Assessment Act 1979 (EP&A Act). The following process of consultation, assessment and approval has been completed:

- The RTA exhibited an Environmental Impact Statement (the EIS), prepared by Sinclair Knight Merz (2001), between 8 November and 1 February 2002;
- Three Hundred and Forty (340) representations were considered and the Representations Report was prepared;
- After preparing the Representations Report, the RTA requested approval for the activity from the then Minister for Planning (now the Minister for Infrastructure and Planning). The Minister approved the activity on 3 December 2002, subject to 259 Conditions; and
- The Chief Executive of the RTA decided to proceed with the Lane Cove Tunnel on 13 December 2002, as per the PAR.

Relevant features of the approved concept design as detailed in the Preferred Activity Report are summarised below:

- A ventilation concept design with tunnel air extraction points in both the eastbound and westbound tunnels and exhaust tunnels that connect the air extraction points to the main exhaust tunnels leading to the western and eastern ventilation stacks respectively. Air from the Pacific Highway exit ramp would be forced down the ramp against traffic flow to be exhausted via the mainline tunnel;
- Relatively steep mainline tunnel gradients between the Lane Cove River and Stringybark Creek; and,
- Main tunnels connecting to the Gore Hill Freeway on the western side of the Reserve Road entry/exit ramps approximately 100 metres to the east of the existing south facing Pacific Highway exit viaduct, requiring 135 metres of cut and cover tunnel construction for each tunnel.

Plans detailing the approved ventilation concept design and tunnel profiles are shown in Appendix A.

1.2 Procedures to Modify the Lane Cove Tunnel Proposal

1.2.1 Part 5 Activity

Environmental Assessment for the Lane Cove Tunnel was undertaken in accordance with the provisions of Part 5 of the EP&A Act. Section 115BA of the EP&A Act regulates the modification of an approval. The RTA's *Environmental Impact Assessment Guidelines* (2001) provides relevant decision paths. Figure 5 from the Guidelines is shown over page as Figure 1. The RTA may modify the approved activity without the need to obtain the Minister's approval to a modification, if the activity as modified would be consistent with the Minister's approval and the RTA has considered the environmental impact of the modification of the activity in accordance with Section 115BA(4) of the EP&A Act.

1.2.2 Objectives of the Consistency Assessment

Specific objectives of this Consistency Assessment and Environmental Review are to:

- To examine and take into account to the fullest extent possible all matters affecting or likely to affect the environment by reason of the proposed modifications in accordance with Section 111 of the EP&A Act;
- To assess whether the Lane Cove Tunnel project as modified will be consistent with the Minister's approval and Conditions of Approval within the meaning of Section 115BA(3) of the Act;
- Ensure compliance with all statutory requirements; and,
- Ensure compliance with the Minister's approval and Conditions of Approval relevant to the proposed modification.

2. Description of Proposed Modification

2.1 Project Objectives

The EIS identified many objectives of the Lane Cove Tunnel project, which was designed to improve road transport for this region of Sydney, whilst contributing to an improvement in the local environment for communities, as detailed in Section 1.4 of the EIS. In summary, the overall objectives of the project were to:

- To improve travel efficiency for all east-west road based transport modes;
- To improve air quality and reduce traffic noise through a reduction in traffic volumes and congestion;
- To improve the amenity of the local community and business;
- To improve the operation of road based public transport for people in north-western Sydney and along the corridor;
- To improve safety, access and connectivity for pedestrians and cyclist; and,
- To minimise impacts on the natural environment during both the construction and operation phases of the project.

The following three revisions to the concept design for the tunnels have been identified to better achieve the project objectives given above:

- Redirection of the exhaust ventilation tunnel, connecting to approximately the mid point of the westbound tunnel, from the eastern ventilation stack to the western ventilation stack and construct a new ventilation tunnel connecting the Pacific Highway exit ramp directly to the eastern ventilation stack;
- Flatter mainline tunnel gradients between the Lane Cove River and Stringybark Creek; and,
- Relocation of the eastern portals 145 metres to the east.

The justifications and a description of the proposed changes are given below in Sections 2.2 to 2.4 of this Report.

2.2 Changes to Exhaust Tunnels

In representations to the EIS concern was raised regarding the potential for Carbon Monoxide (CO) and visibility issues in the tunnel during congested traffic conditions. The RTA modified the ventilation design during the Director-General's assessment to include the following elements:

- tunnel air extraction points at approximately the mid point in both the eastbound and westbound tunnels and exhaust tunnels that connect the air extraction points to the main exhaust tunnels leading to the western and eastern ventilation stacks respectively; and,
- Air from the Pacific Highway exit ramp would be forced down the ramp against traffic flow to be exhausted via the eastbound mainline tunnel;

During the request for proposals and evaluation of proposals phases, the Lane Cove Tunnel Company reviewed the approved concept design and noted that the lengths of the additional exhaust tunnels connecting the air extraction points to the ventilation stakes could be rationalised. The Lane Cove Tunnel Company investigated design refinements to reduce the amount of tunnelling required.

This was undertaken with the following objectives in mind:

- Reduce the amount of tunnel spoil generated;
- Minimise impacts on surface development potential; and,
- Maintain or reduce the environmental impacts of any works as compared to the concept contained in the PAR.

These objectives are consistent with the objectives of the total project as stated in Section 1.4 of the EIS and outlined in Section 2.1 of this Report.

A number of options were assessed by the Lane Cove Tunnel Company, and a preferred design was submitted to the RTA for review. Following assessment and discussions with the Lane Cove Tunnel Company, it was concluded that the proposed design change would be an improvement over the approved design for the exhaust tunnels.

The proposed change would be an improvement due to:

- Reductions in tunnel spoil generation;
- Improvements in surface development potential; and,
- The reduced impact of this option on the environment and, in particular, the geotechnical profile and reduced traffic and spoil management impacts.

The adoption of the proposed change would result in the following changes:

- Redirection of the exhaust ventilation tunnel, connecting to approximately the mid point of the westbound tunnel, from the eastern ventilation stack to the western ventilation stack; and,
- Construction of a new ventilation tunnel connecting the Pacific Highway exit ramp directly to the ventilation tunnel connecting to the eastern ventilation stack;

The introduction of a ventilation tunnel from near the portal of the Pacific Highway exit ramp is an improvement to the ventilation system design allowing exhaust air to be extracted direct to the eastern ventilation stack rather then forcing air down the ramp against traffic flow to be exhausted via the mainline tunnel to the eastern ventilation stack.

All connections and capacities of the approved concept design are maintained. A plan detailing the revisions to the ventilation concept design is given in Appendix A.

2.3 Changes to Tunnel Gradient at the Western End of the Route

Under the approved project, the main tunnel gradients increase sharply between the Lane Cove River and Stringybark Creek. Traffic modelling studies undertaken as part of the EIS showed that the tunnel gradients in this section would necessitate slower entry and exit speeds, particularly in the case of heavy vehicle traffic. Although the approved concept design met the relevant standards, these steep gradients increased the potential for accidents in this precinct, when compared to other sections of the tunnel.

During the request for proposals and evaluation of proposals phases, the Lane Cove Tunnel Company reviewed the approved concept design. The Lane Cove Tunnel Company investigated the potential for flatter gradients in this precinct. This was undertaken with the following objectives in mind:

- Improve traffic safety;
- Improve the operation and level of service of the mainline tunnels; and,
- Maintain or reduce the environmental impacts of any works as compared to the concept contained in the PAR.

These objectives are consistent with the objectives of the total project as stated in Section 1.4 of the EIS and outlined in Section 2.1 of this Report.

A number of options were assessed by the Lane Cove Tunnel Company, and a preferred design was submitted to the RTA for review. Following assessment and discussions with the Lane Cove Tunnel Company, it was concluded that the proposed design change would be an improvement over the approved design.

The proposed change would be an improvement due to:

- Improved traffic safety;
- Improved operation and level of service of the mainline tunnels; and,
- The reduced impact of this option on the environment.

The adoption of the proposed change would result in reductions in the maximum tunnel gradients from 6.5% to 4.6% between the Lane Cove River and Stringybark Creek.

All capacities of the approved concept design are maintained.

2.4 Relocation of the Eastern Portals

Under the approved project, the main tunnels connect to the Gore Hill Freeway on the western side of the Reserve Road entry/exit ramps approximately 100 metres to the east of the existing south facing Pacific Highway exit viaduct, requiring 135 metres of cut and cover tunnel construction for each tunnel. The EIS noted that the tunnels would enter Ashfield Shale at the eastern end of the route, around the eastern portal, and concluded that more extensive roof support will be required in this rock than in the sandstone portions of the route.

During the request for proposals and evaluation of proposals phases, the Lane Cove Tunnel Company reviewed the approved concept design and noted the geotechnical constraints posed by the Ashfield Shale. The Lane Cove Tunnel Company also noted that construction of the approved concept design would require cut and cover tunnel construction under the south facing Pacific Highway exit viaduct necessitating piling works in this precinct and concluded that a standard 12 metre piling rig could not fit under the viaduct. The Lane Cove Tunnel Company investigated design refinements to reduce these constraints. This was undertaken with the following objectives in mind:

- Improve the geotechnical profile;
- Reduce construction constraints; and,
- Maintain or reduce the environmental impacts of any works as compared to the concept contained in the PAR.

These objectives are consistent with the objectives of the total project as stated in Section 1.4 of the EIS and outlined in Section 2.1 of this Report.

A number of options were assessed by Lane Cove Tunnel Company and a preferred design was submitted to the RTA for review. Following assessment and discussions with the Lane Cove Tunnel Company, it was concluded that the proposed design change would be an improvement over the approved design for the eastern portals.

The proposed change would be an improvement due to:

- More stable geotechnical profile;
- Improved constructability; and,
- The reduced impact of this option on the environment, particularly in relation to enhanced urban design opportunities.

The adoption of the proposed change would result in the relocation of the mainline tunnel cut and cover portals (eastbound and westbound) approximately 145 metres to the east in less depth of fill. The length of cut and cover tunnel construction required would increase from 135 metres to 255 metres for the eastbound tunnel and 280 metres for the westbound tunnel (an increase of 120 metres and 145 metres respectively).

All connections and capacities of the approved concept design are maintained and no additional land take would be required.

Plans comparing the proposed revisions to the approved concept design as described above are included at Appendix A.

3. Evaluation of Consistency with the Approved Project

3.1 Consistency with Character and Essence of Approved Activity.

The proposed modification would change the vertical and horizontal alignments of the mainline tunnels, relocate the eastern portals 145 metres to the east and shorten the length of the required exhaust tunnels.

The essence of the Lane Cove Tunnel is the provision of twin two to three lane tunnels from Mowbray Road West to the Gore Hill Freeway with associated road improvements.

The proposed revisions to the concept design provides a solution that achieves an overall improved level of service for the mainline tunnels, minimises the amount of excavation required to construct the required exhaust tunnels and minimises geotechnical constraints at the eastern end of the tunnel route. The proposed revisions to the concept design would not change the character or essence of the Lane Cove Tunnel project or involve any significant transformation of the approved activity. The revised concept design represents changes in the relative detail of the project taken as a whole and does not significantly transform it.

3.2 Consistency with Impacts of the Approved Activity.

The proposed revisions to the concept design would result in additional benefits and impacts. These benefits and impacts relate to operational air quality, geotechnical considerations, soil and waste, traffic, noise generation, visual impacts and urban design and landscaping. The impacts are considered to be of a very minor nature and it is not believed that they would be greater than those impacts already described in the PAR. In terms of construction traffic and spoil management, operational road traffic noise and visual amenity for surrounding residences and commercial properties, there are reductions in impacts. In terms of operational air quality, overall the emissions from the tunnel are estimated to reduce under the revised concept design, largely because the slight increase in emissions in the tunnel due to the increase length of the tunnel are offset by the improvements to the tunnel gradient. There is also no significant change in air quality experienced by a receptor at ground level from both the eastern and western ventilation stacks due to effective dispersion from the ventilation stacks compared with dispersion from surface roads. All of the potential impacts have been addressed in detail in Section 4 of this Report.

3.3 Consistency with the Minister of Infrastructure and Planning Approval.

The Lane Cove Tunnel Conditions of Approval require that the Lane Cove Tunnel Project be constructed in accordance with the proposal as described in the EIS and Representations Report. There are no specific Conditions of Approval for the project that are inconsistent with the proposed revisions to the concept design. However, some conditions relate specifically to the Gore Hill Freeway and the tunnelling works, in particular Conditions of Approval 3, 87, 150 - 175, 182, 186 –204, 225, 227, 231 and 232. A summary of the requirements of these Conditions of Approval and the RTA response in light of the proposed revisions to the concept design are detailed below:

3.3.1 Condition of Approval No. 3

The Tunnel, Falcon Street ramps and Gore Hill Freeway widening shall be opened to traffic concurrently.

The revised concept design would not change the proposed staging for the opening of the project. The Gore Hill Freeway widening would be opened in conjunction with the Lane Cove Tunnel and the Falcon Street Ramps.

3.3.2 Condition of Approval No. 87

Preparation of Detailed Urban Design and Landscape Sub Plans

Detailed Urban Design and Landscape Sub Plans will be prepared in accordance with the requirements of this Condition taking into account the revised concept design.

3.3.3 Conditions of Approval Nos. 150-175

Operational air quality requirements including physical requirements, emission limits and monitoring specifications

The proposed revisions to the approved concept design including the changes to tunnel gradients and the rationalisation of the ventilation exhaust tunnels would not effect the requirements or implementation of these Conditions. Under the Deed, the Lane Cove Tunnel Company's final design is required to meet the requirements of these Conditions.

3.3.4 Condition of Approval No. 182

Any air intake required for the tunnel ventilation system shall be located on the RTA owned land at 130-132 Epping Road or any other location as agreed by the Director-General following further assessment. The proponent shall design the air intake to maximise the undergrounding of the facilities in consultation with nearby residents and Lane Cove Council.

The proposed revisions to the approved concept design would not impact on the fresh air intake or the requirements of this Condition.

3.3.5 Condition of Approval No. 186

Regenerated noise from construction works shall not exceed the following criteria as measured at the nearest sensitive receptor:

(a) LAeq(15 min) 40 dB(A) between the hours of 6:00 pm and 10:00 pm; and
(b) LAeq (15 min) 35 dB(A) between the hours of 10:00 pm and 7:00 am

If any exceedances are proposed they must be fully justified, prior to undertaking the work, through a detailed noise impact assessment report prepared by a qualified acoustic specialist.

The noise impact assessment report shall be prepared in consultation with the EPA and the proposed works must not be commenced without the prior approval of the EPA.

The proposed revisions to the approved concept design would not affect the application of the regenerated noise limits specified in this Condition. Overall, regenerated noise would be reduced under the proposed revisions to the approved concept design.

3.3.6 Conditions of Approval Nos. 187 and 225

Operational noise mitigation measures and limits including noise limits applicable to the tunnel ventilation system

The noise mitigation measures and limits outlined in these Conditions and the noise policies referenced will be maintained under the revised concept design.

3.3.7 Condition of Approval No. 188

The Proponent shall undertake further assessment of tunnel drainage including fire water management prior to construction and operation of the Tunnel to the satisfaction of the Director-General. The assessment

shall include but not be limited to identification of anticipated runoff volumes, runoff treatment options and the potential impacts of runoff discharge into Stringybark Creek from a hydraulic/hydrological and environmental perspective.

The proposed revisions to the approved concept design including the changes to tunnel gradients and the resultant relocation of the eastern portals 145 metres to the east will not affect the requirements of this Condition. In particular, it is noted that the revised concept design would not alter runoff discharge to Stringybark Creek.

3.3.8 Conditions of Approval Nos. 189 – 204

Construction and operational requirements covering geotechnical investigation and modelling, dewatering analysis, total maximum settlement limits and mitigation and management focusing on minimising the potential for property damage.

The proposed revisions to the approved concept design would reduce geotechnical constraints. While the tunnels would be slightly shallower between the Lane Cove River and Stringybark Creek, the tunnels would pass through strong and stable Hawkesbury Sandstone in this area.

3.4 Benefits and Impacts of the Proposed Modification.

The proposed revisions to the concept design provide a solution that achieves an overall improved level of service for the mainline tunnels, minimises the amount of excavation required to construct the required exhaust tunnels and minimises geotechnical constraints at the eastern end of the tunnel route. The proposed revisions to the concept design would reduce the impact on the environment and, in particular, the construction traffic impacts and spoil management and visual amenity.

3.5 Overall Consistency of the Proposed Modification with the Approved Activity.

The proposed revisions to the ventilation design, mainline tunnel gradients and resultant relocation of the eastern portals would be consistent with the overall scheme for the Lane Cove Tunnel Project as outlined in the EIS, the Representations Report, PAR and the requirements of the Lane Cove Tunnel Conditions of Approval. The revisions to the concept design outlined in this Report would not have impacts on the environment that have not already been generally addressed in the EIS, Representations Report and PAR. Measures contained in the PAR and Conditions of Approval would adequately mitigate any minor change in the overall impacts of the Project. For further discussion of potential impacts refer to Section 4 of this Report.

4. Environmental Review

In accordance with the statutory requirements, the EIS and the Representations Report addressed the environmental impacts of the Lane Cove Tunnel Project and outlined mitigation measures to reduce these impacts. Reference should be made to the EIS and Section 7 of the Representations Report when reading this Section. The Representations Report provides a framework for the management of environmental impacts associated with the Lane Cove Tunnel Project. The additional potential impacts relevant to the proposed modification are addressed below.

4.1 Operational Air Quality

The RTA commissioned Holmes Air Sciences to assess the changes in operational air quality impacts associated with the proposed revisions to the concept design. This assessment has been done using the same modelling approach that was used to assess the effects of the approved design.

The assessment shows that there will be changes in emissions from the east and west ventilation stacks due to the revisions to the tunnel design. Emissions from the western ventilation stack will rise and emissions from the eastern ventilation stack will be reduced. The changes will be greatest for CO emissions in the peak hours. Dispersion modelling for the revised concept design indicates that the resulting changes to air quality impacts in the study area would be insignificant. A copy of Holmes Air Sciences' Report is attached at Appendix C.

Operational air quality impacts would be managed in accordance with the requirements of Condition of Approval Nos. 150 to 182.

4.2 Geotechnical Considerations

The EIS stated that the bulk of the tunnelling is expected to be within fresh strong sandstone which would require minimal roof support. However, the EIS noted that the mainline tunnels will enter Ashfield Shale around the approved location of the eastern portals and the weathered shale and quarry backfill (filling a disused brick pit located under the alignment of the Gore Hill Freeway) would require continuous roof support.

The changes to mainline tunnel gradients between the Lane Cove River and Stringybark Creek will not alter the predicted geotechnical profile as the depth of the tunnel would only be slightly reduced and contained within Hawkesbury Sandstone. The changes to the mainline tunnel gradients at the eastern extent of the route and the alterations to the ventilation exhaust tunnels will however improve tunnelling conditions. The proposed revisions to the ventilation exhaust tunnels would connect both the air extraction points near mid tunnel to the Sirius Road ventilation stack and the Pacific Highway exit ramp directly to the eastern ventilation stack. This would avoid the need to construct the required ventilation exhaust connection through the Ashfield Shale area found at the eastern extent of the tunnel route, thus minimising the geotechnical constraints posed by this area.

It is also noted that the reduced length of exhaust tunnelling required under revised concept design would minimise the limits to development potential associated with tunnelling under buildable land.

4.3 Soil and Waste Removal

The relocation of the eastern portals and changes to the ventilation exhaust tunnels would reduce the overall amount of spoil generated when compared to the PAR proposal. While the 120 to 145 metres of additional cut and cover tunnel construction required at the eastern end of the route of each of the mainline tunnels would result in slight increases to spoil generation, the reductions in the required length of ventilation exhaust tunnels would significantly reduce the amount of spoil generated. A comparison of the main elements of work between the PAR design and the revised concept design is shown in Table 1 below. The impact on spoil generation has been calculated assuming that the above revisions to

the concept design are made to the ventilation design detailed in Appendix C, Volume 2 of the Director-General's Assessment Report. Overall the revisions to the concept design result in a reduction to spoil generation of approximately 13 500 m³.

Table 1 - Additional Fill and Waste Volumes

Construction Activity/ Extraction Location	PAR Design (bulked)	Revised Concept Design (bulked)	Difference (bulked)
Relocation of the Eastern Portals			
Gore Hill Freeway	64 800 m³	69 300 m³	4 500 m³ more
Air Extraction Ventilation tunnels			
Mowbray Park	95 000 m³	187 000 m³	92 000 m³ more
Mid Tunnel Access	97 000 m³	70 000 m³	27 000 m³ less
Marden Street	142 000 m³	59 000 m³	83 000 m³ less
Total	399 000 m³	385 500 m³	13 500 m³ less

Table 1 shows that 70 000 m³ of material needs to be removed from the Mid Tunnel Access Site and 59 000 m³ needs to be removed from the Marden Street site under the revised concept design, which would be a significant reduction compared to the approved concept design. Notwithstanding, while the overall amount of tunnel spoil generated is reduced by 13 500 m³ under the revised concept design, it is noted that the amount of spoil removed from the Mowbray Park site would increase by 92 000 m³ and the amount of spoil removed from the Gore Hill Freeway would increase by 4 500 m³.

The additional spoil to be removed from the Gore Hill Freeway and the Mowbray Park sites has the potential to impact upon the surrounding community and environment in terms of waste and fill management and additional construction traffic impacts. The construction traffic impacts are discussed in Section 4.4.1 of this Report. Spoil management would be undertaken as outlined in the Representations Report and in accordance with Conditions of Approval Nos. 117 – 126, which provide specific requirements for spoil and waste management.

The EIS and Representations Report did not identify any acid sulphate soils or potential acid sulphate soils within the location of the proposed revisions to the approved concept design. Nor are there any identified sources of potentially contaminated soils within the vicinity of these additional earthworks.

It is noted that the decrease in spoil generation equates to a 1.4% decrease in the total volume of spoil to be generated by the project. A Construction Framework Environmental Management Plan (Condition of Approval No. 20), Construction Water Management Sub Plan (Condition of Approval No. 105) and site specific Construction Method Statement (Condition of Approval No. 21) will be prepared to detail protective measures for erosion and sedimentation control and dust management.

4.4 Traffic Impacts

4.4.1 Construction Traffic

As outlined in Section 4.3 above, while heavy vehicle traffic generated from Marden Street and the mid tunnel access site would reduce by 3 143 truck loads, there would be approximately 130 additional truck loads of material transported from the eastern portal site and approximately 2 630 additional truck loads transported from the Mowbray Park site.

There is the potential that the additional truck movements on the Gore Hill Freeway and exiting from the Mowbray Park site would exacerbate congestion on the surrounding road system. However, it is noted that overall the total truck movements required would be reduced by 386 truck movements under the proposed revisions to the concept design when compared with the PAR. It is also noted that trucks would access the work areas from the Gore Hill Freeway and Mowbray Road West and Epping Road and therefore would not impact on surrounding local roads.

There is a requirement that existing traffic flows are to be maintained during peak periods throughout construction. The increase in cut and cover construction at the eastern portal may necessitate additional lane closures on the Gore Hill Freeway. Traffic impacts would be managed in accordance with Conditions of Approval 26, 27, 28, 29, 30, 31 and 32. Typical mitigation measures designed to minimise any potential impacts from construction traffic are outlined in Table 7.7 of the Representations Report. As per the Representations Report (Section 2.5.1), a Traffic Management Plan would be prepared whenever major work is proposed that may impact on the existing traffic arrangements.

4.4.2 Operational Traffic

The primary aim of the proposed revisions to mainline tunnel gradients at the western end of the route is to improve the safety and level of service of the mainline tunnels compared to the PAR concept. The relocation of the eastern tunnel portals would not alter the safety or level of service of the mainline tunnels.

4.5 Noise

4.5.1 Construction Noise

Surface Works

The reductions in spoil to be extracted from the Marden Street and Mid Tunnel Access sites would result in noise reductions in these localities. The additional cut and cover construction at the eastern portal (120 metres for each mainline tunnel) and the additional truck movements from the eastern portal and Mowbray Park site have the potential to generate additional construction noise impacts. The subject section of the Gore Hill Freeway is surrounded by low to medium residential and industrial development to the north and commercial development to the south. The Mowbray Park site exits directly onto Mowbray Road West and is surrounded by low to medium residential development

During the construction phase of the proposed revised concept, additional earthworks on the Gore Hill Freeway and additional truck movements from the Mowbray Park site over the PAR design would be required. This would necessitate increased truck movements as detailed in Section 4.4 of this Report. The excavation of the eastern portals would be undertaken in the Gore Hill Freeway, which is dominated by existing road traffic noise. Additional earthworks and truck movements may generate a minor increase in construction noise within the immediate vicinity of these works. It is noted that the intensity of the additional works required to construct the revised concept design would be similar to other works to be undertaken along the Gore Hill Freeway and the Mowbray Park site under the approved concept design. Processes for identifying the required noise mitigation and management measures are outlined in Conditions of Approval 57 and 58 and the construction noise criteria specified in Condition 62 would be maintained.

Some activities, for example, the additional cut and cover tunnel construction on the Gore Hill Freeway may require lane closures and would therefore need to be undertaken at night. Where out of hours work is required, approval to undertake these works would be obtained from the Department of Environment and Conservation in accordance with the Environment Protection Licence for the Lane Cove Tunnel Project.

Regenerated Noise and Vibration

The proposed revisions to the approved concept design would make the tunnel slightly shallower at the western end and involve more tunnelling works between the eastbound tunnel air extraction point and the Sirius Road ventilation stack and at the eastern portals. Regenerated noise has the potential to impact on residents when tunnelling works underneath residences are closer to the surface. It is also noted that regenerated noise impacts are highly dependent on the level of background noise and the building materials of residences. Whilst the proposed changes have the potential to result in slightly

increased regenerated noise impacts between the Lane Cove River and Stringybark Creek, they would eliminate the impacts on residences under the approved exhaust tunnel connecting the westbound tunnel extraction point to the Marden Street Site. It is noted that the regenerated noise limits specified in Condition 186 apply only to tunnelling works undertaken between the hours of 6 pm and 7 am. If exceedances of the specified regenerated noise criteria are predicted, the assessment and reporting requirements of Condition of Approval No. 186 will be implemented.

The proposed revisions to the concept design would generate some additional vibration impacts on nearby residences and, in particular, at the eastern portals where 120 metres of additional cut and cover tunnel construction is required for each mainline tunnel. The intensity of vibration impacts would be similar to works to be carried out under the approved concept design. Processes for identifying the required vibration mitigation and management measures are outlined in Conditions of Approval 57 and 58 and the criteria specified in Conditions 71 and 73 would be maintained.

4.5.2 Operational Road Traffic Noise

The existing noise environment along the Gore Hill Freeway is dominated by road traffic noise. Noise walls approximately 4 metres in height shield the residences adjacent to the Gore Hill Freeway. The road traffic noise assessment included in the EIS predicted that noise levels at residences adjacent to this section of the Gore Hill Freeway would be up to 73 dB(A) (representing a 2- 3 dB(A) increase above existing levels) and recommended that reasonable and feasible barrier options and the architectural treatment of upper level apartments be investigated during the detailed design stage.

The Representations Report included a study on the cost effectiveness and feasibility of noise control options. Appendix M of the Representations Report recommends the provision of acoustic treatment in accordance with the RTA's *Environmental Noise Management Manual*. Additional barriers would also be considered to shield low-rise residences.

It is noted that the revised concept design does not involve any changes outside the footprint of the PAR concept design and that, where possible, existing noise walls would be retained as per the approved concept design. Given that the eastern portals are to be relocated 145 metres to the east, a number of dwellings would not experience road noise impacts from mainline tunnel traffic compared to the PAR concept. This would reduce the noise impacts on these residences and may reduce the extent of noise mitigation required in this precinct. Road noise impacts will be further assessed and mitigation measures identified during the detailed design stage in accordance with the requirements of Condition of Approval No. 225. in close consultation with surrounding residents. Operational noise mitigation measures will be detailed in the Operational Noise Management Sub Plan required by Condition of Approval No. 59.

4.6 Visual Impacts, Urban Design and Landscaping

The existing visual environment is characterised by the Gore Hill Freeway and, in particular, urban design and landscaping provided as part of that project. All additional works to the Gore Hill Freeway associated with the proposed modification would occur within the existing road reserve. The relocation of the eastern portals would provide opportunities for additional landscaping to better integrate the portal structures within the Gore Hill Freeway corridor. An urban design concept consistent with the principles established in the EIS and Representations Report is provided at Appendix C. A Framework Urban Design and Landscaping Plan and site specific Detailed Urban Design and Landscape Sub Plans would be prepared and implemented in accordance with Conditions of Approval Nos. 86 and 87.

4.7 Social Impacts

The proposed revisions to the concept design would bring about positive social impacts perceived by users of the Lane Cove Tunnel and the community in general. These benefits would include improved efficiency in the transport system, an improved level of safety for road users and an improved visual

environment. There would be insignificant changes to air quality. The revised design would not adversely affect the economics of the surrounding community and/or businesses.

4.8 Emergency Response

It is noted that the proposed revisions to the concept design would not alter any of the access arrangements provided in the PAR concept. Any emergency situation would be handled in accordance with the Emergency Response Plan for the Lane Cove Tunnel project which would remain unchanged notwithstanding the proposed revisions to the concept design.

5. Statutory Requirements

5.1 Licensing

The Lane Cove Tunnel project would be licensed by the Department of Environment and Conservation (DEC) for "Freeway/tollway" construction under Schedule 1 of the *Protection of the Environment Operations Act 1997*. Any Conditions of the Environmental Protection Licence issued to the Lane Cove Tunnel Company or its contractors would apply to the construction of the modification. The Lane Cove Tunnel Company and any sub-contractor would be required to comply with all DEC licence requirements. All other necessary licences, permits and approvals required by legislation would be obtained prior to the construction works commencing.

5.2 Approvals

The Minister for Planning (now the Minister for Infrastructure and Planning) placed two hundred and fifty nine (259) Conditions of Approval on the development. The Conditions of Approval covered a range of mitigation measures and management plans in relation to noise, traffic management, vegetation, dust / air and visual impacts etc, to protect the environment. These measures and plans would be applicable to the proposed revisions to the concept design and would need to be satisfactory to the Department of Infrastructure, Planning and Natural Resources (DIPNR). Furthermore, some of these Conditions of Approval as detailed in the Director-General's Report for the Lane Cove Tunnel and Associated Road Improvements project would require additional approvals to be obtained from DIPNR and other authorities (e.g. DEC).

The proposed revisions to the concept design as assessed in this Report would not require specific additional approvals from any statutory authority or other Government body.

6. Consideration of Environmental Factors

6.1 Clause 228 Checklist (NSW Legislation)

As part of its obligation under Section 111 of the *Environmental Planning and Assessment Act 1979* (EP&A Act), the RTA is required to take into account to the fullest extent possible all matters likely to affect the environment by reason of implementing the proposed modification (s115BA(4)). The RTA, as a determining authority, is required by Clause 228 of the EP&A Regulation to give consideration to the following factors:

a) Any environmental impact on a community.

The EIS for the Lane Cove Tunnel Project adequately assessed the social impacts of the project. The proposed revisions to the concept design will not result in any increased social impacts compared to the PAR proposal, and would in fact reduce some of the impacts.

The construction of the revised concept design would result in a short-term increase in construction noise impacts along the Gore Hill Freeway and at the Mowbray Park site, but the impacts would be similar in intensity to other works in these precincts. Noise generation would be reduced at the Marden Street and Mid Tunnel Access sites due to reductions in spoil volumes to be extracted from these sites. Processes for identifying the required noise mitigation and management measures are outlined in Conditions of Approval 57 and 58 and the noise criteria specified in Condition 62 would be maintained. Construction Traffic would be managed in accordance with Traffic Management Plans prepared under Condition of Approval No. 30.

The revised concept design would be expected to reduce construction traffic and spoil management impacts, enhance opportunities for urban design improvements and generate slightly lower noise levels at residences.

b) Any Transformation of a locality.

The proposed revisions to the concept design would result in a minor transformation of the Reserve Road precinct of the Gore Hill Freeway. The visual impact of the PAR proposal is likely to be reduced as a result of the proposed revisions to the concept design as more space is provided for urban design and landscaping enhancements around the eastern portals.

c) Any Environmental Impact on the ecosystems of the locality.

The revised concept design does not require any additional clearing works and no vegetation regarded as having ecological value would be impacted. The revised concept design will in fact provide opportunities to enhance landscaping as discussed in Section 4.6 of this Report.

d) Any reduction of the Aesthetic, Recreational, Scientific or Other Environmental Quality or Value of a locality.

The above issues are addressed in the EIS for the Lane Cove Tunnel project and associated documents. The proposed revisions to the concept design would not give rise to any additional impacts in this regard.

e) Any effect on a locality, Place or Building having aesthetic, Anthropological, Archaeological, Architectural, Cultural, Historical, Scientific or Social significance or other special value for present or future generations.

The proposed revisions to the concept design would not impact on any known locality, place or building having aesthetic, anthropological, archaeological, architectural, cultural, historical, scientific or social significance or other special value for present or future generations.

f) Any impact on the habitat of protected fauna (within the meaning of the National Parks & Wildlife Act 1974).

The proposed revisions to the concept design will not have any impacts on the habitat of protected fauna.

g) Any endangering of any species of animal, plant or other form of life whether living on land, in water or in the air.

The revised concept design does not require any additional clearing works and there would, therefore, be no endangering of any such species under the proposed revisions to the concept design.

h) Any long-term effects on the environment.

The proposed revisions to the concept design would not have any known long-term effects on the environment.

i) Any degradation of the quality of the environment

The proposed revisions to the concept design would be subject to the same environmental mitigation and protective measures and management plans as the PAR concept design and would not lead to the degradation of the quality of the environment.

j) Any risk to the safety of the environment.

The proposed revisions to the concept design would not pose any risk to the safety of the environment greater than that already assessed in Working Paper 6 (Risk) of the EIS. In fact, the safety of the environment would be improved due to the flatter mainline tunnel gradients provided under the revised concept design.

k) Any reduction in the range of beneficial uses of the environment.

No reductions in the range of beneficial uses of the environment are anticipated if the proposed modification is adopted. In fact, the revised design for the exhaust tunnels would result in improvements in surface development potential.

l) Any pollution of the environment.

Pollution issues and mitigation measures were addressed in the EIS for the Lane Cove Tunnel project, the Representations Report and Minister for Planning's Conditions of Approval. Minor construction noise impacts would be generated as a result of additional spoil handling at the Mowbray Park site and additional works at the eastern portals. Notwithstanding, the noise impacts from spoil handling and transportation from Marden Street and the Mid Tunnel Access site would be reduced. Impacts would be mitigated by those measures outlined in the Representations Report and the Conditions of Approval.

m) Any environmental issues associated with the disposal of Waste.

Environmental issues associated with the disposal of waste are addressed in the EIS for the Lane Cove Tunnel project, Section 7 of the Representations Report and the Minister for Planning's

Conditions of Approval 117 - 126. The proposed revisions to the concept design would significantly reduce the waste spoil material being generated.

n) Any increased demands on Resources (Natural or Otherwise) that are or are likely to become in short supply.

The proposed modification would not generate any additional increased demand on resources (natural or otherwise) that are or are likely to become in short supply.

o) Any cumulative Environmental Effect with other existing or likely future activities.

The proposed revisions to the concept design would create a number of additional impacts to the environment, which have been addressed in Section 4 of this Report. Some of these impacts would be cumulative to the impacts already addressed in the EIS and the PAR. However, these impacts can be minimised with mitigation measures and management plans in accordance with the Conditions of Approval for the project.

6.2 EPBC act 1999 (Commonwealth Legislation)

The EPBC Act requires that the following matters of National Environmental Significance (NES) to be considered:

a) Any environmental impact on a World Heritage Property?
The proposed modification would not impact on any World Heritage Property.

b) Any environmental impact on wetlands of international importance?
The proposed modification would not impact on any wetlands of international significance.

c) Any environmental impact on Commonwealth listed threatened species or ecological communities?
The proposed modification would not have any impact on Commonwealth listed threatened species or ecological communities.

d) Any environmental impact on Commonwealth listed migratory species?
The proposed modification would not impact on any Commonwealth listed migratory species.

e) Does any part of the Proposal involve a nuclear action?
No part of the proposed modification involves a nuclear action.

f) Any environmental impact on Commonwealth marine area?
The proposed modification would not impact on any Commonwealth marine area.

In addition, the EPBC Act requires consideration of any impact (directly or indirectly) on Commonwealth land.
The proposed modification would not impact on any Commonwealth land either directly or indirectly.

7. Conclusion

The proposed revisions to the concept design introduce benefits to the Lane Cove Tunnel and Associated Road Improvements Project that achieve an overall improved level of service for the mainline tunnels, minimises the amount of excavation required to construct the required exhaust tunnels and minimises geotechnical constraints at the eastern end of the tunnel route. In addition, they improve the visual amenity of the area and enhance urban design and landscaping opportunities and minimise the impacts of construction stage traffic and spoil management. Dispersion modelling indicates that the changes to air quality in the study area would be insignificant. The proposed revisions to the concept design present a more efficient design solution with minimal impacts on the environment during both the construction and operational phases of the project.

Some minor additional environmental impacts (identified in Section 4 of this document) would result from the implementation of the proposed revisions to the concept design. However, the mitigation measures outlined in the EIS, Table 7.7 of the Representations Report and in the Minister for Planning's Conditions of Approval for the project would effectively manage these additional environmental impacts.

It is thus concluded that the proposed revisions to the concept design are consistent with the Minister for Planning's Approval for the Lane Cove Tunnel project.

8. Certification

This Consistency Assessment and Environmental Review provides a true and fair review of the Project in relation to its potential effects on the environment. It addresses to the fullest extent possible all matters affecting or likely to affect the environment as a result of the proposed modifications to the PAR design.

Geoff Cahill
Environmental Services Manager
Client Environmental Services
Date: 27.04.04

I have examined this Review and the certification by Geoff Cahill and accept the Consistency Assessment and Environmental Review on behalf of the Roads & Traffic Authority.

John Anderson
Project Services Manager
Lane Cove Tunnel Project
Date: 28.04.04

9. References

Minister for Urban Affairs & Planning, 2002. *Approval under Section 115B(2) in Relation to the Proposed Lane Cove Tunnel and Associated Road Improvements.* Approval dated 3 December 2002 and Schedule 1 containing Conditions of Approval.

Roads & Traffic Authority 2001a, *NSW Roads and Traffic Authority: Environmental Impact Assessment Policy Guidelines and Procedures.* RTA, Sydney, NSW

Roads & Traffic Authority July 2002. *Lane Cove Tunnel and Associate Road Improvements Representations Report.* RTA, Sydney NSW.

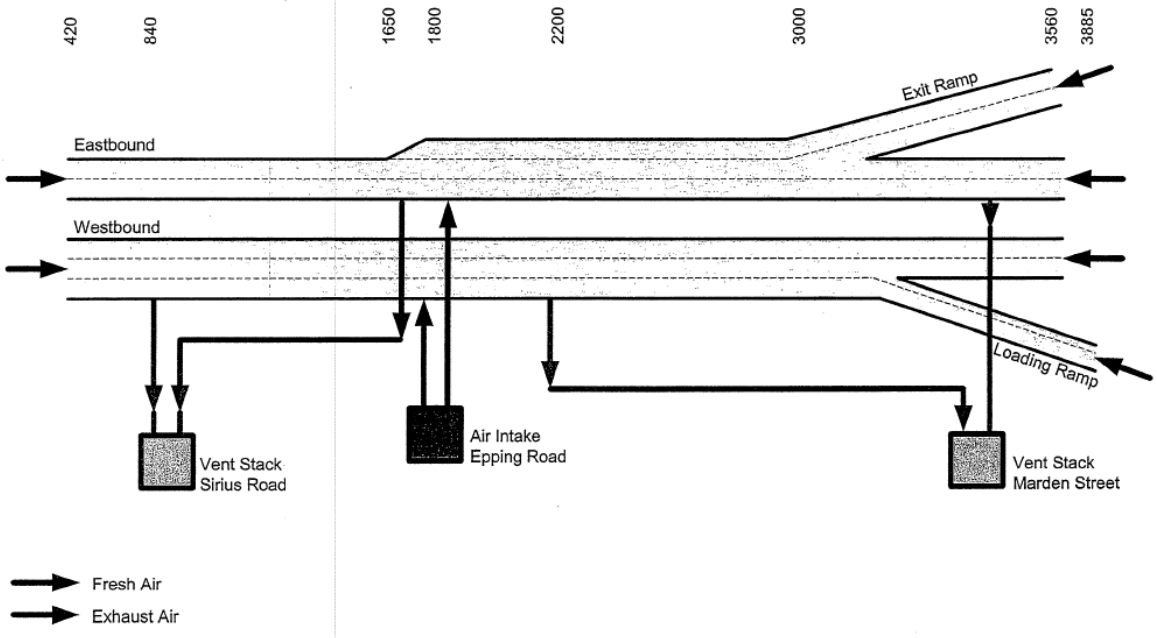
Roads & Traffic Authority, 2002. *Lane Cove Tunnel and Associated Road Improvements.* Representations Report. 2002.

Sinclair Knight Merz (SKM), October 2001. *Lane Cove Tunnel and Associated Road Improvements Environmental Impact Statement.* SKM, Sydney NSW.

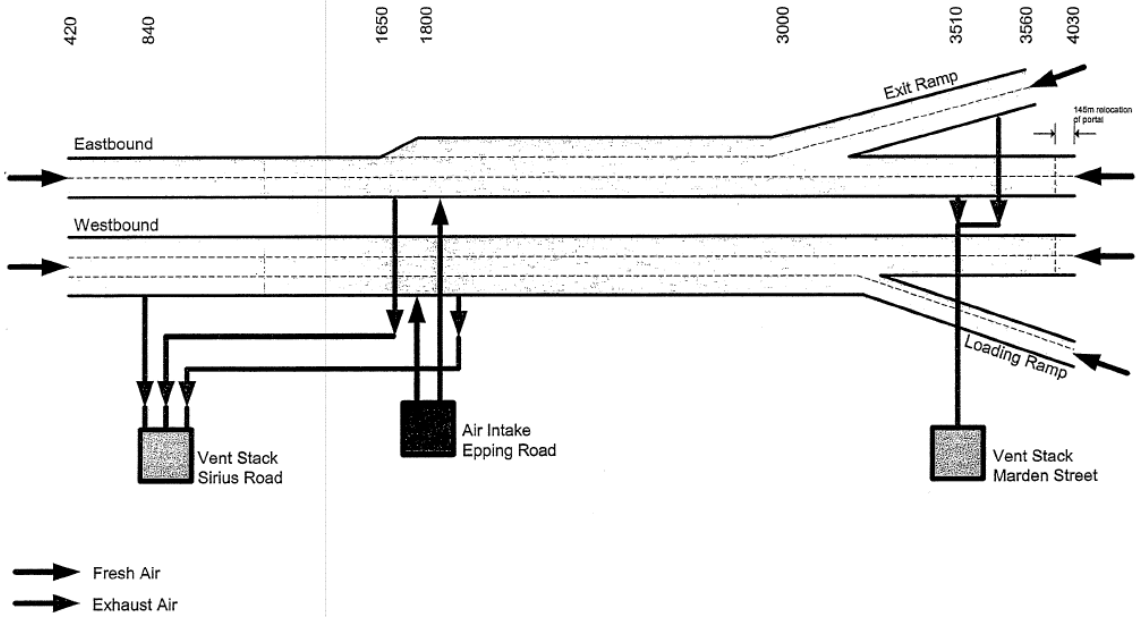
Appendix A

Plans Comparing the Revised Concept Design to the Approved Concept Design

Ventilation Concept Design - Approved



Ventilation Concept Design - Revised



Holmes Air Science assessment and graphs included on CD.

Attachment 29 – DoP Sam Haddad Refused to Make Any Assessment on the Ventilation Changes 29 June 2004

Department of
Infrastructure, Planning and Natural Resources

Office of Sustainable Development
Assessments and Approval
Level 6 20 Lee Street
Sydney NSW 2000
GPO Box 3927
Sydney NSW 2001

Telephone: 02 9762 8022
Facsimile: 02 9762 8707

Mr Peter Brown
General Manager
Lane Cove Council
PO Box 20
LANE COVE NSW 1595

Dear Mr Brown

Lane Cove Tunnel

I refer to your letter of 15th June 2004 expressing your objection to changes to the Lane Cove tunnel ventilation design system being treated by the RTA as minor rather than as a major modification and also your concerns about the display centre location.

Under the legislation (Environmental Planning and Assessment (EP&A) Act) it is a matter for the Proponent (in this case the RTA) to decide if any changes it proposes are consistent with the approved project. The RTA has advised that it considers the changes to be consistent with the approval and therefore will not be seeking a formal modification.

It is not a statutory requirement nor is it normal practice for the Department to independently assess changes to projects proposed by Proponents. The legislation intends that this should and has always been a responsibility that the Proponent carries.

With regard to your concerns about the location of the display centre, I am advised that detailed investigations were undertaken as part of the site selection process, however the contractors preferred location (1 Finlayson Street) was not acceptable to Council. The Department does not have a statutory role in deciding on the location for the display centre.

Yours sincerely

SHaddad

Sam Haddad
Deputy Director General

29. 6. 2004.

Attachment 30 – EPA to RTA 8 July 2004 Requesting Information on Ventilation Changes

Our reference : SRF11498, SR739
Contact : James Goodwin, 9995 6847

NSW EPA
Sydney Region

Mr John Anderson
Project Services Manager, Lane Cove Tunnel Project
Roads and Traffic Authority
7 Sirius Road
Lane Cove West NSW 2066

Dear Mr Anderson

LANE COVE TUNNEL PROJECT – IMPLICATIONS OF PROPOSED TUNNEL CONFIGURATION CHANGES ON AIR QUALITY

The Environment Protection Authority (EPA) has recently become aware through media reports and references at project meetings of proposed changes to the approved Lane Cove Tunnel Project.

The EPA was closely involved in the assessment of operational air quality issues during the planning phase of the Lane Cove Tunnel project. Preparation of the EPA's comments on the Environmental Impact Statement and Representations Report involved several requests for further information in order to be satisfied that adequate traffic, tunnel ventilation performance and emissions modelling had been provided. Importantly, the EPA's comments on operational air quality were predicated on the tunnel design information provided by the Roads and Traffic Authority (RTA) during the planning phase.

The EPA is concerned about the potential implications of the proposed changes to the tunnel configuration on operational air quality. It is noted that the RTA has not yet advised the EPA of any proposal to amend the approved project or initiated any consultation with the EPA in regard to implications for operational air quality. Accordingly, the EPA requests that the RTA:

- provide the EPA with details about the proposed changes to the approved Lane Cove Tunnel Project;

  and

- assure the EPA that the environmental objectives and outcomes achieved by the of approved project will not be compromised in any way by the proposed changes. The RTA should provide the EPA with adequate information to support this assurance.

Environment Protection Authority
PO Box 668 Parramatta NSW 2124 Australia
Level 7 79 George Street Parramatta NSW 2150
Telephone 61 2 9995 5000
Facsimile 61 2 9995 6900
ABN 43 692 285 758
www.epa.nsw.gov.au

Please feel free to contact either David Featherston on 9995 6864 or James Goodwin on 9995 6847 if you wish to discuss the EPA's request.

Yours sincerely

G Reffell 3-7-04

GILLIAN REFFELL
A/Manager Sydney Planning

cc: Mr Mark Hather
Director, Major Infrastructure Assessment
Office of Sustainable Development Assessment and Approval
Department of Infrastructure, Planning and Natural Resources
PO Box 3927
SYDNEY NSW 2000

Dr Vicky Sheppeard
Environmental Health Branch
NSW Health
PO Box 798
Gladesville NSW 1675

Attachment 31 - RTA Response 24 August 2004 to EPA Re Ventilation Changes

RTA

A152

File No. 02M5217
Contact John Anderson 9417 9502

19 August 2004

Received Sydney Region
24 AUG 2004
EPA
PARRAMATTA

Gillian Reffell
A/Manager Sydney Planning
Environment Protection Authority
PO Box 668
PARRAMATTA NSW 2124

Dear Gillian

Re: Lane Cove Tunnel – Changes to Project

I refer to your letter dated 8 July 2004 regarding the air quality impacts of changes to the Lane Cove Tunnel project.

A number of changes were made to the Lane Cove Tunnel project between planning approval and contract award. In summary, these changes are:

- An additional left turn lane onto Epping Road will be provided the Delhi Road/Epping Road intersection;
- Main carriageway will be located centrally at Reserve Road;
- Construction access to the main tunnels from Mowbray Road will go under Mowbray Road rather than be constructed by cut and cover;
- Motorway Control Centre has been moved from Marden Street to Sirius Road;
- Ventilation tunnel from Marden Street has been moved from beneath to adjacent to the Corinthian Building;
- An exhaust ventilation tunnel will connect the Pacific Highway exit ramp directly to the ventilation tunnel to the Marden Street ventilation building;
- Exit to eastbound tunnel and entrance to westbound tunnel has been moved 145 metres further to east and moved together;
- The exhaust ventilation tunnel connecting approximately to the mid-point of the westbound tunnel, to be used during traffic congestion, has been redirected from the eastern to the western ventilation building; and,
- The maximum tunnel gradient has been reduced from 6.5% to 4.6% between Lane Cove River and Stringybark Creek

The RTA has assessed these changes under the requirements of Section 115BA(3) of the *Environmental Planning and Assessment Act, 1979* and determined them to be consistent with the Minister for Planning's approval.

Dispersion modelling, assuming conservatively the worst case scenario that both tunnels are fully congested, including the changes to grade, tunnel length and directing both mid-point exhaust points to the western stack, indicates that the air quality impacts are insignificant (as shown on the attached diagrams).

The reason for this outcome (i.e. insignificant change) is that the modelling takes into account emissions from the ventilation stacks, the local network of surface roads and the background concentrations from other sources as identified in the EIS.

The attached diagram also shows, as identified in the EIS, that the Lane Cove Tunnel substantially reduces air pollution levels in the vicinity of the tunnel, providing improved air quality for residents, pedestrians and cyclists.

The approved project only requires congestion to be considered in one tunnel with free-flowing traffic in the other. However RTA has conservatively required that the ventilation system be designed with the capacity to manage the worst case of vehicles concurrently occupying the total length of both tunnels at the worst speed for vehicle emissions (5kph for CO).

With respect to traffic management, the Lane Cove Tunnel and adjacent roads will be managed on a network basis to minimise traffic congestion. Traffic management systems to be built into the project include moveable medians on Epping Road, Gore Hill Freeway and M2. Ramp metering is also being considered on entry ramps, to be activated when required to appropriately manage traffic flow on the network. This management strategy is in accordance with Condition of Approval 157.

Traffic management is not required to maintain CO pollutant limits in the tunnels. Should the worst-case scenario of concurrent congestion occur in both tunnels, the ventilation system has the capacity to maintain ( ) exposure limits in accordance with the Conditions of Approval without any traffic management intervention. However, traffic conditions will be monitored to ensure traffic movement is safe and efficient. Should this monitoring indicate the need for intervention, appropriate traffic management would be initiated.

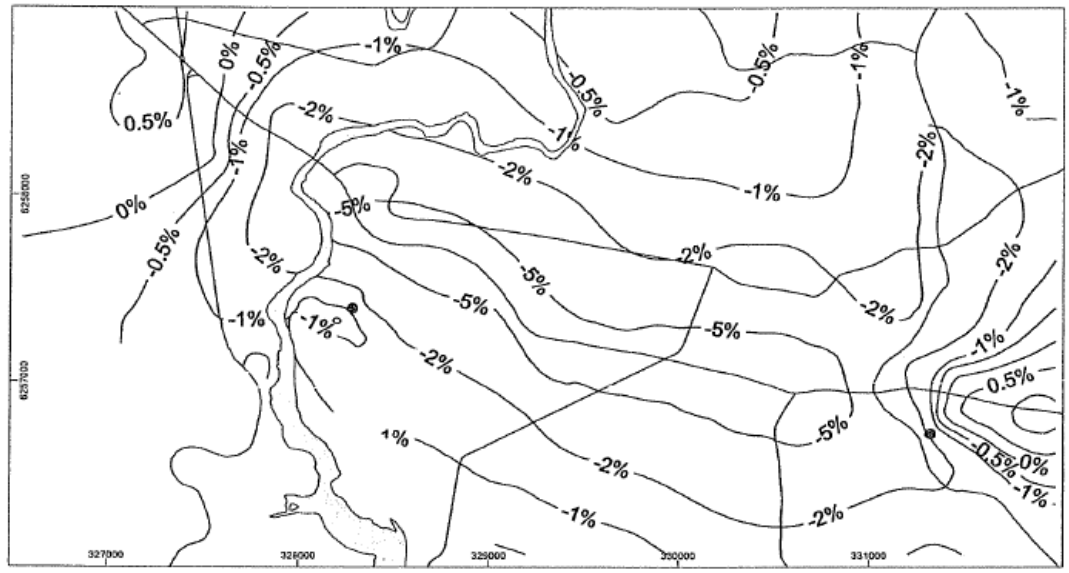
In accordance with the Project Conditions of Approval, a comprehensive air quality monitoring system will be installed to confirm compliance with air quality requirements.

Should you have any further enquiries, please contact me on 9417 9502.

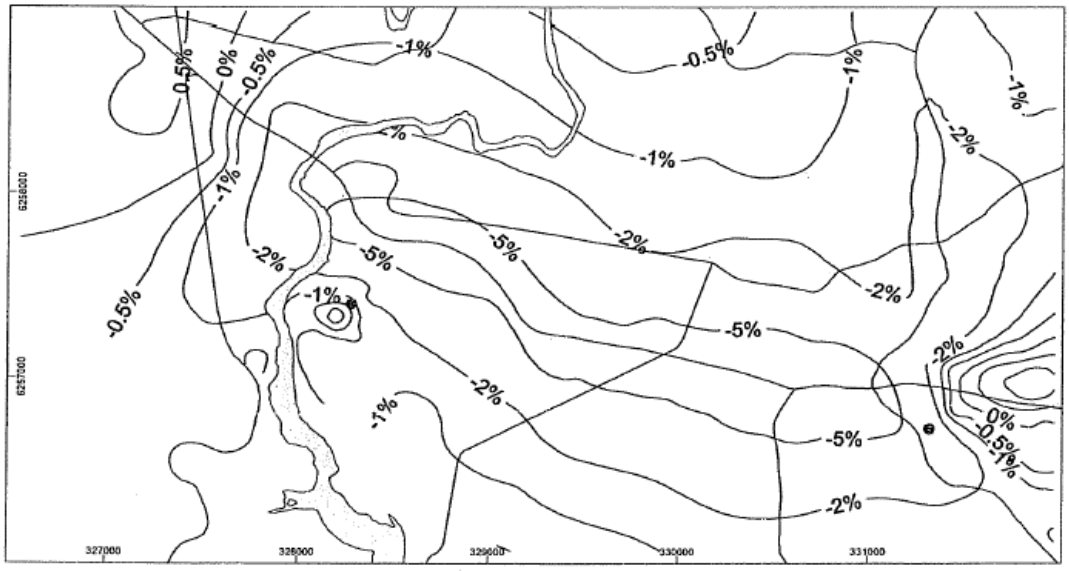
Yours sincerely,

John Anderson
RTA's Representative
Lane Cove Tunnel Project

G:\LCT\Files\Authorities\02M5217 - EPA\Letter Changes to Project July 04.doc



Approved concept design



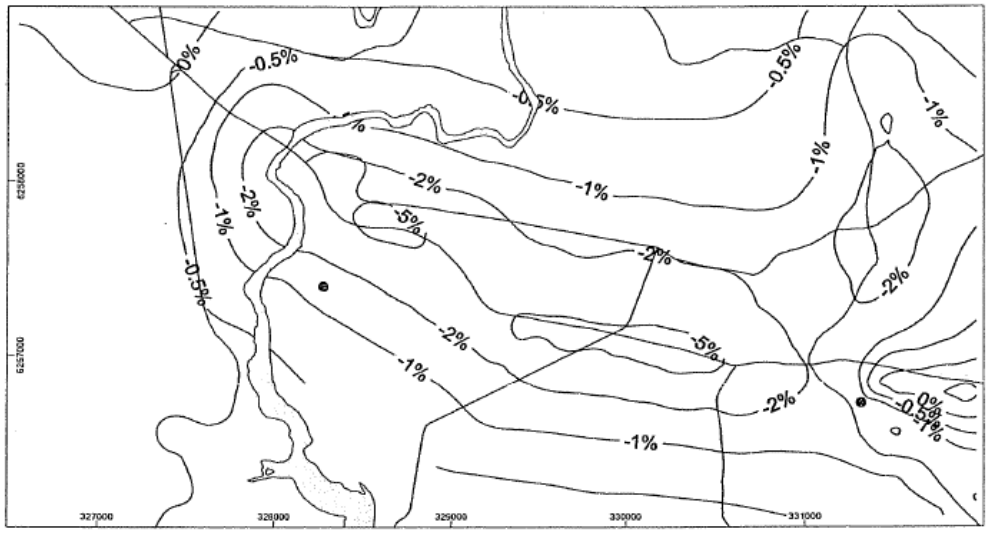
Revised concept design

Deterioration in air quality

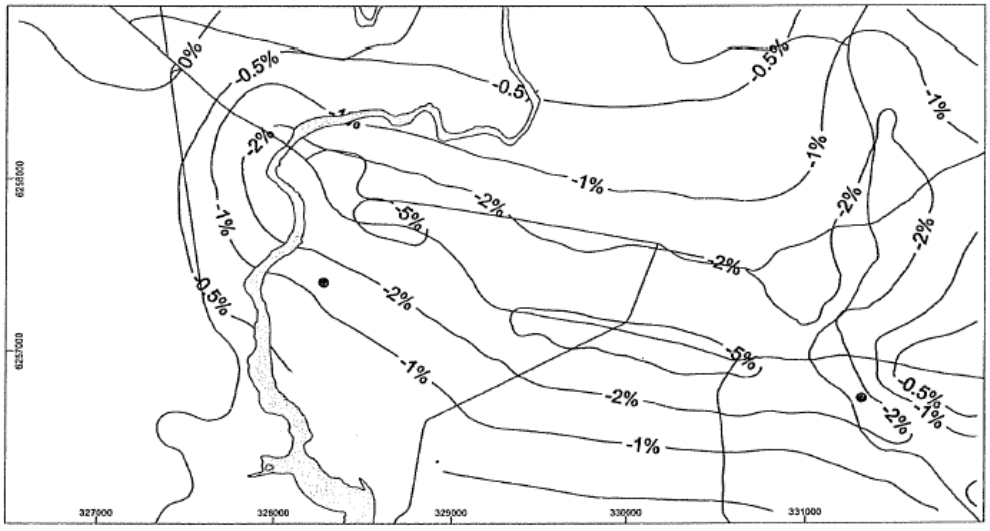
Improvement in air quality

Predicted change in maximum 24-hour average PM_{10} concentrations (2016)

FIGURE 8



Approved concept design



Revised concept design

Deterioration in air quality

Improvement in air quality

Predicted change in annual average PM_{10} concentrations (2016)

FIGURE 9

Attachment 32 – RTA Sydney Region Published Traffic Volumes August 2002

HOURLY TRAFFIC VOLUMES for Week commencing MON 12/08/02 Station No. 32.022.E

EPPING RD,MR373 LANE COVE-W OF LONGUEVILLE RD

HOUR	MON	TUE	WED	THU	FRI	SAT	SUN	WEEKDAYS			WEEKEND (+HOLIDAYS)			WHOLE WEEK		
comm.	12/08	13/08	14/08	15/08	16/08	17/08	18/08	TOTAL	MEAN	%	TOTAL	MEAN	%	TOTAL	MEAN	%
0	109	109	165	162	209	404	469	754	151	0.38	873	437	1.54	1627	232	0.64
1	70	67	71	92	111	218	335	411	82	0.21	553	277	0.97	964	138	0.38
2	50	50	54	51	99	137	164	304	61	0.15	301	151	0.53	605	86	0.24
3	69	68	73	71	89	111	132	370	74	0.19	243	122	0.43	613	88	0.24
4	215	203	200	188	170	154	114	976	195	0.49	268	134	0.47	1244	178	0.49
5	850	820	742	800	772	415	275	3984	797	2.01	690	345	1.22	4674	668	1.83
6	2940	3023	3068	2964	2918	1125	558	14913	2983	7.53	1683	842	2.96	16596	2371	6.51
7	3575	3654	3587	3621	3635	1274	692	18072	3614	9.12	1966	983	3.46	20038	2863	7.86
8	3437	3410	3444	2878	3465	1866	946	16634	3327	8.40	2812	1406	4.95	19446	2778	7.63
9	3035	3518	3488	2719	3185	2089	1347	15945	3189	8.05	3436	1718	6.05	19381	2769	7.61
10	2381	2415	2464	3072	2596	2246	1610	12928	2586	6.53	3856	1928	6.79	16784	2398	6.59
11	2022	1919	2230	2336	2336	2402	1953	10843	2169	5.47	4355	2178	7.67	15198	2171	5.96
12	2011	2196	2294	2374	2465	2271	2235	11340	2268	5.73	4506	2253	7.94	15846	2264	6.22
13	1894	1957	2102	2258	2284	2038	1754	10495	2099	5.30	3792	1896	6.68	14287	2041	5.61
14	1804	2033	1948	2036	2170	1835	1743	9991	1998	5.04	3578	1789	6.30	13569	1938	5.32
15	1888	1996	2093	2259	2184	1680	1644	10420	2084	5.26	3324	1662	5.85	13744	1963	5.39
16	2137	2051	2277	2377	2331	1772	1728	11173	2235	5.64	3500	1750	6.16	14673	2096	5.76
17	2545	2568	2377	2625	2528	2164	1901	12643	2529	6.38	4065	2033	7.16	16708	2387	6.56
18	2251	2420	2583	2485	2525	2390	1606	12264	2453	6.19	3996	1998	7.04	16260	2323	6.38
19	1429	1512	1737	1595	1949	1931	1096	8222	1644	4.15	3027	1514	5.33	11249	1607	4.41
20	916	998	1059	1135	1154	1109	848	5262	1052	2.66	1957	979	3.45	7219	1031	2.83
21	744	845	953	1024	949	873	777	4515	903	2.28	1650	825	2.91	6165	881	2.42
22	585	611	704	815	798	841	483	3513	703	1.77	1324	662	2.33	4837	691	1.90
23	275	356	350	419	689	765	262	2089	418	1.05	1027	514	1.81	3116	445	1.22
DAY TOT	37232	38799	40063	40356	41611	32110	24672	198061	39612	100.00	56782	28391	100.00	254843	36406	100.00
MAX	3575	3654	3587	3621	3635	2402	2235	AWT =	39612		AWE =	28391		ADT =	36406	

HOURLY TRAFFIC VOLUMES for Week commencing MON 12/08/02 Station No. 32.022.W

EPPING RD,MR373 LANE COVE-W OF LONGUEVILLE RD

HOUR	MON	TUE	WED	THU	FRI	SAT	SUN	WEEKDAYS			WEEKEND (+HOLIDAYS)			WHOLE WEEK		
comm.	12/08	13/08	14/08	15/08	16/08	17/08	18/08	TOTAL	MEAN	%	TOTAL	MEAN	%	TOTAL	MEAN	%
0	261	312	392	446	579	1142	1192	1990	398	0.87	2334	1167	3.43	4324	618	1.46
1	181	202	200	240	360	671	880	1183	237	0.52	1551	776	2.28	2734	391	0.92
2	121	118	136	167	240	522	566	782	156	0.34	1088	544	1.60	1870	267	0.63
3	103	112	143	127	204	375	444	689	138	0.30	819	410	1.20	1508	215	0.51
4	108	134	123	144	177	276	295	686	137	0.30	571	286	0.84	1257	180	0.42
5	341	343	356	356	388	310	260	1784	357	0.78	570	285	0.84	2354	336	0.80
6	1036	1035	1019	1012	1056	629	362	5158	1032	2.26	991	496	1.46	6149	878	2.08
7	2284	2329	2324	2323	2260	1168	595	11520	2304	5.05	1763	882	2.59	13283	1898	4.49
8	2417	2454	2448	2423	2396	1703	905	12138	2428	5.32	2608	1304	3.84	14746	2107	4.98
9	2278	2239	2290	2239	2313	1832	1127	11359	2272	4.98	2959	1480	4.35	14318	2045	4.84
10	1959	2055	2125	2155	2262	2200	1537	10556	2111	4.63	3737	1869	5.50	14293	2042	4.83
11	2159	2222	2273	2301	2464	2483	1971	11419	2284	5.01	4454	2227	6.55	15873	2268	5.36
12	2314	2435	2426	2492	2655	2579	1995	12322	2464	5.41	4574	2287	6.73	16896	2414	5.71
13	2590	2725	2740	2864	2914	2503	1970	13833	2767	6.07	4473	2237	6.58	18306	2615	6.19
14	2874	3158	3220	3213	3315	2621	1940	15780	3156	6.92	4561	2281	6.71	20341	2906	6.87
15	3377	3678	3649	3644	3655	2521	2156	18003	3601	7.90	4677	2339	6.88	22680	3240	7.66
16	3663	3694	3749	3529	3677	2752	2739	18312	3662	8.03	5491	2746	8.08	23803	3400	8.04
17	3688	3669	3775	3840	3729	2755	2389	18701	3740	8.20	5144	2572	7.57	23845	3406	8.06
18	3598	3651	3533	3632	3627	1960	1790	18041	3608	7.91	3750	1875	5.52	21791	3113	7.36
19	2365	2729	2712	2860	2581	1376	1365	13247	2649	5.81	2741	1371	4.03	15988	2284	5.40
20	1784	2025	2007	2075	1795	1048	1219	9686	1937	4.25	2267	1134	3.34	11953	1708	4.04
21	1562	1737	1828	1892	1502	1104	1163	8521	1704	3.74	2267	1134	3.34	10788	1541	3.65
22	1124	1458	1526	1490	1689	1492	913	7287	1457	3.20	2405	1203	3.54	9692	1385	3.28
23	623	857	915	1102	1450	1625	550	4947	989	2.17	2175	1088	3.20	7122	1017	2.41
DAY TOT	42810	45371	45909	46566	47288	37647	30323	227944	45589	100.00	67970	33985	100.00	295914	42273	100.00
MAX	3688	3694	3775	3840	3729	2755	2739	AWT =	45589		AWE =	33985		ADT =	42273	

HOURLY TRAFFIC VOLUMES for Week commencing MON 12/08/02 Station No. 32.028.E

EPPING RD,MR373 LANE COVE- W OF ELIZABETH PDE

HOUR comm.	MON 12/08	TUE 13/08	WED 14/08	THU 15/08	FRI 16/08	SAT 17/08	SUN 18/08	WEEKDAYS TOTAL	WEEKDAYS MEAN	WEEKDAYS %	WEEKEND (+HOLIDAYS) TOTAL	WEEKEND (+HOLIDAYS) MEAN	WEEKEND (+HOLIDAYS) %	WHOLE WEEK TOTAL	WHOLE WEEK MEAN	WHOLE WEEK %
0	128	117	172	191	232	424	523	840	168	0.43	947	474	1.69	1787	255	0.71
1	75	72	73	86	124	231	319	430	86	0.22	550	275	0.98	980	140	0.39
2	48	44	60	63	88	140	173	303	61	0.15	313	157	0.56	616	88	0.24
3	68	60	59	72	88	101	127	347	69	0.18	228	114	0.41	575	82	0.23
4	163	186	445	159	152	136	114	1105	221	0.56	250	125	0.45	1355	194	0.54
5	765	713	657	688	649	358	225	3472	694	1.77	583	292	1.04	4055	579	1.61
6	2729	2767	2798	2725	2672	1016	497	13691	2738	6.97	1513	757	2.70	15204	2172	6.02
7	3513	3588	3575	3549	3664	1236	622	17889	3578	9.10	1858	929	3.31	19747	2821	7.82
8	3203	3263	3165	2912	3190	1837	888	15733	3147	8.01	2725	1363	4.86	18458	2637	7.31
9	2985	3394	3428	2374	3076	1930	1280	15257	3051	7.76	3210	1605	5.72	18467	2638	7.31
10	2323	2554	2549	3066	2584	2289	1459	13076	2615	6.65	3748	1874	6.68	16824	2403	6.66
11	2059	2145	2170	2288	2317	2304	1926	10979	2196	5.59	4230	2115	7.54	15209	2173	6.02
12	1992	2227	2327	2453	2482	2239	2226	11481	2296	5.84	4465	2233	7.96	15946	2278	6.31
13	1922	1928	2092	2203	2301	1952	1722	10446	2089	5.32	3674	1837	6.55	14120	2017	5.59
14	1835	1987	1987	2055	2147	1856	1729	10011	2002	5.09	3585	1793	6.39	13596	1942	5.38
15	1823	1969	2115	2229	2207	1648	1646	10343	2069	5.26	3294	1647	5.87	13637	1948	5.40
16	2151	2259	2326	2385	2385	1779	1677	11506	2301	5.85	3456	1728	6.16	14962	2137	5.92
17	2566	2682	2460	2697	2569	2124	1996	12974	2595	6.60	4120	2060	7.34	17094	2442	6.77
18	2342	2434	2571	2488	2584	2398	1644	12419	2484	6.32	4042	2021	7.20	16461	2352	6.52
19	1415	1594	1771	1642	1960	2025	1133	8382	1676	4.27	3158	1579	5.63	11540	1649	4.57
20	965	1018	1088	1153	1224	1128	880	5448	1090	2.77	2008	1004	3.58	7456	1065	2.95
21	765	845	957	1018	917	928	798	4502	900	2.29	1726	863	3.08	6228	890	2.47
22	624	649	723	853	819	816	508	3668	734	1.87	1324	662	2.36	4992	713	1.98
23	298	384	376	460	703	795	298	2221	444	1.13	1093	547	1.95	3314	473	1.31
DAY TOT	36757	38879	39944	39809	41134	31690	24410	196523	39305	100.00	56100	28050	100.00	252623	36089	100.00
MAX	3513	3588	3575	3549	3664	2398	2226	AWT =	39305		AWE =	28050		ADT =	36089	

HOURLY TRAFFIC VOLUMES for Week commencing MON 12/08/02 Station No. 32.028.W

EPPING RD,MR373 LANE COVE- W OF ELIZABETH PDE

HOUR comm.	MON 12/08	TUE 13/08	WED 14/08	THU 15/08	FRI 16/08	SAT 17/08	SUN 18/08	WEEKDAYS TOTAL	WEEKDAYS MEAN	WEEKDAYS %	WEEKEND (+HOLIDAYS) TOTAL	WEEKEND (+HOLIDAYS) MEAN	WEEKEND (+HOLIDAYS) %	WHOLE WEEK TOTAL	WHOLE WEEK MEAN	WHOLE WEEK %
0	284	310	413	440	597	1141	1271	2044	409	0.93	2412	1206	3.76	4456	637	1.57
1	173	185	196	232	350	695	866	1136	227	0.52	1561	781	2.43	2697	385	0.95
2	118	106	112	157	232	532	598	725	145	0.33	1130	565	1.76	1855	265	0.65
3	83	94	140	129	195	384	452	641	128	0.29	836	418	1.30	1477	211	0.52
4	82	108	95	109	149	260	301	543	109	0.25	561	281	0.87	1104	158	0.39
5	216	199	234	224	245	248	240	1118	224	0.51	488	244	0.76	1606	229	0.57
6	761	816	786	770	816	487	321	3949	790	1.80	808	404	1.26	4757	680	1.68
7	2207	2182	2190	2165	2090	1024	504	10834	2167	4.94	1528	764	2.38	12362	1766	4.36
8	2546	2643	2590	2598	2561	1523	820	12938	2588	5.90	2343	1172	3.65	15281	2183	5.39
9	2336	2335	2359	2257	2279	1702	987	11566	2313	5.27	2689	1345	4.19	14255	2036	5.03
10	1889	1981	1999	2035	2185	2057	1407	10089	2018	4.60	3464	1732	5.40	13553	1936	4.78
11	2041	1991	2110	2205	2252	2251	1768	10599	2120	4.83	4019	2010	6.26	14618	2088	5.16
12	2150	2340	2289	2325	2478	2442	1954	11582	2316	5.28	4396	2198	6.85	15978	2283	5.64
13	2432	2508	2597	2617	2743	2385	1825	12897	2579	5.88	4210	2105	6.56	17107	2444	6.03
14	2660	2963	2898	2914	3017	2431	1826	14452	2890	6.59	4257	2129	6.63	18709	2673	6.60
15	3153	3434	3407	3573	3600	2434	2004	17167	3433	7.83	4438	2219	6.91	21605	3086	7.62
16	3396	3551	3719	3455	3550	2535	2522	17671	3534	8.06	5057	2529	7.88	22728	3247	8.02
17	3582	3567	3599	3622	3613	2623	2309	17983	3597	8.20	4932	2466	7.68	22915	3274	8.08
18	3519	3727	3499	3576	3522	2001	1782	17843	3569	8.14	3783	1892	5.89	21626	3089	7.63
19	2558	2679	2853	2892	2730	1333	1267	13712	2742	6.25	2600	1300	4.05	16312	2330	5.75
20	1737	2058	1923	2088	1745	1005	1193	9551	1910	4.36	2198	1099	3.42	11749	1678	4.14
21	1493	1622	1721	1733	1412	982	1093	7981	1596	3.64	2075	1038	3.23	10056	1437	3.55
22	1129	1387	1466	1454	1567	1292	885	7003	1401	3.19	2177	1089	3.39	9180	1311	3.24
23	674	909	1039	1145	1505	1633	602	5272	1054	2.40	2235	1118	3.48	7507	1072	2.65
DAY TOT	41219	43695	44234	44715	45433	35400	28797	219296	43859	100.00	64197	32099	100.00	283493	40499	100.00
MAX	3582	3727	3719	3622	3613	2623	2522	AWT =	43859		AWE =	32099		ADT =	40499	

HOURLY TRAFFIC VOLUMES for Week commencing MON 12/08/02 Station No. 52.039.E

HILLS MOTORWAY,M2 EAST RYDE-W OF MOWBRAY RD

HOUR	MON	TUE	WED	THU	FRI	SAT	SUN	WEEKDAYS			WEEKEND (+HOLIDAYS)			WHOLE WEEK		
comm.	12/08	13/08	14/08	15/08	16/08	17/08	18/08	TOTAL	MEAN	%	TOTAL	MEAN	%	TOTAL	MEAN	%
0	34	215	46	69	53	137	181	417	83	0.47	318	159	1.25	735	105	0.65
1	44	166	83	161	207	99	371	661	132	0.75	470	235	1.85	1131	162	0.99
2	13	14	14	11	21	46	47	73	15	0.08	93	47	0.37	166	24	0.15
3	18	17	21	1265	26	28	465	1347	269	1.52	493	247	1.94	1840	263	1.62
4	81	80	1248	54	46	51	34	1509	302	1.71	85	43	0.33	1594	228	1.40
5	466	408	382	405	360	178	131	2021	404	2.28	309	155	1.22	2330	333	2.05
6	1867	1921	1956	1884	1896	579	211	9524	1905	10.77	790	395	3.11	10314	1473	9.06
7	2538	2428	2503	2480	2620	657	311	12569	2514	14.21	968	484	3.81	13537	1934	11.89
8	2055	2139	2254	2025	2042	892	440	10515	2103	11.89	1332	666	5.25	11847	1692	10.41
9	1470	1739	1695	1582	1416	912	601	7902	1580	8.93	1513	757	5.96	9415	1345	8.27
10	857	919	946	988	1036	904	691	4746	949	5.37	1595	798	6.28	6341	906	5.57
11	696	747	812	826	841	943	1008	3922	784	4.43	1951	976	7.69	5873	839	5.16
12	629	644	706	825	757	943	998	3561	712	4.03	1941	971	7.65	5502	786	4.83
13	638	596	661	692	715	807	738	3302	660	3.73	1545	773	6.09	4847	692	4.26
14	512	647	613	686	1075	707	720	3533	707	3.99	1427	714	5.62	4960	709	4.36
15	609	630	645	770	752	661	708	3406	681	3.85	1369	685	5.39	4775	682	4.19
16	667	712	788	773	822	745	865	3762	752	4.25	1610	805	6.34	5372	767	4.72
17	835	828	873	841	893	919	934	4270	854	4.83	1853	927	7.30	6123	875	5.38
18	754	789	839	789	947	1181	783	4118	824	4.66	1964	982	7.74	6082	869	5.34
19	398	451	560	490	707	838	473	2606	521	2.95	1311	656	5.16	3917	560	3.44
20	266	339	316	365	413	452	364	1699	340	1.92	816	408	3.21	2515	359	2.21
21	202	232	294	298	308	364	377	1334	267	1.51	741	371	2.92	2075	296	1.82
22	143	193	188	236	285	336	178	1045	209	1.18	514	257	2.02	1559	223	1.37
23	74	101	98	117	223	280	97	613	123	0.69	377	189	1.49	990	141	0.87
DAY TOT	15866	16955	18541	18632	18461	13659	11726	88455	17691	100.00	25385	12693	100.00	113840	16263	100.00
MAX	2538	2428	2503	2480	2620	1181	1008	AWT =	17691		AWE =	12693		ADT =	16263	

HOURLY TRAFFIC VOLUMES for Week commencing MON 12/08/02 Station No. 52.039.W

HILLS MOTORWAY,M2 EAST RYDE-W OF MOWBRAY RD

HOUR	MON	TUE	WED	THU	FRI	SAT	SUN	WEEKDAYS			WEEKEND (+HOLIDAYS)			WHOLE WEEK		
comm.	12/08	13/08	14/08	15/08	16/08	17/08	18/08	TOTAL	MEAN	%	TOTAL	MEAN	%	TOTAL	MEAN	%
0	74	79	130	133	188	408	514	604	121	0.65	922	461	3.64	1526	218	1.29
1	44	44	53	66	104	230	352	311	62	0.34	582	291	2.30	893	128	0.76
2	28	22	33	35	67	173	203	185	37	0.20	376	188	1.48	561	80	0.48
3	18	30	44	35	45	99	157	172	34	0.19	256	128	1.01	428	61	0.36
4	20	27	27	34	43	78	119	151	30	0.16	197	99	0.78	348	50	0.30
5	55	57	60	70	83	98	102	325	65	0.35	200	100	0.79	525	75	0.45
6	349	344	324	316	319	225	145	1652	330	1.79	370	185	1.46	2022	289	1.72
7	774	766	775	790	770	455	199	3875	775	4.19	654	327	2.58	4529	647	3.84
8	729	739	751	746	752	626	378	3717	743	4.02	1004	502	3.96	4721	674	4.01
9	701	780	762	665	780	654	486	3688	738	3.99	1140	570	4.50	4828	690	4.10
10	640	605	664	673	715	827	599	3297	659	3.56	1426	713	5.62	4723	675	4.01
11	695	697	646	704	774	888	764	3516	703	3.80	1652	826	6.51	5168	738	4.38
12	718	724	734	750	838	948	798	3764	753	4.07	1746	873	6.89	5510	787	4.67
13	883	840	910	895	1023	877	716	4551	910	4.92	1593	797	6.28	6144	878	5.21
14	1051	1118	1134	1154	1284	986	721	5741	1148	6.21	1707	854	6.73	7448	1064	6.32
15	1462	1587	1607	1701	1788	961	725	8145	1629	8.80	1686	843	6.65	9831	1404	8.34
16	1836	1993	1982	2020	2114	1002	1143	9945	1989	10.75	2145	1073	8.46	12090	1727	10.26
17	2117	2160	2191	2246	2256	1111	1000	10970	2194	11.86	2111	1056	8.32	13081	1869	11.10
18	2046	2175	2040	2033	2072	841	752	10366	2073	11.21	1593	797	6.28	11959	1708	10.15
19	1141	1252	1355	1383	1302	483	470	6433	1287	6.95	953	477	3.76	7386	1055	6.27
20	676	834	787	853	711	353	422	3861	772	4.17	775	388	3.06	4636	662	3.93
21	526	601	647	635	515	295	345	2924	585	3.16	640	320	2.52	3564	509	3.02
22	362	479	575	522	546	480	265	2484	497	2.69	745	373	2.94	3229	461	2.74
23	214	301	366	415	533	702	184	1829	366	1.98	886	443	3.49	2715	388	2.30
DAY TOT	17159	18254	18597	18874	19622	13800	11559	92506	18501	100.00	25359	12680	100.00	117865	16838	100.00
MAX	2117	2175	2191	2246	2256	1111	1143	AWT =	18501		AWE =	12680		ADT =	16838	

HOURLY TRAFFIC VOLUMES for Week commencing MON 12/08/02 Station No. 52.040.E

EPPING RD,MR373 EAST RYDE-W OF HILLS MWY,M2 TERMINAL

HOUR	MON	TUE	WED	THU	FRI	SAT	SUN	WEEKDAYS			WEEKEND (+HOLIDAYS)			WHOLE WEEK		
comm.	12/08	13/08	14/08	15/08	16/08	17/08	18/08	TOTAL	MEAN	%	TOTAL	MEAN	%	TOTAL	MEAN	%
0	106	110	158	146	186	354	389	706	141	0.42	743	372	1.58	1449	207	0.68
1	65	76	68	82	109	195	272	400	80	0.24	467	234	0.99	867	124	0.41
2	45	40	49	59	95	120	166	288	58	0.17	286	143	0.61	574	82	0.27
3	56	62	77	72	82	90	123	349	70	0.21	213	107	0.45	562	80	0.26
4	194	197	191	200	180	137	99	962	192	0.58	236	118	0.50	1198	171	0.56
5	810	821	784	811	796	427	214	4022	804	2.41	641	321	1.37	4663	666	2.18
6	2364	2525	2524	2448	2383	801	442	12244	2449	7.35	1243	622	2.65	13487	1927	6.32
7	2405	2534	2508	2547	2455	1034	491	12449	2490	7.47	1525	763	3.25	13974	1996	6.54
8	2437	2359	2402	2210	2361	1501	714	11769	2354	7.06	2215	1108	4.72	13984	1998	6.55
9	2089	2391	2412	2206	2349	1739	1112	11447	2289	6.87	2851	1426	6.07	14298	2043	6.70
10	1957	1934	2035	2207	2011	1923	1278	10144	2029	6.09	3201	1601	6.82	13345	1906	6.25
11	1750	1781	1815	1840	2000	2012	1519	9186	1837	5.51	3531	1766	7.52	12717	1817	5.95
12	1736	1844	1916	2000	2097	1807	1683	9593	1919	5.76	3490	1745	7.43	13083	1869	6.13
13	1710	1855	1912	1910	2025	1702	1486	9412	1882	5.65	3188	1594	6.79	12600	1800	5.90
14	1633	1819	1820	1834	1962	1667	1577	9068	1814	5.44	3244	1622	6.91	12312	1759	5.77
15	1686	1819	1948	2011	1977	1558	1358	9441	1888	5.67	2916	1458	6.21	12357	1765	5.79
16	2052	2110	2258	2201	2054	1622	1478	10675	2135	6.41	3100	1550	6.60	13775	1968	6.45
17	2518	2648	2502	2592	2519	1877	1640	12779	2556	7.67	3517	1759	7.49	16296	2328	7.63
18	1865	2030	2081	2049	1979	1764	1227	10004	2001	6.00	2991	1496	6.37	12995	1856	6.09
19	1267	1305	1410	1457	1573	1380	900	7012	1402	4.21	2280	1140	4.86	9292	1327	4.35
20	934	990	992	1111	945	847	782	4972	994	2.98	1629	815	3.47	6601	943	3.09
21	791	892	905	1000	824	684	690	4412	882	2.65	1374	687	2.93	5786	827	2.71
22	580	640	682	781	705	723	469	3388	678	2.03	1192	596	2.54	4580	654	2.14
23	263	328	317	376	602	643	231	1886	377	1.13	874	437	1.86	2760	394	1.29
DAY TOT	31313	33110	33766	34150	34269	26607	20340	166608	33322	100.00	46947	23474	100.00	213555	30508	100.00
MAX	2518	2648	2524	2592	2519	2012	1683	AWT =	33322		AWE =	23474		ADT =	30508	

HOURLY TRAFFIC VOLUMES for Week commencing MON 12/08/02 Station No. 52.040.W

EPPING RD,MR373 EAST RYDE-W OF HILLS MWY,M2 TERMINAL

HOUR	MON	TUE	WED	THU	FRI	SAT	SUN	WEEKDAYS			WEEKEND (+HOLIDAYS)			WHOLE WEEK		
comm.	12/08	13/08	14/08	15/08	16/08	17/08	18/08	TOTAL	MEAN	%	TOTAL	MEAN	%	TOTAL	MEAN	%
0	250	308	363	393	473	908	842	1787	357	0.97	1750	875	3.20	3537	505	1.48
1	150	169	164	203	286	547	648	972	194	0.53	1195	598	2.18	2167	310	0.91
2	102	85	103	143	201	408	485	634	127	0.35	893	447	1.63	1527	218	0.64
3	78	89	120	111	174	313	351	572	114	0.31	664	332	1.21	1236	177	0.52
4	88	107	94	103	143	194	218	535	107	0.29	412	206	0.75	947	135	0.40
5	241	216	243	236	250	220	168	1186	237	0.65	388	194	0.71	1574	225	0.66
6	707	743	749	680	746	423	254	3625	725	1.97	677	339	1.24	4302	615	1.80
7	1714	1729	1729	1715	1686	870	446	8573	1715	4.67	1316	658	2.40	9889	1413	4.15
8	2206	2273	2131	2176	2101	1408	676	10887	2177	5.93	2084	1042	3.81	12971	1853	5.44
9	2061	2138	2160	2028	2034	1656	916	10421	2084	5.67	2572	1286	4.70	12993	1856	5.45
10	1644	1807	1869	1803	1940	1884	1307	9063	1813	4.93	3191	1596	5.83	12254	1751	5.14
11	1760	1842	1943	1936	2013	2121	1606	9494	1899	5.17	3727	1864	6.81	13221	1889	5.54
12	2014	2088	2127	2122	2216	2114	1758	10567	2113	5.75	3872	1936	7.07	14439	2063	6.06
13	2167	2228	2285	2247	2328	2182	1623	11255	2251	6.13	3805	1903	6.95	15060	2151	6.32
14	2205	2492	2520	2546	2559	2147	1683	12322	2464	6.71	3830	1915	7.00	16152	2307	6.77
15	2786	2853	2950	2977	2858	2072	1738	14424	2885	7.85	3810	1905	6.96	18234	2605	7.65
16	2832	2965	3031	2865	2803	2117	1928	14496	2899	7.89	4045	2023	7.39	18541	2649	7.78
17	3017	3044	3089	3053	2890	2158	1829	15093	3019	8.22	3987	1994	7.28	19080	2726	8.00
18	2777	2745	2682	2856	2777	1672	1435	13837	2767	7.53	3107	1554	5.67	16944	2421	7.11
19	1942	2035	2039	2132	1973	1174	1062	10121	2024	5.51	2236	1118	4.08	12357	1765	5.18
20	1362	1498	1504	1563	1386	841	1023	7313	1463	3.98	1864	932	3.40	9177	1311	3.85
21	1197	1340	1383	1433	1128	845	906	6481	1296	3.53	1751	876	3.20	8232	1176	3.45
22	975	1131	1157	1181	1333	1073	806	5777	1155	3.14	1879	940	3.43	7656	1094	3.21
23	547	761	817	932	1211	1201	496	4268	854	2.32	1697	849	3.10	5965	852	2.50
DAY TOT	34822	36686	37252	37434	37509	30548	24204	183703	36741	100.00	54752	27376	100.00	238455	34065	100.00
MAX	3017	3044	3089	3053	2890	2182	1928	AWT =	36741		AWE =	27376		ADT =	34065	

DAILY TRAFFIC VOLUMES Year 2002
HILLS MOTORWAY,M2 EAST RYDE-W OF MOWBRAY RD Station No. 52.039.E

Week	Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Total	Percent
1	31/12/01	13306	5480p	10521	12108	13439	11056	9823	75733	1.3427
2	7/01/02	12926	14204	15071	15137	15991	11781	10000	95110	1.6862
3	14/01/02	14570	15191	15231	16298	16779	12828	11012	101909	1.8067
4	21/01/02	15504	16621	16505	16246	17527	11955	10620	104978	1.8611
5	28/01/02	10376p	16037	16512	16907	17358	13097	10025	100312	1.7784
6	4/02/02	14833	15322	16107	16459	18121	13191	11392	105425	1.8691
7	11/02/02	16095	16975	16663	17841	18552	13909	11063	111098	1.9696
8	18/02/02	15620	16515	17149	17389	18386	13471	11526	110056	1.9512
9	25/02/02	15991	16759	17023	17396	17937	13108	11031	109245	1.9368
10	4/03/02	15798	16718	17049	17077	18049	13433	11066	109190	1.9358
11	11/03/02	16112	16759	17150	17505	18808	14831	12166	113331	2.0092
12	18/03/02	15820	16767	15929	17285	17891	13843	11396	108931	1.9312
13	25/03/02	16294	17139	17481	17271	7692p	9304	10102	95283	1.6892
14	1/04/02	9722p	15677	16862	16700	17708	13430	11269	101368	1.7971
15	8/04/02	15841	16484	17066	16847	18154	13928	10814	109134	1.9348
16	15/04/02	15864	16189	16749	16723	17738	13958	11519	108740	1.9278
17	22/04/02	15952	16571	16761	10015p	15446	12682	10706	98133	1.7398
18	29/04/02	15948	16661	17071	17118	18012	13363	11592	109765	1.9460
19	6/05/02	15729	16533	16743	16955	17560	13378	13380	110278	1.9551
20	13/05/02	15746	16399	16397	16479	17650	13874	11474	108019	1.9150
21	20/05/02	15608	16284	16404	16813	17345	12569	10979	106002	1.8793
22	27/05/02	15968	16391	16781	16947	17490	12901	10180	106658	1.8909
23	3/06/02	15479	16153	16713	16814	17272	12019	9982	104432	1.8514
24	10/06/02	10229p	15744	16353	16753	17485	13577	10753	100894	1.7887
25	17/06/02	15498	16222	16359	16754	17762	13252	10763	106610	1.8901
26	24/06/02	15587	16509	16783	17061	17725	13016	10912	107593	1.9075
27	1/07/02	15529	16070	16396	16926	17554	12906	11697	107078	1.8984
28	8/07/02	15309	16110	16156	15297	16222	16426	16750	112270	1.9904
29	15/07/02	16487	16327	16844	17466	17766	13318	11482	109690	1.9447
30	22/07/02	15652	16828	16807	17306	17986	14209	11804	110592	1.9607
31	29/07/02	15907	17053	17470	17677	18575	14450	11906	113038	2.0040
32	5/08/02	16072	17463	17167	17762	18347	14473	11764	113048	2.0042
33	12/08/02	15866	16955	18541	18632	18461	13659	11726	113840	2.0182
34	19/08/02	16083	16961	17186	17571	18269	15647	11383	113100	2.0051
35	26/08/02	16079	16750	17903	17852	18090	14067	12073	112814	2.0001
36	2/09/02	15846	16611	17189	17350	18276	14197	11573	111042	1.9686
37	9/09/02	16124	16346	16883	17480	18706	14010	11680	111229	1.9720
38	16/09/02	15881	16842	17512	17338	18247	14397	12096	112313	1.9912
39	23/09/02	16167	17447	18083	17893	18829	14792	11411	114622	2.0321
40	30/09/02	16418	17284	18052	17763	17510	12972	10472	110471	1.9585
41	7/10/02	10420p	16355	16722	16567	17934	13571	11427	102996	1.8260
42	14/10/02	16471	17134	17634	17798	18847	15052	12751	115687	2.0510
43	21/10/02	16557	17384	18089	18058	18971	14202	11821	115082	2.0403
44	28/10/02	16384	17453	17994	18154	18962	13900	11991	114838	2.0359
45	4/11/02	17260	16649	17532	17856	19011	14670	11767	114745	2.0343
46	11/11/02	16733	17607	17497	17971	19261	14244	12289	115602	2.0495
47	18/11/02	16859	17900	18419	18130	19272	14734	12623	117937	2.0909
48	25/11/02	16937	17649	18470	18796	20527	15446	12683	120508	2.1365
49	2/12/02	16791	18305	19380	18555	19742	15747	12543	121063	2.1463
50	9/12/02	17248	17731	18018	19133	20609	15545	12738	121022	2.1456
51	16/12/02	17597	18230	18581	18798	19340	14285	11433	118264	2.0967
52	23/12/02	14663	12919	11469p	10031p	11297	9514	9544	79437	1.4083
Annual Averages:		15896	16612	16980	17220	17898	13619	11480	108472	

AADT	AAWT	AAWE	AAPH
15496	16932	12550	9493

p indicates Public Holiday

DAILY TRAFFIC VOLUMES Year 2002
HILLS MOTORWAY,M2 EAST RYDE-W OF MOWBRAY RD

Station No. 52.039.W

Week	Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Total	Percent
1	31/12/01	9019	9032p	11285	12673	13648	10831	9900	76388	1.2726
2	7/01/02	13535	15084	15957	15942	16758	12019	10565	99860	1.6636
3	14/01/02	15601	16288	16525	17492	18627	13169	11711	109413	1.8228
4	21/01/02	16637	17753	17806	17714	18606	12292	11148	111956	1.8652
5	28/01/02	10048p	17072	17960	18284	18819	13321	10959	106463	1.7736
6	4/02/02	16219	16812	17578	18010	19296	13628	12125	113668	1.8937
7	11/02/02	17122	18356	18379	19054	20131	14366	11709	119117	1.9845
8	18/02/02	16672	18615	18715	18799	19933	13819	11910	118463	1.9736
9	25/02/02	17453	18144	18980	18876	19524	13309	11813	118099	1.9675
10	4/03/02	16971	18153	18343	19081	19796	13934	11840	118118	1.9678
11	11/03/02	17373	18433	18473	19045	20345	15110	12877	121656	2.0268
12	18/03/02	17594	18302	18560	19205	19652	14191	12227	119731	1.9947
13	25/03/02	17588	18673	19562	19326	9513p	9038	10289	103989	1.7324
14	1/04/02	8631p	16276	18293	18403	19329	13874	11863	106669	1.7771
15	8/04/02	17324	18244	18692	18939	19654	14428	11455	118736	1.9781
16	15/04/02	17112	17815	18596	18618	19292	14207	12121	117761	1.9619
17	22/04/02	17160	18346	19755	10910p	16130	12666	11215	106182	1.7690
18	29/04/02	16944	18326	18978	18992	19412	13958	12014	118624	1.9762
19	6/05/02	17201	18321	18712	18813	19450	14151	13981	120629	2.0096
20	13/05/02	17066	18111	18298	18523	19292	13906	12499	117695	1.9608
21	20/05/02	16734	17908	18154	18495	19221	12816	11995	115323	1.9212
22	27/05/02	17383	17964	18523	18506	19185	13500	11072	116133	1.9347
23	3/06/02	16739	18060	18294	18859	19241	12625	10502	114320	1.9045
24	10/06/02	9384p	16944	18121	18732	19654	13836	11514	108185	1.8023
25	17/06/02	17069	18020	18241	18796	19469	13972	11411	116978	1.9488
26	24/06/02	16840	18068	18563	18912	19446	13389	11627	116845	1.9466
27	1/07/02	16816	17744	18297	18983	19117	13445	11794	116196	1.9358
28	8/07/02	16642	17659	18119	18167	19060	13566	12013	115226	1.9196
29	15/07/02	16701	17656	18177	18601	19177	13174	11358	114844	1.9133
30	22/07/02	16806	17812	18096	18467	19221	13969	11510	115881	1.9305
31	29/07/02	17060	17956	18869	19151	19633	14357	12420	119446	1.9899
32	5/08/02	16944	18510	18610	18945	19454	14364	12078	118905	1.9809
33	12/08/02	17159	18254	18597	18874	19622	13800	11559	117865	1.9636
34	19/08/02	17181	18016	18813	19177	19481	14505	11949	119122	1.9845
35	26/08/02	16957	17947	18564	19011	19411	14474	12382	118746	1.9783
36	2/09/02	16681	17944	18363	18830	19430	14174	11947	117369	1.9553
37	9/09/02	17260	18217	18160	18864	19586	14353	11776	118216	1.9694
38	16/09/02	17229	18157	18796	18874	19759	14349	12465	119629	1.9930
39	23/09/02	17255	19050	18807	19318	19936	14525	11866	120757	2.0118
40	30/09/02	17155	18268	18713	18764	19072	12543	10565	115080	1.9172
41	7/10/02	9626p	16861	17939	18354	19019	13714	11229	106742	1.7783
42	14/10/02	17208	18202	18784	19017	20492	15207	12957	121867	2.0303
43	21/10/02	17504	18593	19161	19211	19854	14468	12293	121084	2.0172
44	28/10/02	17206	18501	19138	19659	20097	13786	11939	120326	2.0046
45	4/11/02	17499	17638	19338	19061	19640	14547	11978	119701	1.9942
46	11/11/02	17516	18649	19044	19358	20219	14682	12525	121993	2.0324
47	18/11/02	17812	18933	19759	19256	20337	15153	12831	124081	2.0672
48	25/11/02	17933	18918	19765	19846	20434	16029	13058	125983	2.0988
49	2/12/02	17629	19333	21155	20214	20237	15582	13717	127867	2.1302
50	9/12/02	18231	18813	19367	20248	21142	16036	13700	127537	2.1247
51	16/12/02	18946	19446	20173	20617	20393	14775	12261	126611	2.1093
52	23/12/02	15744	15359	11551p	8621p	10646	9186	9317	80424	1.3398
Annual Averages:		16884	17971	18470	18739	19184	13752	11843	115433	

AADT	AAWT	AAWE	AAPH
16490	18264	12798	9702

p indicates Public Holiday

DAILY TRAFFIC VOLUMES Year 2002

EPPING RD,MR373 EAST RYDE-W OF HILLS MWY,M2 TERMINAL Station No. 52.040.E

Week	Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Total	Percent
1	31/12/01	24220	16243p	23795	26069	27872	21231	18719	158149	1.4584
2	7/01/02	27747	31208	30364	31200	32457	23232	19929	196137	1.8087
3	14/01/02	30174	31481	31837	33050	33008	24456	20512	204518	1.8860
4	21/01/02	31231	32639	32853	32862	34492	22433	19751	206261	1.9021
5	28/01/02	19230p	32538	33517	33660	32665	25842	20047	197499	1.8213
6	4/02/02	29700	30733	32307	33090	34302	25724	21766	207622	1.9147
7	11/02/02	32454	33995	33105	35072	36024	26158	21204	218012	2.0105
8	18/02/02	30847	33420	33883	34405	35570	26900	22081	217106	2.0021
9	25/02/02	32596	33653	33864	34001	34702	26462	21261	216539	1.9969
10	4/03/02	32404	33589	35290	35682	34461	26549	21629	219604	2.0252
11	11/03/02	32765	34108	34228	35031	35161	27698	21813	220804	2.0362
12	18/03/02	32325	33408	34863	34824	34686	26825	21688	218619	2.0161
13	25/03/02	33016	34030	35150	34578	15816p	19467	18353	190410	1.7559
14	1/04/02	18636p	31265	33373	33820	34540	26357	21277	199268	1.8376
15	8/04/02	33356	33833	33675	34271	34440	26218	20414	216207	1.9938
16	15/04/02	32019	33408	33719	34192	34163	25465	20638	213604	1.9698
17	22/04/02	31399	34068	36576	19313p	30880	24252	19995	196483	1.8119
18	29/04/02	31947	33252	34670	34343	33962	26568	20923	215665	1.9888
19	6/05/02	32159	33551	34262	34337	34545	26574	23611	219039	2.0199
20	13/05/02	32997	32589	33493	34454	34430	26253	20883	215099	1.9836
21	20/05/02	31226	33109	33848	33962	33475	24865	21014	211499	1.9504
22	27/05/02	31898	32147	33742	33383	34113	26132	19901	211316	1.9487
23	3/06/02	31736	33208	33470	33967	33138	23070	18998	207587	1.9143
24	10/06/02	18249p	31993	33350	33619	34298	25915	20306	197730	1.8234
25	17/06/02	31116	31117	32161	33152	33482	26080	20644	207752	1.9159
26	24/06/02	31271	32453	32985	33501	33778	25761	21037	210786	1.9438
27	1/07/02	30839	32510	33141	33682	33350	25215	20896	209633	1.9332
28	8/07/02	30598	32382	32602	33040	33878	23467	20372	206339	1.9028
29	15/07/02	30555	31544	32521	33023	32673	24481	20998	205795	1.8978
30	22/07/02	31085	32790	32857	33591	33994	26124	21082	211523	1.9506
31	29/07/02	31606	34693	34318	33990	33908	26506	21106	216127	1.9931
32	5/08/02	31781	33209	33708	33972	33955	26862	20895	214382	1.9770
33	12/08/02	31313	33110	33766	34150	34269	26607	20340	213555	1.9694
34	19/08/02	31664	32918	33333	33812	33567	26638	21089	213021	1.9644
35	26/08/02	30943	33287	33642	33832	34198	26812	21724	214438	1.9775
36	2/09/02	31282	32308	33404	34054	33907	26177	21360	212492	1.9596
37	9/09/02	31454	32858	32930	33635	34026	26409	21601	212913	1.9635
38	16/09/02	31631	32259	33695	34322	34390	26990	21426	214713	1.9801
39	23/09/02	31344	32982	33787	33948	34483	25391	21588	213523	1.9691
40	30/09/02	31219	32269	32880	33267	32313	22138	18938	203024	1.8723
41	7/10/02	18502p	31792	33131	34050	33310	24859	20453	196097	1.8084
42	14/10/02	31847	32932	33783	33967	33936	25877	21398	213740	1.9711
43	21/10/02	31883	33408	34008	34453	33957	25675	20857	214241	1.9757
44	28/10/02	31686	33595	33924	34495	34222	25851	20975	214748	1.9804
45	4/11/02	31748	31892	33520	34044	34115	26134	20990	212443	1.9591
46	11/11/02	31976	32941	33446	34084	33562	26447	21293	213749	1.9712
47	18/11/02	31965	32858	33766	33842	34699	26414	21663	215207	1.9846
48	25/11/02	32073	33570	34418	34719	35908	27074	21493	219255	2.0219
49	2/12/02	32075	33515	34204	33688	33956	26740	22124	216302	1.9947
50	9/12/02	31831	31325	33695	35146	36431	26733	22500	217661	2.0072
51	16/12/02	32352	33855	34209	34911	34244	24162	19816	213549	1.9693
52	23/12/02	28662	25187	17295p	15551p	20587	17840	16909	142031	1.3098
Annual Averages:		31375	32682	33393	33805	33657	25387	20813	208535	

AADT	AAWT	AAWE	AAPH
29791	32998	23100	17648

p indicates Public Holiday

DAILY TRAFFIC VOLUMES Year 2002

EPPING RD,MR373 EAST RYDE-W OF HILLS MWY,M2 TERMINAL Station No. 52.040.W

Week	Beginning	Mon	Tue	Wed	Thu	Fri	Sat	Sun	Total	Percent
1	31/12/01	21605	24227p	26710	29040	30605	24071	21941	178199	1.4745
2	7/01/02	30858	33034	33494	34063	34863	26804	23756	216872	1.7946
3	14/01/02	33604	34909	35490	36270	35017	28121	24363	227774	1.8848
4	21/01/02	34775	35881	36476	36434	36413	26202	23173	229354	1.8978
5	28/01/02	21883p	35781	37012	36978	36096	29132	24453	221335	1.8315
6	4/02/02	32787	34188	35556	36636	37567	29588	26169	232491	1.9238
7	11/02/02	36258	37409	37053	38201	38227	30133	25376	242657	2.0079
8	18/02/02	34501	36835	37726	37654	38395	30683	26024	241818	2.0010
9	25/02/02	35688	37277	37519	37628	38246	29751	25627	241736	2.0003
10	4/03/02	36142	37715	38914	39548	37620	30346	25638	245923	2.0349
11	11/03/02	36578	37856	38061	38626	38477	31340	25941	246879	2.0429
12	18/03/02	35849	37212	38036	38650	37949	30269	25854	243819	2.0175
13	25/03/02	36657	38171	39193	37874	20514p	21561	21198	215168	1.7805
14	1/04/02	20246p	34688	36632	37057	37402	29939	25476	221440	1.8324
15	8/04/02	35279	36731	37566	37558	37549	29943	24729	239355	1.9806
16	15/04/02	35680	36620	36996	37613	37309	28929	24877	238024	1.9696
17	22/04/02	35259	37310	38526	23070p	33710	27231	23778	218884	1.8112
18	29/04/02	35389	36744	37731	37833	36555	30328	25323	239903	1.9851
19	6/05/02	35861	37188	37487	37805	37739	30420	27299	243799	2.0174
20	13/05/02	35304	36005	37045	37496	37302	29718	25051	237921	1.9687
21	20/05/02	34849	36686	37661	37031	36717	28370	25077	236391	1.9561
22	27/05/02	35271	35916	36706	37028	37229	29777	23856	235783	1.9510
23	3/06/02	35257	36716	37113	37558	36262	27112	22412	232430	1.9233
24	10/06/02	20494p	35627	36931	37179	36899	29669	24122	220921	1.8281
25	17/06/02	34434	34439	35646	36396	36565	29993	24496	231969	1.9195
26	24/06/02	34747	35732	36552	37189	36937	29251	24937	235345	1.9474
27	1/07/02	34652	36116	36016	36778	36730	28790	25245	234327	1.9390
28	8/07/02	34009	35824	35933	36525	35922	26937	23990	229140	1.8961
29	15/07/02	33880	35067	35968	35960	36044	28182	24449	229550	1.8995
30	22/07/02	34465	35827	35920	36706	37153	29613	24825	234509	1.9405
31	29/07/02	35044	36051	37567	37425	37237	30452	24884	238660	1.9748
32	5/08/02	35124	36650	36102	37209	37258	30400	24617	237360	1.9641
33	12/08/02	34822	36686	37252	37434	37509	30548	24204	238455	1.9731
34	19/08/02	34914	36334	37187	37586	36953	30349	24807	238130	1.9705
35	26/08/02	34471	36303	37180	37351	37588	30988	25669	239550	1.9822
36	2/09/02	34642	36034	36445	37230	37128	30191	25206	236876	1.9601
37	9/09/02	34849	36345	36473	36578	37121	30362	25089	236817	1.9596
38	16/09/02	35003	35699	36916	37514	37875	30491	25361	238859	1.9765
39	23/09/02	34795	36124	36875	37317	38194	29118	25316	237739	1.9672
40	30/09/02	34670	35544	36110	36525	35837	25917	22070	226673	1.8757
41	7/10/02	20686p	34838	36420	36806	36180	28468	24134	217532	1.8000
42	14/10/02	34891	36390	37197	37297	37273	29631	25417	238096	1.9702
43	21/10/02	35335	36628	37353	37969	37027	29395	25021	238728	1.9754
44	28/10/02	35084	36733	37409	37764	37391	29439	24617	238437	1.9730
45	4/11/02	35050	35060	37528	37273	37228	29703	24958	236800	1.9595
46	11/11/02	35365	36401	37497	37383	36824	29799	25469	238738	1.9755
47	18/11/02	35298	36826	37051	36852	37527	30237	25573	239364	1.9807
48	25/11/02	35286	36730	37758	37951	36910	31034	26101	241770	2.0006
49	2/12/02	35622	36709	37308	37496	36726	30407	26580	240848	1.9929
50	9/12/02	35796	34401	36816	38335	38092	30706	26577	240723	1.9919
51	16/12/02	35673	37378	37633	38251	37685	28045	23969	238634	1.9746
52	23/12/02	32225	29900	19895p	17145p	23126	20509	19710	162510	1.3447
Annual Averages:		34658	36064	36779	37137	36631	29008	24708	232404	

AADT	AAWT	AAWE	AAPH
33201	36270	26858	20907

p indicates Public Holiday

Attachment 33 – Contract Deed – Rent and Base Revenue

1. Definitions and interpretation

1.1 Definitions

Words and expressions not defined in this Lease will have the same meaning as the words and expressions defined in the Project Deed except that:

"Actual Revenue" means, in respect of any Rent Period, the aggregate of tolls collected (exclusive of GST) in accordance with clause 17 of the Project Deed.

"Base Revenue" means, in respect of any Rent Period, the amount of gross toll revenue (exclusive of GST) specified for that period in the Base Case Financial Model (as at the date of the Project Deed).

"Claim" includes any claim, action, demand or proceeding:

(a) under, arising out of, or in any way in connection with, this Lease;

(b) arising out of, or in any way in connection with the Project or either of the Lessor's or Lessee's conduct prior to the date of this Lease; or

(c) otherwise at law or in equity including:

(i) by statute;

(ii) in tort for negligence or otherwise, including negligent misrepresentation; or

(iii) for restitution, including restitution based on unjust enrichment.

"Commencement Date" means the date which is the Completion Date of Stage 1.

"Company" means Lane Cove Tunnel Company Pty Limited, ACN 103 411 052.

"Easements" means those easements, restrictions on use, covenants, agreements, or other similar arrangements together with any leases, sub-leases, licences, rights or privileges in each case as contemplated by clause 8, which benefit or burden the Motorway Stratum.

"Lease" means this deed.

"Lessee" means Lane Cove Tunnel Nominee Company Pty Limited, ACN 103 411 294 as trustee for the Trust.

"Lessee's Employees" means the authorised agents, employees, invitees and sub-contractors of the Lessee and their respective employees and invitees, of the Lessee and any other person authorised by the Lessee.

"Lessor" means the Roads and Traffic Authority of New South Wales.

"Lessor's Employees" means the authorised officers, agents, employees, invitees and sub-contractors of the Lessor and their employees and invitees of the Lessor and any other person authorised by the Lessor.

"Motorway Stratum" means the land (and improvements) details of which are set out in Schedule 1 annexed to this Lease.

"Non-toll Business" means the use of the Motorway or the Motorway Stratum by the Company for any business or revenue generating activity other than the collection of tolls and

charges approved in accordance with the Project Deed (including permitting others to have access to the Motorway or the Motorway Stratum for the purpose of installing and operating Services and service centres).

"Project Deed" means the deed titled "Lane Cove Motorway Project Deed" dated [*insert*] between the Lessor, the Lessee and the Company.

"Rent" means, in respect of any Rent Period, the aggregate of:

(a) the amount of $1.00;

(b) in respect of each Non-toll Business, the share of gross revenue (exclusive of GST) derived from the Non-toll Business that is agreed between the Lessor and the Company pursuant to clause 17.3 of the Project Deed; and

(c) the aggregate of:

(i) 0% of that amount of Actual Revenue that is greater than 100% and less than or equal to 110% of Base Revenue;

(ii) 10% of that amount of Actual Revenue that is greater than 110% and less than or equal to 120% of Base Revenue;

(iii) 20% of that amount of Actual Revenue that is greater than 120% and less than or equal to 130% of Base Revenue;

(iv) 30% of that amount of Actual Revenue that is greater than 130% and less than or equal to 140% of Base Revenue;

(v) 40% of that amount of Actual Revenue that is greater than 140% and less than or equal to 150% of Base Revenue; and

(vi) 50% of that amount of Actual Revenue that is greater than 150% of Base Revenue.

"Rent Period" means each of the following:

(a) the period commencing on the Commencement Date and terminating on the next 30 June;

(b) each subsequent period of 12 months wholly within the Term; and

(c) the period from 1 July during the last year of the Term to the Termination Date.

"Security Interest" has the meaning given to that term in the RTA Consent Deed.

"Sublease" means the sublease between the Lessee and the Company of the Motorway Stratum and licence for access to the Licensed Maintenance Areas dated on or about the date of this Lease.

"Term" means the period beginning on the Commencement Date and ending on the Termination Date.

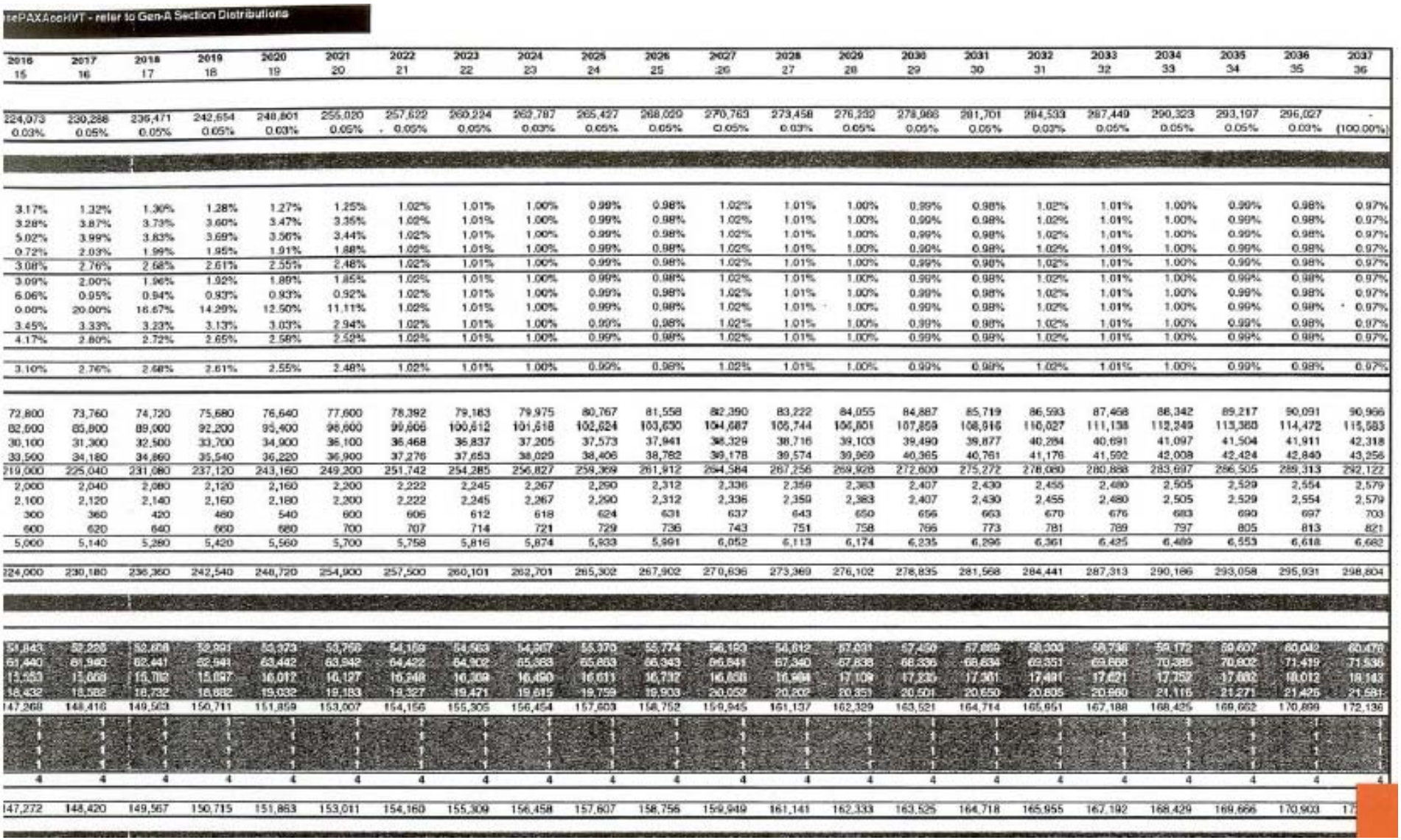
"Termination Date" means the earlier to occur of:

(a) if the Satisfaction Date occurs on or before 10 December 2003 (or such later date as the Lessor and the Lessee may agree), one month after the 33rd anniversary of the Satisfaction Date; or

Attachment 34 – LCTC Base Case Financial Model – Traffic Projections December 2002

Note 1: Changes to the Debt Base Cases, require a change in the ranges M_DistnPAXBase, M_DistnPAXBaseHVT, M_DistnPAXAps, M_DistnPAXApsHVT, M_LeasePAXBase, M_LeasePAXBaseHVT, M_LeasePAXAps, M_LeasePAXA
Note 2: Use of the RTA or Custom cases, or changes to the other cases, requires a change in the range "M_LeasePAXBase", i.e. load the case, then copy and paste values from "M_DistnPaxCrnt" to "M_LeasePAXBase".

Year (Calendar)		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016
Count			2	3	4	5	6	7	8	9	10	11	12	13	14	15
From Model																
Total		-	-	-	-	-	97,101	161,940	174,342	182,366	190,390	197,104	203,876	210,619	217,362	224,073
Check		(100.00%)	(100.00%)	(100.00%)	(100.00%)	(100.00%)	(38.57%)	(2.59%)	0.05%	0.05%	0.05%	0.03%	0.05%	0.05%	0.05%	0.03%
Active Case																
Growth Table	1															
Cars - Tunnel - Eastbound	2	0.00%	2.35%	2.40%	2.46%	2.52%	2.52%	2.46%	2.40%	2.35%	2.29%	3.64%	3.51%	3.39%	3.28%	3.17%
Cars - Tunnel - Westbound	3	0.00%	4.76%	5.00%	5.26%	5.55%	5.55%	5.26%	5.00%	4.76%	4.54%	3.77%	3.63%	3.51%	3.39%	3.28%
Cars - Falcon St - On	4	0.00%	8.72%	9.55%	10.56%	11.81%	11.81%	10.56%	9.55%	8.72%	8.02%	6.29%	5.92%	5.59%	5.29%	5.02%
Cars - Falcon St - Off	5	0.00%	5.96%	6.34%	6.77%	7.26%	7.26%	6.77%	6.34%	5.96%	5.62%	0.74%	0.74%	0.73%	0.73%	0.72%
Total	6	0.00%	4.28%	4.55%	4.86%	5.24%	5.31%	5.04%	4.80%	4.58%	4.38%	3.51%	3.39%	3.28%	3.18%	3.08%
Trucks - Tunnel - Eastbound	7	0.00%	3.80%	3.95%	4.11%	4.29%	4.29%	4.11%	3.95%	3.80%	3.66%	3.53%	3.41%	3.30%	3.10%	3.08%
Trucks - Tunnel - Westbound	8	0.00%	5.97%	6.35%	6.78%	7.27%	7.27%	6.78%	6.35%	5.97%	5.63%	8.00%	7.41%	6.90%	6.45%	6.06%
Trucks - Falcon St - On	9	0.00%	18.18%	22.22%	28.57%	40.00%	40.00%	28.57%	22.22%	18.18%	15.38%	0.00%	0.00%	0.00%	0.00%	0.00%
Trucks - Falcon St - Off	10	0.00%	4.35%	4.55%	4.76%	5.00%	5.00%	4.76%	4.55%	4.35%	4.17%	4.00%	3.85%	3.70%	3.57%	3.45%
Total	11	0.00%	4.87%	5.21%	5.67%	6.37%	6.67%	6.25%	5.88%	5.56%	5.26%	5.00%	4.76%	4.55%	4.35%	4.17%
	12															
Total	13	0.00%	4.29%	4.66%	4.88%	5.26%	5.34%	5.07%	4.82%	4.60%	4.40%	3.54%	3.42%	3.31%	3.20%	3.10%
Discounted Patronage	1															
Cars - Tunnel - Eastbound	2	48,686	50,851	52,673	53,354	54,700	56,080	57,460	58,840	60,220	61,600	63,840	66,080	68,320	70,560	72,800
Cars - Tunnel - Westbound	3	44,515	46,633	48,964	51,559	54,400	57,420	60,440	63,460	66,480	69,500	72,120	74,740	77,360	79,980	82,600
Cars - Falcon St - On	4	9,781	10,634	11,649	12,880	14,400	16,100	17,800	19,500	21,200	22,900	24,340	25,780	27,220	28,660	30,100
Cars - Falcon St - Off	5	18,368	19,453	20,696	22,096	23,700	25,420	27,140	28,860	30,580	32,300	32,540	32,780	33,020	33,260	33,500
Total	6	122,350	127,581	133,382	139,869	147,200	155,020	162,840	170,660	178,480	186,300	192,840	199,380	205,920	212,460	219,000
Trucks - Tunnel - Eastbound	7	1,195	1,241	1,289	1,342	1,400	1,460	1,520	1,580	1,640	1,700	1,760	1,820	1,880	1,940	2,000
Trucks - Tunnel - Westbound	8	852	903	960	1,025	1,100	1,180	1,260	1,340	1,420	1,500	1,620	1,740	1,860	1,980	2,100
Trucks - Falcon St - On	9	38	45	56	71	100	140	180	220	260	300	300	300	300	300	300
Trucks - Falcon St - Off	10	333	348	364	381	400	420	440	460	480	500	520	540	560	580	600
Total	11	2,418	2,537	2,669	2,820	3,000	3,200	3,400	3,600	3,800	4,000	4,200	4,400	4,600	4,800	5,000
	12															
Total	13	124,769	130,118	136,051	142,689	150,200	158,220	166,240	174,260	182,280	190,300	197,040	203,780	210,520	217,260	224,000
RTA Case: RTACase																
Patronage	1															
Cars - Tunnel - Eastbound	2	46,722	47,072	47,427	47,788	48,154	48,523	48,892	49,261	49,630	49,999	50,387	50,776	51,165	51,474	51,843
Cars - Tunnel - Westbound	3	54,772	55,225	55,686	56,155	56,632	57,113	57,594	58,074	58,555	59,036	59,517	59,998	60,478	60,958	61,440
Cars - Falcon St - On	4	14,017	14,122	14,228	14,336	14,446	14,557	14,668	14,778	14,889	15,000	15,110	15,221	15,332	15,442	15,553
Cars - Falcon St - Off	5	16,432	16,568	16,706	16,847	16,990	17,134	17,278	17,422	17,567	17,711	17,855	17,999	18,144	18,288	18,432
Total	6	131,943	132,987	134,048	135,126	136,222	137,326	138,431	139,536	140,640	141,745	142,849	143,954	145,059	146,163	147,268
Trucks - Tunnel - Eastbound	7	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Trucks - Tunnel - Westbound	8	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Trucks - Falcon St - On	9	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Trucks - Falcon St - Off	10	1	1	1	1	1	1	1	1	1	1	1	1	1	1	1
Total	11	4	4	4	4	4	4	4	4	4	4	4	4	4	4	4
	12															
Total	13	131,947	132,991	134,052	135,130	136,226	137,330	138,435	139,540	140,644	141,749	142,853	143,958	145,063	146,167	147,272

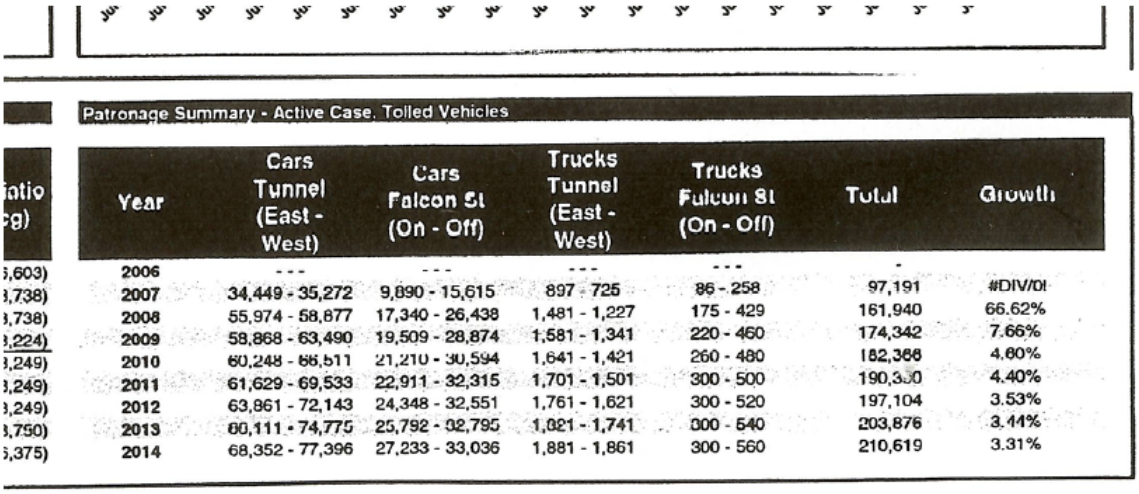

rePAXAccHVT - refer to Gen-A Section Distributions

Attachment 35 – Base Case Financial Model Tabulated Traffic Volumes

Base Case Financial Model Traffic Volumes							
Eastbound				Westbound			Total
Year	cars	trucks	Total EB	cars	trucks	Total WB	Both Tunnels
2006	54,700	1,400	56,100	54,400	1,100	55,500	111,600
2007	56,080	1,460	57,540	57,420	1,180	58,600	116,140
2008	57,460	1,520	58,980	60,440	1,260	61,700	120,680
2009	58,840	1,580	60,420	63,460	1,340	64,800	125,220
2010	60,220	1,640	61,860	66,480	1,420	67,900	129,760
2011	61,600	1,700	63,300	69,500	1,500	71,000	134,300
2012	63,840	1,760	65,600	72,120	1,620	73,740	139,340
2013	66,080	1,820	67,900	74,740	1,740	76,480	144,380
2014	68,320	1,880	70,200	77,360	1,860	79,220	149,420
2015	70,560	1,940	72,500	79,980	1,980	81,960	154,460
2016	72,800	2,000	74,800	82,600	2,100	84,700	159,500
2017	73,760	2,040	75,800	85,800	2,120	87,920	163,720
2018	74,720	2,080	76,800	89,000	2,140	91,140	167,940
2019	75,680	2,120	77,800	92,200	2,160	94,360	172,160
2020	76,640	2,160	78,800	95,400	2,180	97,580	176,380
2021	77,600	2,200	79,800	98,600	2,200	100,800	180,600
2022	78,392	2,222	80,614	99,606	2,222	101,828	182,442
2023	79,183	2,245	81,428	100,612	2,245	102,857	184,285
2024	79,975	2,267	82,242	101,618	2,267	103,885	186,127
2025	80,767	2,290	83,057	102,624	2,290	104,914	187,971
2026	81,558	2,312	83,870	103,630	2,312	105,942	189,812
2027	82,390	2,336	84,726	104,687	2,336	107,023	191,749
2028	83,222	2,359	85,581	105,744	2,359	108,103	193,684
2029	84,055	2,383	86,438	106,801	2,383	109,184	195,622
2030	84,887	2,407	87,294	107,859	2,407	110,266	197,560
2031	85,719	2,430	88,149	108,916	2,430	111,346	199,495
2032	86,593	2,455	89,048	110,027	2,455	112,482	201,530
2033	87,468	2,480	89,948	111,138	2,480	113,618	203,566
2034	88,342	2,505	90,847	112,249	2,505	114,754	205,601
2035	89,217	2,529	91,746	113,360	2,529	115,889	207,635
2036	90,091	2,554	92,645	114,472	2,554	117,026	209,671
2037	90,966	2,579	93,545	115,583	2,579	118,162	211,707

Attachment 36 – BCFM 2 year Ramp Up profile

Active Case Showing Projected Ramp Up Traffic Volumes 2007-2009



Patronage Summary - Active Case, Tolled Vehicles

Year	Cars Tunnel (East - West)	Cars Falcon St (On - Off)	Trucks Tunnel (East - West)	Trucks Falcon St (On - Off)	Total	Growth
2006	---	---	---	---	-	
2007	34,449 - 35,272	9,890 - 15,615	897 - 725	86 - 258	97,191	#DIV/0!
2008	55,974 - 58,877	17,340 - 26,438	1,481 - 1,227	175 - 429	161,940	66.62%
2009	58,868 - 63,490	19,509 - 28,874	1,581 - 1,341	220 - 460	174,342	7.66%
2010	60,248 - 66,511	21,210 - 30,594	1,641 - 1,421	260 - 480	182,366	4.60%
2011	61,629 - 69,533	22,911 - 32,315	1,701 - 1,501	300 - 500	190,390	4.40%
2012	63,861 - 72,143	24,348 - 32,551	1,761 - 1,621	300 - 520	197,104	3.53%
2013	66,111 - 74,775	25,792 - 32,795	1,821 - 1,741	300 - 540	203,876	3.44%
2014	68,352 - 77,396	27,233 - 33,036	1,881 - 1,861	300 - 560	210,619	3.31%

Attachment 37 – Graphed BCFM Traffic Projections compared to RTA Projections

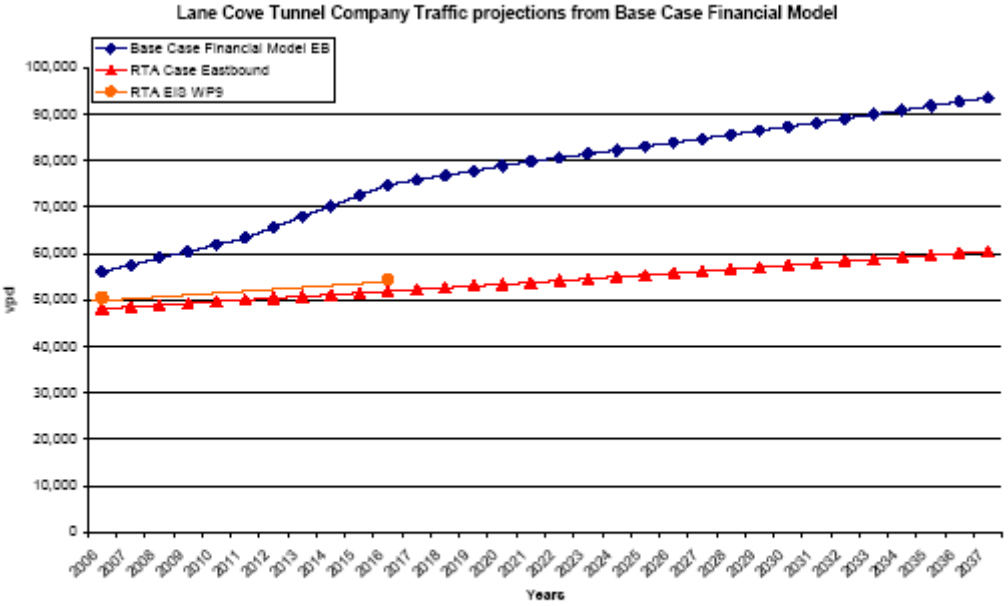


FIGURE 1- EASTBOUND TRAFFIC PROJECTS FOR LANE COVE TUNNEL

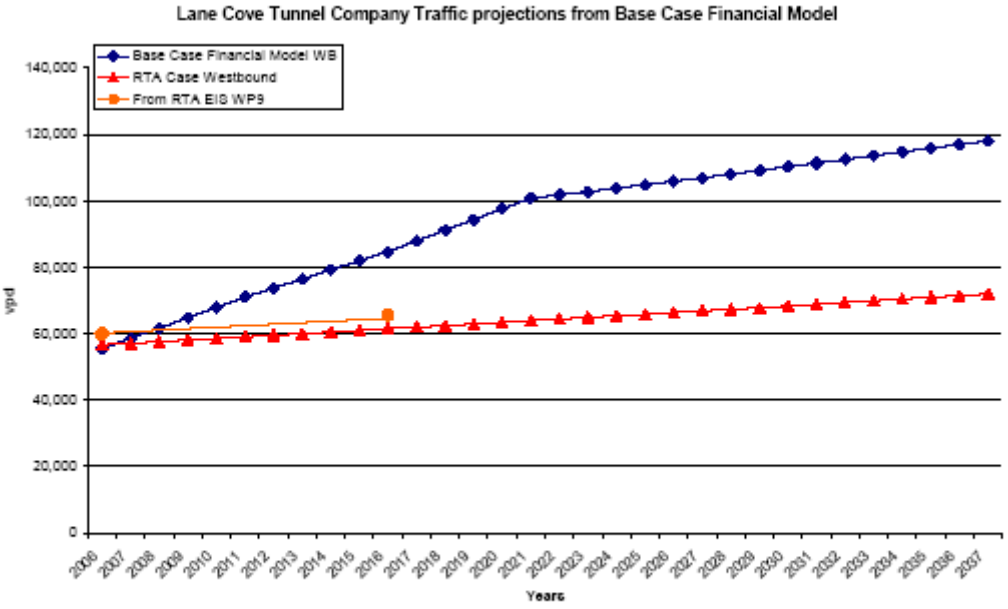


FIGURE 2- WESTBOUND TRAFFIC PROJECTS FOR LANE COVE TUNNEL

Attachment 38 – Graphed BCFM Hourly Traffic Volume Profile 2006, 2016 and 2037

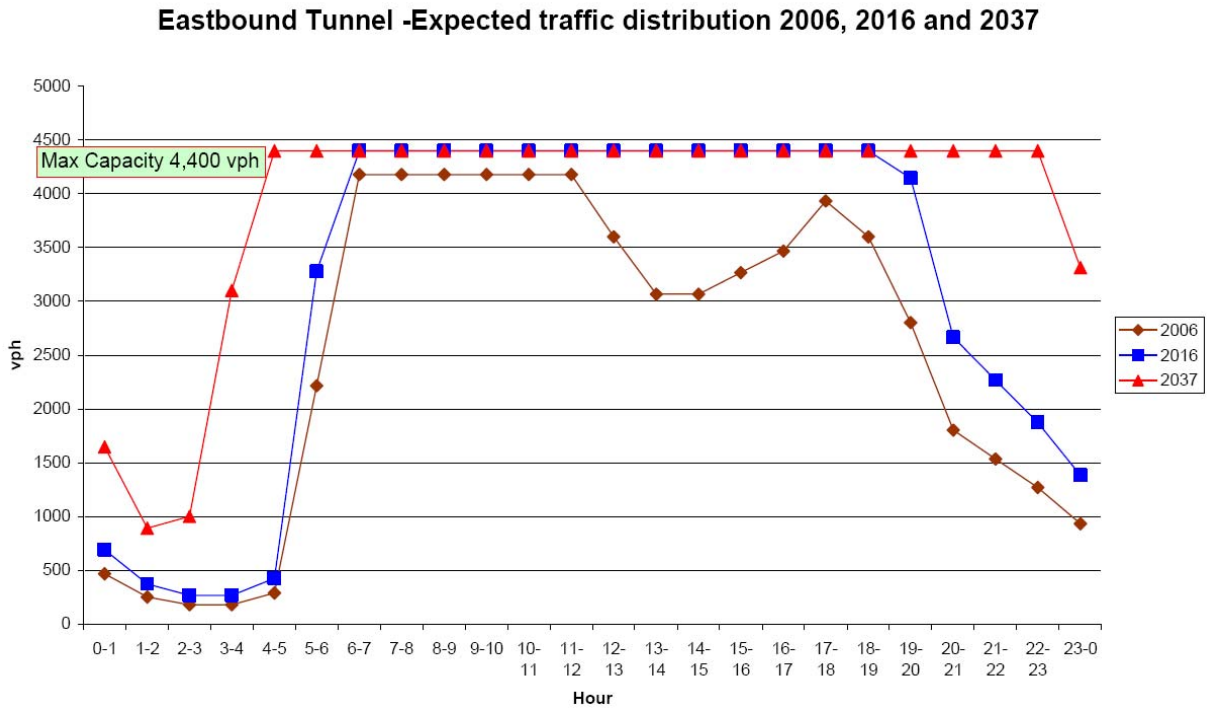


FIGURE 4 DERIVED HOURLY TRAFFIC VOLUMES TO ACHIEVE DAILY TRAFFIC VOLUMES EASTBOUND

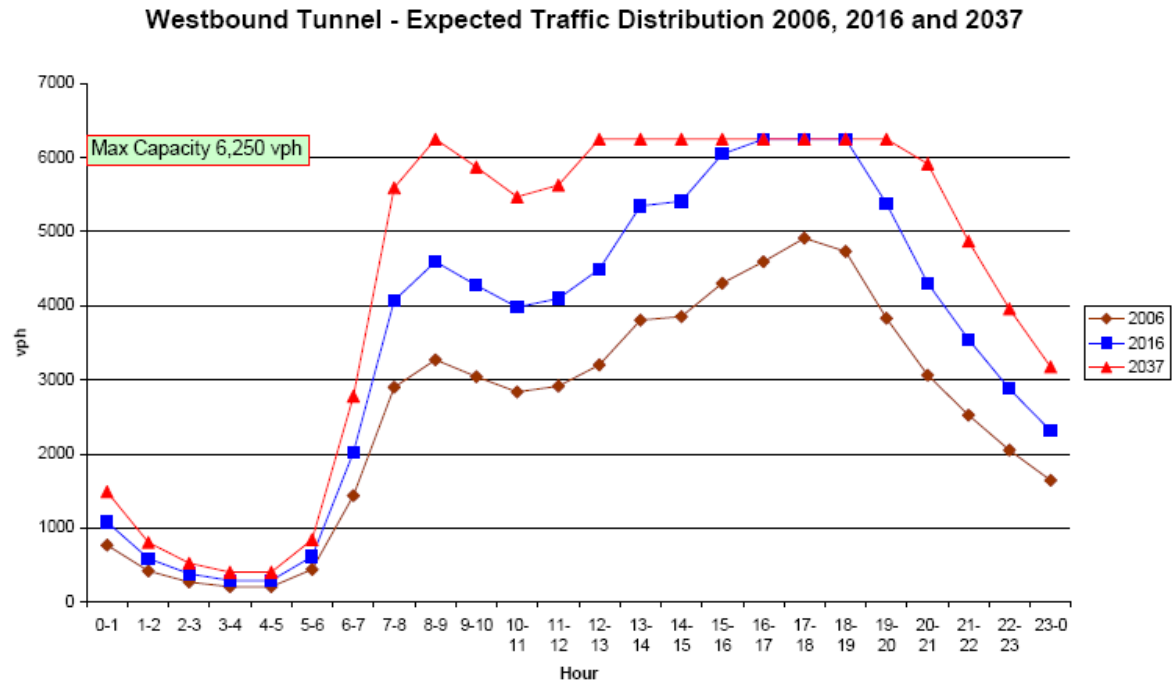


FIGURE 5 DERIVED HOURLY TRAFFIC VOLUMES TO ACHIEVE DAILY TRAFFIC VOLUMES WESTBOUND

Attachment 39 - Dr Manins Progress Report and PB Comment On Traffic Volumes

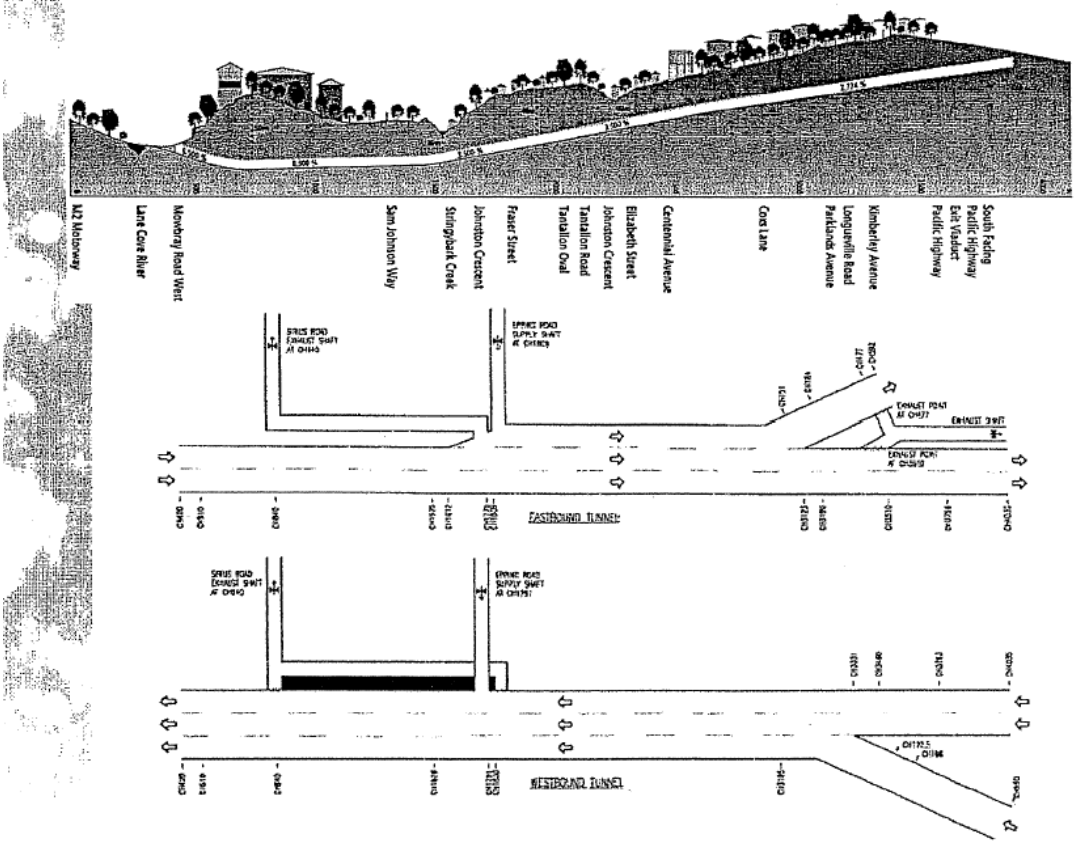
CSIRO

Atmospheric Research

Lane Cove Tunnel

Air Quality Modelling for DIPNR Condition 173

Issues discussed by Peter Manins



This is a Progress Report on reviewing the air quality modelling approach, inputs and results for the Lane Cove Tunnel. Following that is discussion of relevant points raised in the Air Quality Community Consultative Committee. It is pertinent to note the timing of events relative to the Reports being reviewed. In particular, Department of Environment and Conservation air modelling requirements (DEC 2004a) was issued in November 2004, after the modelling for LCT by CAMM (PB 2004, CAMM 2004) was completed. And the AQCCC has prompted some additional work — calculation of annual averages of predicted benzene concentrations, is an example.

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1. Questions and Comments about Emissions from Vehicles and Vents

Parsons Brinkerhoff Document No. PB-RP-TU-ME15-02420B-0 (PB, 2004) raises several questions. These have been put to Dr Magdalena Vasilovska of Parsons Brinkerhoff.

1. Table 2 and similar in the PB Document are presented with a precision that requires that a particular traffic speed(s) in the tunnel has been used. The text merely points to Table 3A and 3B. What is that speed(s)? PB has explained the procedure clearly.

   Section 4.1 indicates that for heavily congested conditions (those used to construct Table 1A of Appendix B3) the chosen speed was 5 kph. PB has confirmed that.

2. Table 2 shows that maximum traffic volume will reach [redacted] vehicles for two lanes for 2006. What confidence limits does PB place on this? Particularly given the much higher usage and shorter time to reach this usage for the M5E than was planned? Is the volume expected to be correct within 20%? So, could the traffic reach 4900 vehicles for two lanes within 12 months of opening? PB's response is

   The traffic numbers used came from LCTC's patronage projections and assumes that the Lane Cove Tunnel remains a tolled road. LCTC is a commercial enterprise and if anything will have overestimated rather than underestimated the patronage.

   This response seems counter to the experience of the M5 East (not tolled) and the expectations of the Cross City Tunnel JV partners. See the discussion in Section 6.

   Has that been considered in the emissions estimates and ventilation requirements? What of the extent of the am peak and pm peak? The M5E experience seems to be that the tunnel runs at or near capacity for many hours longer each day. At present PB seems to take the AM peak to be six hours and the PM peak to be perhaps two hours.

   PB's response notes that the ventilation system is designed to cope with the more severe case of abnormal congestion and that in regards to the air dispersion and the impact on the environment, the air dispersion modelling results showed that the impact on the environment is lower in case of abnormal traffic congestion. The ventilation rate through the stack(s) will be higher, the stack exit velocity will be higher and this will result in a better air dispersion. The ventilation rate through the exhaust stack(s) will be increased inline with the increase of the vehicle emissions in order to satisfy the in-tunnel and stack air quality limits.

3. Re vehicle mixes, what are the times of the peak periods listed in Table 3C? A presentation to AQCCC by PB indicated AM Peak = 00:00 - 12:00 and PM Peak = 12:00 - 24:00. PB confirms this to be the case.

4. If the peak periods are not as suggested in 3 above, what are the traffic mixes in non-peak periods? N/A.

5. Why is the design of the ventilation system such that the western vent discharges

much more pollutants than the eastern vent? This seems peculiar in that dispersion conditions at the western end are likely to be poorer than at the eastern end due to the elevated terrain, particularly to the north, around the vent. In congested conditions, even more pollutants are discharged from the western vent, with some pollutants from the eastward tunnel circulated to the western vent. PB's response does not really answer this question yet.

6. I note PIARC approach has mostly been followed to estimating CO, NOx concentrations and PM concentrations and emissions from the tunnel. The usual reference is PIARC (1995). Table 3.2 of the PB report notes that EURO2 / ADR80/00 and ADR79/00 are relevant vehicle emission standards. PB has supplied a copy of a draft of PIARC 2003 which has emission factors for later vehicle standards, including for particle emissions for petrol vehicles.

7. Has PIARC given emissions for these vehicles (EURO2 etc) for different grades? If so, please provide. If not, what have you used to account for the emissions at different grades? It is evident from the material PB has supplied that there are no data for petrol vehicle emissions of particles for different grades. What has PB done in that case?

8. PIARC (1995) only considers grades to ±6%. But LCT will have grades to +8%, -9.5% (and CCT has grades to -12% and +13%). What has PB done to estimate emissions at these grades? PB has responded:

   We have used the following method for grades beyond ±6%:-
   To calculate the emission required for a tunnel sections with gradient >6% (say 9.5% for 100m tunnel length) the equivalent tunnel length for 6% grade was calculated as: (100m x 9.5%)/6% = 158.33m

   The response indicates a linear extrapolation for steeper slopes. This is expected to be quite adequate for Lane Cove Tunnel where the length of steeper slopes is short. But for the Cross City Tunnel and perhaps other tunnels the extrapolation is likely to significantly underestimate particle emissions from diesel vehicles. CSIRO (2000) noted that particle emissions increase more strongly at steeper slopes.

9. PIARC (1995) is silent about particle emissions from petrol vehicles. Has PIARC listed emissions for petrol vehicles since then? Does it include emissions at different grades? Please provide. If not, what has PB done re particle emissions from petrol vehicles, particularly for different grades? PB has responded:

   Emission factors for turbidity because of non exhaust particles as presented in Table II.34 of the attached draft PIARC document have been used for petrol vehicles. Eg. Turbidity of 0.4m^2/h was used for petrol cars and LCV's travelling at 5 kph.

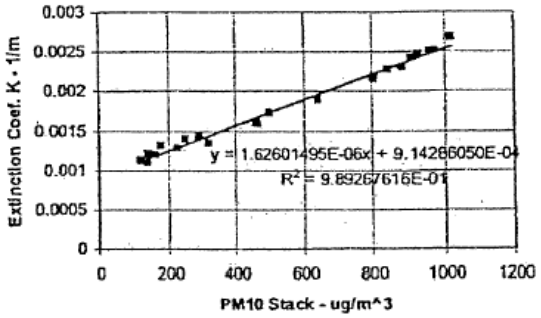
   It appears that PIARC does not recognise exhaust emissions of particles from petrol vehicles. But perhaps that is just an issue of terminology, since the data presented in the draft of PIARC (2003) for petrol vehicles is consistent with the observations for the M5 East and CityLink tunnel as presented in Section 6 below. Since there are no data for particle emissions from petrol vehicles for different grades in the material forwarded by PB, it is still unclear what PB has done about that—almost the whole of the eastward direction for LCT is uphill.

10. PIARC (1995) gives particle emissions in terms of "turbidity". How has PB converted this to particle mass concentrations? PB has responded noting that they apply the PIARC (1995) conversion factor.

This conversion factor between particle concentration and extinction coefficient is (PIARC, 1995, p21):

$$1000\ \mu g/m^3 = 0.0045\ m^{-1}$$

However, a relationship derived from data measured in the M5 East Tunnel is reported by Synergetics (Figure 3 of 2004) and shows that the PIARC conversion factor underestimates particle concentrations by approximately a factor of two, as shown below:



The conversion factor found for the M5 East Tunnel is

$$1000\ \mu g/m3 = 0.0025\ m^{-1} \text{ or}$$
$$2323\ \mu g/m3 = 0.0045\ m^{-1}.$$

This discrepancy between European and Australian experience appears to be part of the explanation why PB seems to underestimate fleet-average vehicle emissions of particles for the LCT design (see Section 6).

11. The air pollution industry reports NOx as ppm and when converting to or from ug/m^3, considers all the NOx to be in the form of NO_2. Is that what PB have done? So, when reporting emissions of NOx from the tunnel vent, have PB converted all the NO (90%++ of the NOx) to NO_2 when doing the mass flux determination, or have PB left the NO as NO and added that mass flux to the NO_2 flux to give the NOx flux? The difference in reported mass flux is about 50% so it is important to know what was done. PB has responded by noting that they convert NOx to NO_2, in line with the air pollution industry.

Attachment 40 – Advice from Dr P Manins to AQCCC

Review of Air Quality Modelling for Lane Cove Tunnel

Prepared for
Thiess John Holland Joint Venture

By
Dr Peter Manins

CSIRO Atmospheric Research
Private Bag 1
Aspendale, Vic 3195

Tel: (03) 9239 4400
Fax: (03) 9239 4444

Contact:
E-mail: ar_chief@csiro.au

Report C/1074 **March 2005** TJH Contract 2004110845

3.6.1 Relating Turbidity to Particle Emissions

PIARC (1995) considers particle emissions from motor vehicles only in terms of their effect on visibility in the tunnel – the turbidity of the air.

A conversion factor is used to relate particle emissions to turbidity. This conversion factor is (PIARC, 1995: p21):

$$1000\ \mu g/m^3 = 0.0045\ m^{-1}$$

However, a relationship derived from data measured in the M5 East Tunnel is reported by Synergetics (2004: Figure 3). It shows that the PIARC conversion factor under-estimates PM10 particle concentrations by approximately a factor of two, as shown in Figure 6.

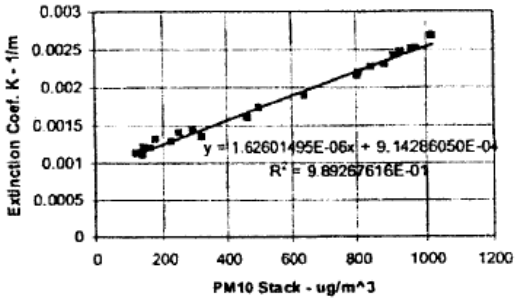


Figure 6: Observed relationship between extinction coefficient and PM10 emissions from M5 East Tunnel.

The conversion factor found for the M5 East Tunnel is

$$1000\ \mu g/m^3 = 0.0025\ m^{-1} \text{ or}$$
$$2320\ \mu g/m^3 = 0.0045\ m^{-1}.$$

This discrepancy between European and Australian experience is a major part of the explanation of why PB (2004) seems to underestimate fleet-average vehicle emissions of PM10 particles for the LCT design (see Section 3.5). The different experience may be due to a higher percentage of "gross-polluters" in the Australian HDV fleet: these vehicles emit a much higher percentage of heavier particles than a well performing vehicle. The PIARC conversion factor is more relevant to fine particles, approximately PM1, not PM10 the emissions of which from well maintained vehicles should be negligible. Alternatively, perhaps the PIARC emission conversion factor was never intended to be used to estimate emissions of particles from the ventilation system, which include road dust as well as exhaust emissions—Are Australian designers misusing the PIARC methodology?

Katestone (2004: Appendix D, p2), in a critique of the M5 East health studies by Department of Health, note that a May 2003 report from HLA Envirosciences (possibly the same report referred to by Synergetics, 2004) presented measured emissions of particles in the M5 East vent and found that typically, the collected particulate matter from peak hour ventilation stack exhaust consists of 35% PM10, 62% PM30 and a

considerable amount of coarser material (by mass). They also noted that the size distribution is usually dominated by peaks in the 30–80 μm size range and a smaller peak in the PM1 size range.

Clearly, reliance on the PIARC conversion factor will lead to serious errors in estimates of emissions of particles from tunnel ventilation stacks in Sydney.

3.6.2 Effect of Grade on Vehicle Emissions

PIARC (1995) offers HDV emission factors that depend on grade up to ±6%. However each of the Sydney tunnels, including Lane Cove Tunnel, has sections with steeper grades, so some approximations have had to be made. The grades for LCT are shown in Figure 1. In the calculations by PB (2004) for the LCT these approximations are reasonable (Dr Magdalena Vasilovska (personal communication)).

For petrol vehicles, PIARC did not consider particle emissions at all until the 2003 update and even then no dependence on grade was considered. Yet, as shown in Table 4 petrol vehicles have a similar particle emission performance to diesel vehicles in the ratio of approximately 100:1. The design data shown in Table 5 demonstrates that petrol vehicle particle emissions have not been ignored for the Sydney tunnels, but it is not clear whether corrections for tunnel grade have been made.

Attachment 41 – Refusal by Paul Forward RTA to extend time for Mid Tunnel Submissions

CE 03/3156

Mr Peter Brown
Acting General Manager
Lane Cove Council
48 Longueville Road
LANE COVE NSW 2066

10 NOV 2003

10 November 2003

Dear Mr Brown

Lane Cove Tunnel – Options for Mid-tunnel Access

I refer to your letter dated 4 November 2003 in relation to the *Community Update* dated November 2003 and the *Comparative Assessment of Options – Mid Tunnel Access Site*, which is currently on display.

The consultation process being undertaken by the RTA fully satisfied Condition 243 of the Conditions of Approval for the Lane Cove Tunnel Project. Condition 243 requires an assessment of alternative sites and construction compound designs, including the results of consultation with affected residents, prior to any works commencing at the currently approved Moore Street Site. The Comparative Assessment of Options report details the RTA's assessment of the potential environmental impacts identified in Condition 243 in order to facilitate the required consultation with the potentially affected residents. This consultation is in addition to the consultation which was undertaken as part of the EIS process, although the RTA had regard to the results of that consultation in preparing the Comparative Assessment of Options report, including site options suggested by the community.

The Lane Cove Tunnel Community Relations Manager has been meeting affected residents and is available to answer any queries which residents may have in relation to the report during the display period.

Following the period for comment, the RTA will review all comments and prepare a report to DIPNR nominating a final mid point tunnel access site and design for the Director-General's approval.

The above consultation procedure is clearly explained in the Community Update.

The fourteen (14) day period for comments nominated by the RTA is considered reasonable having regard to the fact that there are only two alternative feasible options involved and given the nature and extent of the specific environmental impacts required to be considered under Condition 243. The reasonableness of the period should be viewed in the context of the 30 day minimum period prescribed by the Environmental Planning and Assessment Act 1979 for the public display of a full EIS for comment.

Roads and Traffic Authority
ABN 64 480 155 255

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260 Elizabeth St, Surry Hills NSW 2010 | PO Box K198 Haymarket NSW 1238 DX13 Sydney | T 02 9218 6888 | www.rta.nsw.gov.au

The Comparative Assessment of Options report was available on the RTA website on Tuesday 4 November as some technical difficulties delayed its availability on Monday 3 November.

The Community Update was distributed to those residents considered to be potentially affected by the alternative mid tunnel access sites identified by the RTA in the report. Condition 243 requires consultation with affected residents in addition to the EPA (now the Department of Environment and Conservation), DLWC (now DIPNR) and Lane Cove Council. As you are aware, the RTA provided Council staff with a detailed briefing on the alternative sites at Council's Chambers on 3 November 2003. The RTA's identification of potentially affected residents was in accordance with the requirements of Condition 243 which does not require a general distribution throughout the Lane Cove West area.

The RTA is committed to an open process of consultation and has prepared the Comparative Assessment of Options report in order to facilitate such consultation. The Council's comments on the report are invited and will be carefully considered in the preparation of a final report to DIPNR.

If you have any other queries or wish to discuss this matter further, please contact Mr Garry Humphrey on tel: 8814-2006.

Yours sincerely,

Paul Forward
Chief Executive

FAXED 4.30pm

Attachment 42 – LCC to DG DoP 19 November 2003 re Mid Tunnel Access

Lane Cove Council
48 Longueville Road, Lane Cove NSW 2066 Tel: 9911 3555 Fax: 9911 36(

COPY

Date: 19 November 2003
Ref: JL:cl

Ms Jennifer Westacott
Director General & Commissioner for Forests
Department of Infrastructure Planning & Natural Resources
GPO Box 3927
SYDNEY 2001

Dear Ms Westacott,

Public submission on the Lane Cove Tunnel Comparative Assessment of Options Mid Tunnel Access Site

I am writing to you with significant concerns about the process used by the RTA in its assessment of alternate sites required by Condition 243 of the Approval by your Minister for the Lane Cove Tunnel and Associated Road Improvements project.

That condition was required by the then Department of Planning because it remained concerned at the level of environmental impacts which would result from the construction activities for mid tunnel access from use of Moore Street site. **The Moore Street site, whilst providing a suitable compound and mid tunnel access could never be justified from the environmental harm caused.**

Condition 243 states:

"Prior to any works at the proposed Moore Street compound site, the Proponent shall investigate alternative sites and alternative construction compound designs to address the potential environmental impacts. The assessment shall include as a minimum:

(a) detailed comparative assessment of all viable alternative sites and justification for use of this site and implications for the Project of not using it;
(b) results of consultation with affected residents, EPA, DLWC and Lane Cove Council;
(c) alternative construction compound designs, including locations of spoil stockpile, truck wheel wash, site access etc.;

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(d) *traffic management, with particular attention to management of access to Moore Street during peak periods;*
(e) *alternative means of spoil disposal to eliminate heavy vehicle traffic from Moore Street;*
(f) *all feasible options for noise and dust/air quality mitigation measures including cost effectiveness of the options considered;*
(g) *consideration of alternative means of operating the site including works scheduling, maintenance requirements etc.;*
(h) *impacts on vegetation and measures to minimise impacts for the alternative designs considered; and*
(i) *visual impacts for surrounding residents and options for screening to minimise those impacts.*

The primary objective of the consideration of alternative designs and methods of operation shall be to minimise environmental impacts on local residents.

The assessment shall nominate a final site and construction compound design which shall require the approval of the Director-General at least one (1) month prior to the commencement of any works at Moore Street compound site."

On 3rd November 2003, the RTA advised Council that the *Lane Cove Tunnel Comparative Assessment of Options Mid Tunnel Access Site* dated October 2003 (MTAS Options) prepared by RTA Operations – Environmental Technology Branch was on public display.

On 4th November 2003, Council wrote to Paul Forward as Chief Executive Officer of the RTA, seeking an extension of 14 days in which to respond. Mr Forward's reply of 10th November, advised that he was not prepared to extend the time even though use of any site for mid tunnel access is not required until the second quarter of 2004. This does not demonstrate a spirit of community liaison, and did not even allow for sufficient time to have Council formally consider the issues before making its submission in respect of the matter.

I have attached a copy of Council's submission to the RTA, a copy of the relating resolution of the Lane Cove Council, and a copy of the correspondence referred to between Council and the RTA.

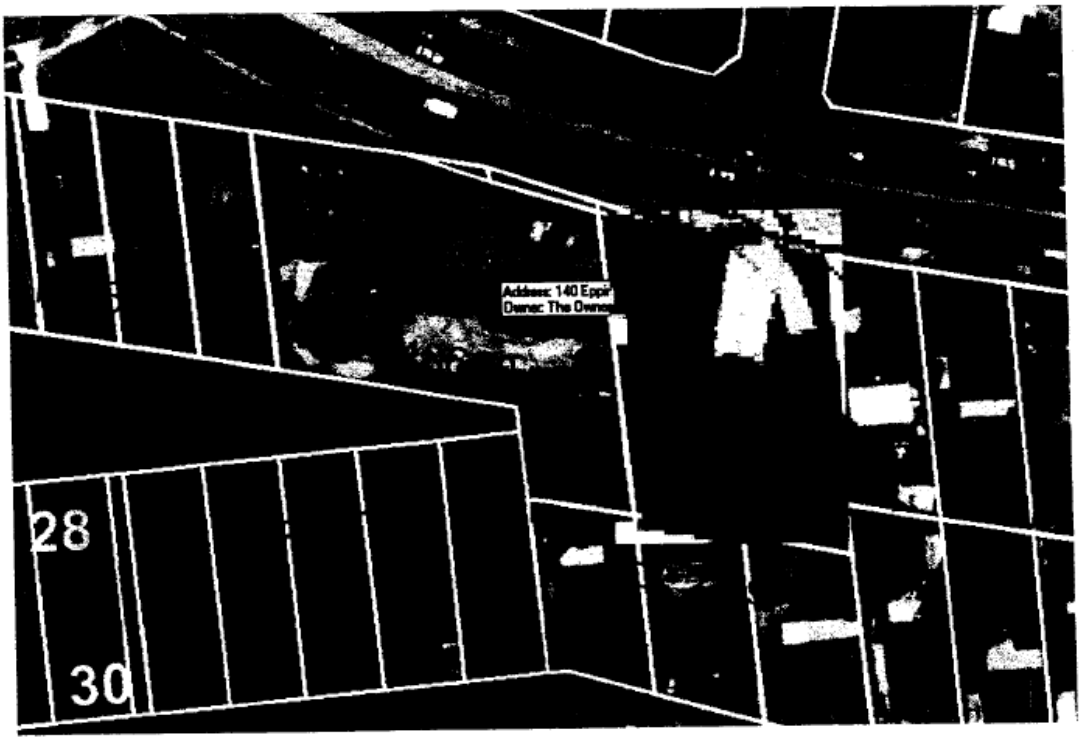
There is sufficient strength inherently implied in the Conditions of Approval giving direction to the RTA to consult with key stakeholders, of which Lane Cove Council has a major role. The lack of time and lack of discussion between writers of MTAS Options and Council's experienced engineers as well as with the Lane Cove Tunnel Action Group representing key resident stakeholders and the wider community is not, in our view, the intended manner in which consultation should be undertaken.

MTAS Options purports to be a comparison of sites, yet does not include the detail necessary to support their preferred outcomes.

The conclusions by the RTA that either Moore Street or 130-132 Epping Road are the only available sites for mid-tunnel access clearly continues to ignore the environmental values of Moore Street already highlighted by EPA and by condition 243 required by your department and dismisses the social impacts of some 17,000 fully laden truck and trailer movements from underground at 130-132 Epping Road up a steep incline within metres of residential living, with average noise levels in excess of 75 dB(A), in addition to the construction impacts of a clean air intake shaft.

It is quite apparent that no site specific environmental, geotechnical or social impact assessment was undertaken by the RTA on any of the sites in addition to that undertaken in the EIS.

It would seem that the only real assessment being undertaken is project cost evaluation with little regard to environmental or social costs. Of particular concern is the lack of assessment of the impacts on 130-132 Epping Road, a very constrained site approx 36.5m wide as demonstrated from the following aerial with the mid tunnel access as proposed by RTA superimposed.



130-132 Epping Road is owned by the RTA and is bounded by 5 established homes and the Environmental Housing Complex having access off Garling Street.

To satisfy condition 243, the alternate options identified by Council in its submission to the RTA must be properly considered as they each appear to have far less environmental and social impacts than the two sites preferred by the RTA.

The 130 -132 Epping Road site and the alternate sites identified by Council must be subjected to a proper environmental economic and social impact evaluation before RTA makes a recommendation on a preferred site.

At a recent meeting with RTA, it was noted that they did not intend providing EPA with the opportunity to comment on these other sites and would respond directly within the provisions of condition 243.

Council therefore urges you to require the RTA to:

a) include the options listed by Council in their analysis;
b) undertake a thorough triple bottom line sensitivity analysis of each of the options, including a do nothing approach as used in the longer M5 tunnel; and
c) include details of site specific environmental and social impacts in an amended Lane Cove Tunnel Comparative Assessment of Options Mid Tunnel Access Site.
d) resubmit the Lane Cove Tunnel Comparative Assessment of Options Mid Tunnel Access Site amended report for public comment with adequate timelines.

For your information, Council has now appointed **John Lee**, as Project Manager, Lane Cove Tunnel Coordination to act as Council's representative. Mr Lee may be reached on **9911 3564** or 0402937478.

Yours sincerely

Peter Brown
GENERAL MANAGER

4

A full copy of the submission is on the CD

Attachment 43 – LCC Faxed to DG DoP 3 December 2003 for Urgent Meeting re Mid Tunnel

COPY

Lane Cove Council

48 Longueville Road, Lane Cove NSW 2066 Tel: 9911 3555 Fax: 9911 3600

Date: 3 December 2003
Doc Ref:

Ms Jennifer Westacott
Director General & Commissioner for Forests
Department of Infrastructure, Planning & Natural Resources
GPO Box 39
SYDNEY 2001

Fax No. 9228 6191

Dear Ms Westacott

Re: Public submission on the Lane Cove Tunnel Comparative Assessment of Options Mid Tunnel Access Site

Reference is made to Condition 243 of the Minister for Planning's approval of the Lane Cove Tunnel project.

Recently the RTA put on public exhibition a report entitled "Lane Cove Tunnel – Comparative Assessment of Options - Mid Tunnel Access site Report" (MTAS Options), and I have sent you a copy of Council's submission by letter dated 19 November 2003.

In Council's submission, it listed a further **4 sites** which it considered warranted further examination. I am most concerned that between the time public submissions closed on 14 November 2003, the RTA has commissioned a further study into Council's options, received the consultant's report and written its response without any public consultation or referral to the Department of Environment & Conservation/EPA (DEC) for assessment and had their submission to you typed, collated and printed by 26 November 2003, within the intervening period of 10 calendar days.

Council has already demonstrated to your officers that the Connell Wagner report is factually false, misleading, erroneous in calculations and biased in reporting, yet they are prepared to accept the findings on the advice of the RTA.

I am writing to you as a matter of extreme urgency as your staff have indicated that they intend to ask you to issue an approval for the site of the Lane Cove Tunnel mid tunnel access this week and possibly before Friday 5 December 2003.

The RTA has had over 12 months to address Condition 243 and is now applying undue pressure to have mid tunnel access resolved before awarding a contract.

..... /2

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Your officers seem convinced by the RTA that using 130 – 132 Epping Road is the most feasible alternative to Moore Street, despite the prolonged resident impact.

In November 2003, the RTA issued a Community Update, met with a number of residents adjacent to 130-132 Epping Road individually, attended a resident meeting and told them about MTAS Options which included advice that the RTA would use 130-132 Epping Road to move 231,000 m3 from the tunnel operations over a 14 month period using 47 trucks per day in addition to the 50,000m3 required for site establishment and the vent stack.

This information was consistent with information contained in Table 7.4 of the EIS for 2 road headers operating from the Moore Street site for mid tunnel access. Within 2 weeks, however, the RTA advised your officers that they would allow 4 road headers to operate from the mid tunnel access via 130-132 Epping Road, thus doubling the quantum of truck movements within close proximity to residents. This admission clearly demonstrates that the RTA have not been open and transparent in their dealings with the community.

As Condition 243 requires the results of community consultation. We believe that the Department of Infrastructure, Planning & Natural Resources are not in a position to approve this site until RTA advise the affected residents that MTAS Options understated the impacts, seek further submissions from them on the amended impacts and advise your Department.

Condition 243 did not envisage the final site being resolved prior to the RTA entering into a contract with the consortia. It envisaged that the consortia had considered the opportunities for minimising their construction costs from a range of viable sites, with a decision being required of you as the Director General, at least 1 month prior to commencement of construction.

You are urged to take a little extra time to allow a more thorough testing of the information provided with the benefit of advice from the preferred consortia on what sites are economically viable to them.

You are also urged to allow the Department of Environment and Conservation the opportunity to respond to the environmental aspects of the sites Council have proposed.

I exhort you to delay making any decision until the Mayor, Mr John May and myself, with the assistance of the technical staff have an opportunity to meet with you personally to explain our concerns.

A copy of our submission to your Mr John Wasserman will follow.

Yours sincerely

Peter Brown
FOR. General Manager

Attachment 44 – LCC to DoP dated 4 December 2003 re Mid Tunnel Access

Lane Cove Council

48 Longueville Road, Lane Cove NSW 2066 Tel: 9911 3555 Fax: 9911 3600

Date: 4 December, 2003

Mr John Wasserman
Project Manager
Department Infrastructure Planning and
Natural Resources
20 Lee Street
SYDNEY 2000

COPY

Dear John,

Re: Lane Cove Tunnel, Mid Tunnel Access and Condition 243 of the Minister's Approval

Reference is made to Condition 243 of the Minister for Planning's approval of the Lane Cove Tunnel project, to Lane Cove Tunnel – Comparative Assessment of Options - Mid Tunnel Access site Report (MTAS Options), and to the subsequent submission by RTA to you on 26th November 2003 (RTA Subsequent Submission).

Reference is also made to the meeting of 28th November 2003 at Lane Cove Offices with Jan Parsons and yourself, John Anderson and John Betts of the RTA and myself in respect of mid tunnel access options arranged by the RTA to consider technical aspects of their subsequent submission.

Reference is further made to the meeting on 2nd December 2003 with you, Jan Parsons and Ms Lisa Mitchell of DIPNR, Messrs Humphries and Betts of the RTA and Mr Selleck and myself of Lane Cove Council.

1 Documentation Made available to Council

I confirm my request of 26th November 2003 to you for a full copy of the RTA report to Council for review, and note that you didn't see any reason why Council should not be provided with a copy. I further confirm the request made of Garry Humphrey at our meeting of 2nd December. Garry has declined to release that report to Council until after you issue an approval for mid tunnel access.

Given my role as Project Manager – Lane Cove Tunnel Coordination, and as their report addresses issues raised by this Council, it is imperative that a much higher level of cooperation and transparency is afforded this Council, including the exchange of relevant reports.

DPC REF: jl1l291

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I ask again that before you make a decision, this Council is provided with a copy of what has been provided to you in support of a site for mid tunnel access.

In the interim, Council can only address the issues on the basis of the extracts that were provided to Council by the RTA late on 27th November 2003.

I also note that the expectation of the RTA and DIPNR for an 8:30 am meeting with me on the morning following receipt of the reports to discuss technical issues showed undue haste. Whilst respecting the need for resolving this matter expeditiously, without adequate time to review technical reports, errors invariably go undetected.

The information provided to Council consisted of:

a) an unauthored report entitled *"Consultation with Government Authorities"*; and

b) an unauthored, verified or approved report dated 25th November 2003 Revision 0 by Connell Wagner P/L, entitled *"Lane Cove Tunnel Technical Assessment of Issues Raised by Lane Cove Council"*, inclusive of Figures 1, 2 and 3.

Presumably Appendix A referred to in *"Consultation with Government Authorities"* as the technical assessment of the alternatives, is the Connell Wagner Report. Section 5.1.3 (or any other section reference) or Section 8 specifically referenced in *"Consultation with Government Authorities"* was not provided to Council.

Public submissions for MTAS Options closed on 14th November 2003, after a 14 day period, purporting to be a public consultation period. A copy of Council's submission to the RTA was sent to your Director General dated 19th November 2003.

For your information, Council's General Manager has written to the Director General asking her to delay making a decision until after she has had an opportunity to meet with Council's Mayor and staff.

Condition 243 did not envisage the final site being resolved prior to the RTA entering into a contract with the consortia. It would be reasonable to assume that after the consortia had considered the opportunities for minimising their construction costs from a range of viable sites, the RTA would report to the Director General with a recommended site for a decision being required of the Director General at least 1 month prior to commencement of construction.

From the reports received by Council, there was no clear indication of the RTA nominating the final site or the construction compound design as

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required by Condition 243 - *"The assessment shall nominate a final site and construction compound design"*

You are urged to take a little extra time to allow a more thorough testing of the information provided with the benefit of advice from the preferred consortia on what sites are economically viable to them.

2 ASSESSMENT

The sections available to Council of the RTA subsequent submission to MTAS Options, including the Connell Wagner report (CW Report) have now been reviewed from a technical aspect on an assumption that the polluted air tunnels are required, **and does not imply that Council accepts their size or design without in tunnel filtration**.

The 10 calendar day period from close of the public submissions to the RTA lodging their subsequent submission with you clearly has been insufficient to allow a detailed and comprehensive assessment of various submissions and alternative options to be undertaken. From the obvious errors and lack of assessment in the CW Report, insufficient time was afforded Connell Wagner to be adequately briefed or to properly research the options. It is noted that in Sections 6 and 7 Connell Wagner qualify their report as being a **preliminary assessment.**

This **preliminary assessment** should not be regarded by DIPNR as satisfying the detailed assessment required by condition 243.

Examples of gross errors in CW Report - Table 4.1 include:

a) Sirius Road Option 2 and Site 1 Alternate – Polluted Air Tunnel involves identical work, yet Sirius Road Option 2 is $2M more expensive.
b) The 940m long Site 1 Alternate – Polluted Air Tunnel is 530m shorter than the proposed polluted air tunnel parallel to the main tunnel it replaces, yet this option is listed as $50M more expensive.
c) Site 3 Alternative Sam Johnson Way involves 440m less tunnel with a spoil savings of 11,700m3, yet is listed as having 30,000m3 - 35,000m3 of additional spoil.

Examples of lack of technical assessment in CW Report include:

a) No increase in the hours of operation up to 24 hours per day for spoil removal as the Council options are less affected by residential night time constraints.
b) No traffic management plan and little technical assessment provided to justify dismissal of Council's options on traffic grounds.
c) No assessment of the cost of site filling, access tunnel, additional handling of stockpiled materials, retaining walls, removal of spoil,

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pollution controls, and site remediation to operate from both the Moore Street site and 130-132 Epping Road.

d) No assessment of the time to achieve mid tunnel access from Moore Street and 130-132 Epping Road

e) No assessment of truck management returning to the site during peak hours whilst mid tunnel access from 130-132 Epping Road is being constructed.

f) No independent check of the times, quantities or feasibility quoted in MTAS Options for 130-132 Epping Road.

g) In order to maintain the overall construction timeline, no assessment was made for changes in construction sequencing or methodology including:

   i. An increase in the number of road headers using the mid tunnel access from 2 proposed in the EIS[1] to increase the rate of production associated with any of the alternate options proposed by Council.

      This is particularly pertinent as the Shell Site and the Site 1 Alternate – Polluted Air Tunnel concurrently completes a section of tunnel, so that any delay in achieving mid tunnel access is more than offset by the progress capable by additional 2 road headers working the mid tunnel access to reduce the 14 month[2] period of operation from the mid tunnel access by up to 7 months.

   ii. No examination of the opportunity to achieve early commencement of the main tunnel excavation from "quarter point access" via Shell at Ch 950 with additional road headers used once midpoint access is available.

   iii. Combining ingress and egress from the down ramp off Epping Road, north side, west of Moore Street, egress can be controlled under temporary traffic signals, phased to coordinate between Tantallon Avenue and Sam Johnson Way, so as to minimise disruption to traffic on Epping Road. Peak hour traffic at this location is slow moving and often queued back beyond Sam Johnson Way so that the coordinated control of access to this site should not exacerbate traffic delays.

At the 28 November meeting, RTA categorically refused to provide the meeting with the estimated cost of constructing the mid tunnel access from 130-132 Epping Road site claiming commercial confidence, even though the estimate is an essential requirement for economic comparisons of the other sites for which estimates were provided.

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[1] Lane Cove Tunnel EIS Page 7.64

[2] MTAS Options Page 6.31

Surprisingly, the RTA had not instigated commercial negotiations to secure land not under their ownership, made no mention in their report of land acquisition, yet at the last minute lists that time to acquire viable sites may take 9 months as being an issue. It would be an unacceptable reason for DIPNR to take into account ownership when the RTA has been in and still is in a position to make commercial arrangements.

Further, having regard to the fact that 12 months have elapsed since project approval, the RTA had more than ample time to undertake investigation, acquisition or leasing of required land.

3 EIS Table 7.64

The following Table 7.64 from the EIS is included for clarity on what the RTA intended.

Table 7.4 Production of Excavated Material from Tunnelling, Excavations and Accesses

Location	Estimated bulked volume of spoil (m^3)	No. of operating roadheader/excavator	Duration of operation (months)	Rate of spoil removal (m^3 per day)	No. of truckloads per day	Hours of spoil removal	Approx. hourly truck movements
Western End Cutting	45,000	2 excavators	12*	550	37	11	4
Mowbray Road West tunnel	200,000	2 roadheaders	11*	700	47	11	5
Moore Street	231,000	2 roadheaders	14*	700	47	11	5
Eastern End Cutting	245,000	4 excavators	11*	1100	74	11	8
Marden Road	287,000	4 roadheaders	14*	1400	94	20	5
Willoughby Road	30,000	1 excavator	13+	110	8	11	1

* Assumes 21 working days per month
\+ Assumes 30 working days per month

4 MTAS Options Clause 6.3.3

The following is a direct quote from 6.3.3 MTAS Options (in the context of 130-132 Epping Road):

"The proposal would involve an additional 231,000 m3 of spoil being transported from the tunnel to the nominated construction compound over a period of 14 months. During this time, it is estimated that there would be approximately 47 truck movements from the sites each day (5 truck movements each hour)"

5 130-132 EPPING ROAD AS THE BENCHMARK

At the 2nd December meeting the RTA confirmed that 130-132 Epping Road had been used in the CW Report as the benchmark for assessment of Council's options and that the additional cost and additional time was over and above that required for 130-132 Epping Road.

It is inappropriate to use 130-132 Epping Road as the benchmark, when Moore Street was the benchmark from which other sites are compared against.

Before proceeding further to consider other aspects of the RTA subsequent submission, it is important to first examine the validity of the "benchmark" advice from the RTA by examining 130-132 Epping Road in comparison to each of the other options proposed by Council at:

- Site 1 Alternative – Polluted Air Tunnel, Sirius Road to Mid Tunnel Option 2;
- Interim access from Sam Johnson Way to link with Sirius Road to Mid Tunnel Option 2
- Epping Road west of Moore Street; and
- Shell Site to mid tunnel access via polluted air tunnel beside eastbound tunnel.

Garry (RTA) advised the 2nd December 2003 meeting that RTA would allow 4 road headers to operate from the 130-132 Epping Road site. This is totally inconsistent with both the EIS and MTAS Options, and recent advice given by the RTA to affected residents.

MTAS Options quotes 231,000m3 (bulked) at 700m3/day (bulk) using 47 truck movements per day. This is achieved using **2 road headers** excavating the Main Tunnel. The source document is Table 7.4 of the EIS – Moore Street, where the period of 14 months assumed a 30 day per month operation.

The use of 2 road headers excavating the Main Tunnel must be the benchmark criteria used against other options which would allow up to 4 road headers to be used from the mid tunnel access without compromising the limitations on the 700m3/47 truck movements per day associated with both Moore Street and 130-132 Epping Road.

5.1 130-132 Epping Road

The table in Attachment 1 estimates the time required for achieving mid tunnel access from 130-132 Epping Road at 26 weeks on the following basis:

i) one road header operating 11 hours per day less the time for the muck truck to leave the tunnel, travel to the surface, dump the load of approx 14m3 solid and reverse back down the tunnel to the road header for:
   a. The Up ramp and Down ramp with a cross sectional area of 30m2
   b. A 20m section of 30m2 to create a link to allow road trucks to drive through from Epping Road
   c. At least 20m of the combined access tunnel with a cross sectional area of 60m2 to establish the road header with sufficient space to stockpile 350m3 to allow 24 hour production by the road header

ii) one road header operating 24 hours per day with removal of spoil by both road truck and muck truck for:
   a. A further 25m of 60m2 combined tunnel and 140m of 30m2 tunnel to the mid tunnel underground stockpile

b. At least 3000 m3 of the underground stockpile excavated.

5.2 Site 1 Alternative – Polluted Air Tunnel, Sirius Road to Mid Tunnel Option 2

Site 1 Alternative – Polluted Air Tunnel, Sirius Road to Mid Tunnel Option 2 involves driving a drift from No 2 (or No 5) Sirius Road and generally along the road alignment of Orion Street and Moore Street to the polluted air off take. Road header production can proceed 24 hours per day with muck trucks being able to allow continuous operation of the road header.

The table in Attachment 2 demonstrates that:

- the time required to achieve mid tunnel access at 29 weeks, 3 weeks later than from the 130 – 132 Epping Road site,
- a reduction in spoil of 20,670m3; and
- a project cost savings of $2.5M, inclusive of the pro rata construction delay in establishment of $6.2M.*

Contrast this with Table 4.1 of the CW Report, where

- the additional time of 4 months (16 weeks);
- the additional spoil is 30-35,000 m3; and
- Approximate additional cost of $50M.

*The delay in achieving mid tunnel access is more than offset by the ability to introduce 2 additional road headers to reduce the time required for the removal of the 231,000 m3 at 1400m3/day. This has not been included in the project cost savings. At a maximum, the theoretical reduction in time from 2 headers to 4 headers excavating 231,000 m3 from the Main Tunnel is 35 weeks with a reduction in the delay/establishment costs of $77.9M.

5.3 Epping Road West of Moore Street

Epping Road west of Moore Street involves the concurrent construction of a portal on either side of Epping Road. Road headers and muck trucks commence the tunnel loop to achieve road truck access to allow 24 hour operation of trucks from this site. Approx 100m3 per night could be extracted in approx 12-15m3 dumps with the muck truck dumping the load within the entry (or exit) ramp before reversing back along the tunnel. Each dump load would then loaded onto a waiting road truck and removed from site. Whilst the operation is not without some difficulty and will require traffic management on Epping Road, the pain involved in establishing early entry and exit for trucks with direct access/egress to Epping Road has long term benefits.

Once the road truck access loop is completed, the tunnel is continued to establish mid tunnel access and underground stockpile chamber.

The table in Attachment 3 demonstrates that:

- the time required to achieve mid tunnel access is approx 16 weeks, 10 weeks earlier than for 130-132 Epping Road
- a reduction in spoil of 8,640m3; and
- a project cost savings of $19.4M, inclusive of the pro rata construction delay savings in establishment.*

Contrast this with Table 4.1 of the CW Report, where

- no change in timing;
- no additional spoil; and
- no additional cost of $50M.

* The opportunity to operate 4 road headers further increases the project savings.

The plan tabled by RTA at the 2nd December 2003 meeting showing the accumulation of spoil across 3 lanes of Epping Road did not demonstrate a practical understanding of removing spoil from each muck truck.

5.4 Interim Access From Sam Johnson Way To Polluted Air Tunnel Beneath Orion Road To Mid Tunnel Polluted Air Take Off Point

This option takes advantage of the savings in tunnelling from the more direct polluted air tunnel, but achieves mid tunnel access much earlier, by an access tunnel into the rock face with minimal portal work.

The table in Attachment 4 demonstrates that:

- the time required to achieve mid tunnel access at 18 weeks, 8 weeks earlier than for 130-132 Epping Road
- a reduction in spoil of 16,800m3; and
- a project cost savings of $24.6M, inclusive of the pro rata construction delay savings in establishment.*

Contrast this with Table 4.1 of the CW Report, where

- Additional time of 1.5 months (6 weeks);
- 30-35,000m3 of additional spoil; and
- An additional cost of $20M.

* The opportunity to operate 4 road headers further increases the project savings.

5.5 Shell Site To Mid Tunnel Access Via Polluted Air Tunnel Beside Eastbound Tunnel

Although this site is private land, no approach was made by the RTA to determine the commercial cost to sub lease part of the site. Council's

enquiries have revealed that the owner and main lessee maybe amenable to a commercial arrangement.

For the purpose of this analysis, an amount of $4M has been included to secure the sub lease.

The access to main tunnel from the access tunnel is achievable at approx chainage 950, around ¼ way along the tunnel.

The table in Attachment 5 shows that within 7 weeks, access to the main tunnel is available allowing 2 road headers to commence eastwards until mid tunnel access is available within 24 weeks, at which time an additional 2 road headers to be operated in an easterly direction. The table also demonstrates that:

- the time required to achieve mid tunnel access is 2 weeks earlier than for 130-132 Epping Road
- an increase in spoil of 3120m3; and
- An additional cost of $1.5M if ¼ point access isn't used
- If ¼ point access at Ch 950 is used, the project cost savings are approx $40.9M*, inclusive of the pro rata construction delay savings in establishment if tunnelling can commence once the access tunnel decline reaches the main tunnel.

Contrast this with Table 4.1 of the CW Report, where

- Additional time of 5 months (20 weeks);
- 10,000m3 of additional spoil; and
- An additional cost of $60M.

* The opportunity to operate 4 road headers further increases the project savings.

5.6 Conclusion - 130-132 Epping Road as Benchmark

From this relatively detailed analysis of quantities involved, a consistent list of unit rates, assessment of the methodology and equally applying savings for early access for mid tunnel access as for delays in achieving mid tunnel access relative to 130-132 Epping Road as the benchmark, it can be clearly seen that 130-132 Epping Road is not cost effective for mid tunnel access compared to the other sites, and is only 2 weeks earlier than the most cost effective solution of the direct polluted air tunnel from Sirius Road.

The analysis is sufficiently detailed to indicate that the Connell Wagner Report contains errors to such a magnitude that data and conclusions cannot be relied on.

Use of the Shell Site appears to have the greatest opportunity for project savings and eliminates the need for prolonged impacts and the $4.9M cost of mid tunnel access from 130-132 Epping Road.

At the 2nd December meeting the RTA were requested to provide Council with a copy of the working assessment used by Connell Wagner in deriving their timing and costing assessments to assist in the review process. At the time of this letter, that information had not been forwarded to Council.

130-132 Epping Road is claimed by the RTA in MTAS Options as the only feasible alternative to Moore Street. Without the cost and timing of mid tunnel access for both Moore Street and 130-132 Epping Road included for comparative assessment of the costs associated with each of the options included in Tables 4.1 and 5.1 the CW Report in incomplete and misleading.

Assumptions include:

a) a "do nothing" impact of $72M[3] for an 8 month delay, approx equal to the loss of income expected from tolls plus maintaining site establishment;
b) Average road header production rate of 350m3/day[4] (bulk) or 278m3/day[5] solid.
c) Driving access tunnels from residential areas at a production rate of 758m3/week[6] solid
d) Tunnel costs of $500/m3[7]
e) At least one portal required for each site to obtain mid tunnel access
f) RTA proposal only uses two road headers from the mid tunnel access point.[4]
g) A maximum of 8 road headers proposed for use on the Lane Cove Tunnel at any one time[5].

6 DISCUSSION

The following discussion addresses each of the sites.

6.1 Moore Street

MTAS Options quotes 231,000m3 (bulked) at 700m3/day using 47 truck movements per day and 2 road headers. The use of Moore Street site prevents the use of more than 2 road headers in the main tunnel with access from Moore Street as the truck movements from this site would exceed the movements quoted in the EIS and in MTAS Options.

[3] Consultation with Government Agencies – RTA Nov 2003
[4] Lane Cove Tunnel EIS Page 7.64
[5] John Betts Project Manager RTA verbal advice
[6] Calculated from average production rate and checked against MTAS Options Section 6.3.1
[7] Calculated from Lane Cove Tunnel Technical Assessment of Issues Raised by Lane Cove Council - Connell Wagner Table 4.1

The cost of site filling, access tunnels, additional handling of stockpiled materials, retaining walls, removal of spoil, pollution controls, and site remediation to operate from the Moore Street site should be assessed and included in the comparison of sites.

It is estimated that after filling the site, construction of portals, retaining walls, hard standing areas/ roads etc, mid tunnel access will take approx 14 weeks at a cost of approx $4.7M.

Council will continue to oppose the use of Moore Street for mid tunnel access and compound facilities, despite the RTA's belief that they have an approval to manage the destruction of the bushland and associated environmental values. The RTA has not made an assessment of the economic value associated with environmental or social impacts.

6.2 130-132 Epping Road

In MTAS Options, RTA concluded that 130-132 Epping Road was a feasible site[8] without undertaking any site specific analysis, confirming they would undertake the analysis once this site is approved. Until geotechnical, noise, air quality and vibration testing has been assessed, this site should not be classified as feasible.

For the purpose of comparative analysis however, any proposal, which has better overall outcomes, must also be regarded as feasible.

In Section 6.3.1 of MTAS Options, the RTA advised that the excavation of the temporary entry / exit drifts was 248m of 30m2 and 45m of 60m2, but omitted to include the minimum additional 140m * 30m2 of excavation necessary before trucks can turn around. At least 3000m3 underground stockpile would need to be available for mid tunnel access to commence.

The method of operation most likely involves a "muck" truck reversing into the tunnel to be loaded from a conveyor off the road header. When full the muck truck drives out of the tunnel, reverses to the stockpile empties, moves to the front of the lot to reverse back down the tunnel. During this operation the road header is not operational. With other loading conflicts of a loader and trucks, this period can be up to ten minutes, approx 10-12 times a day, reducing the available time of road header operation from 11 hours to 9 hours per day. Based on the production rates used in MTAS Options, the 13 week for achieving mid tunnel access from this site appears to be underestimated by approx 12 weeks.

Additional materials will be removed over another 16 weeks for the vent chamber before the air intake vent is constructed, unless the number of truck movements from 130-132 Epping Road is significantly increased contrary to MTAS Options.

[8] MTAS Options page 5-27

From comment made at the 28 November meeting it appears that DIPNR officers were under the impression that 130-132 Epping Road would only have severe impacts on residents for 3 months during which time RTA had an option to relocate residents. As MTAS Options is misleading, the RTA should be required to provide a detailed analysis from the preferred contractor certifying their estimates of time required to achieve mid tunnel access from each of the sites.

RTA failed to advise the 28 November and 2nd December 2003 meetings just how trucks will return from the M2 and reach this site during the initial operations to achieve mid tunnel access, without returning via the Pacific Highway. Use of local streets for truck turnaround will not be acceptable.

The use of 130-132 Epping Road also prevents the use of more than 2 road headers in the main tunnel as the truck movements from this site would exceed the movements quoted in the EIS and in MTAS Options.

In noting the advice from Garry (RTA) that 4 road headers would operate concurrently via 130-132 Epping Road site, one can only conclude that the community have been falsely informed of the impacts, if immediately after close of public consultation, the RTA now wish to double the daily truck movements of spoil out of 130-132 Epping Road, from 700m3 bulk to 1400 m3. Should this site be approved, this aspect must be addressed by DIPNR.

As Condition 243 requires the results of community consultation DIPNR is not in a position to approve this site until RTA advise the affected residents that MTAS Options understated the impacts, seek further submissions from them on the amended impacts and advise your Department. A similar situation would apply to Moore Street if the materials handling and truck movements doubled.

Why, in Table 6.1 and clause 6.1 of the CW Report, 130-132 Epping Road is quoted as having the highest rating for project environmental benefits on the basis that it does not impact on the construction program, yet the construction time is demonstrably much longer (and more expensive) than Moore Street to establish mid tunnel access? This is a classic case of biased reporting for the client RTA.

Why would the RTA want to make residents adjacent to 130-132 Epping Road suffer when other viable options exist? No indication on how the severe impacts on residents will be managed. No background noise readings have been assessed for the Garling Street properties adjacent to or within the influence of noise from the use of this site. Noise levels should be set relative to the quieter Garling Street properties and not relative to Epping Road.

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6.3 Epping Road west of Moore Street

Lane Cove Council proposed this option as it involved less initial access tunnel excavation, established road truck access much earlier and operations would not be as constrained to daytime hours, thus allowing the maximum of 4 road headers to work concurrently. Relocation of the mid tunnel beside the footbridge may well provide savings in excavation for clean air intake.

RTA raised issues of materials handling during construction of the tunnel accesses as the major objection to this proposal. On the strength of their objections, the Cross City Tunnel and other major works would be impossible. No meaningful discussion was provided by Connell Wagner on how this option might be made to work.

From our observations of the traffic distribution outside of peak hours, there seems no reason why the portals could not be constructed with materials movements being limited to out of peak hour periods including some limited night time operations.

If, for technical reasons it proves difficult to manage trucks leaving via the exit ramp, consideration should be given to a signalized intersection between Moore Street and west of the entry ramp to enable trucks to enter and leave the site under signalised traffic control. The lights would need to be phased to operate on demand but in synchronisation with the adjacent lights.

6.4 Sirius Road

The RTA raised issues of limited site area on their site at 5 Sirius Road, not owning no 2 Sirius Road, lead time to construct control centre and vent stack on No 2 Sirius Road as reasons why this site was not acceptable. Neither MTAS Options nor the RTA subsequent submission addressed problems associated with acquiring ownership.

I have already discussed the commercial aspects of acquiring/ leasing either No 2 Sirius Road or the Shell site. Times quoted to DIPNR by RTA to acquire are based on normal government processes of offering as little as possible and dragging the acquisition through a legal process. The commercial reality of the potential savings to the project relative to acquisition cost would determine this. Has the RTA made contact with the Owner?

If No 2 Sirius Road is unavailable, it is noted that No 5 Sirius Road, owned by the RTA is 37*60m and slightly irregular, and compares to 130-132 Epping Road of 37*51m. The type of operations from Sirius Road closely resembles the 130-132 Epping Road portal and ramps scenario.

Although raised as an issue in the CW Report, the building on 5 Sirius Road is being demolished anyway for the control building and western polluted air vent stack.

The construction of the control building and fit out was not listed as being a critical issue in the CW Report nor the RTA subsequent submission with no details as to the criticality of those time lines for constructing the air intake, control centre and fit out once the tunnel excavations are completed.

6.5 Sirius Road Option 1 – Proposed Polluted Air tunnel

Sirius Road Option 1 was proposed in MTAS Options as a potential site being the proposed location of an polluted air tunnel under Stringybark Creek and was always required. No discussion however was made on driving the shaft deeper and removing spoil by crane.

Given that the section under Stringybark Creek could contain the combined cross sectional areas of both polluted air tunnels being 39m2 and 64m2 respectively and would be driven at the same time, with access via the western portal, the time to achieve mid tunnel access does not justify further consideration of the polluted air tunnel under Stringybark Creek.

6.6 Sirius Road Options 2 and 3

By including Sirius Road Options 2 and 3, the CW Report simply confuses issues. Why would Connell Wagner propose these Options as they are additional tunnels to the requirements of an polluted air tunnel from near the midpoint to Sirius Road?

Information included on these options are totally irrelevant.

6.7 Site 1 Alternative – Polluted Air Tunnel, Sirius Road to Mid Tunnel Option 2 or 3

The RTA[9] has confirmed that it is technically feasible to redirect the polluted air tunnel from the polluted air off take generally along Moore Street / Orion Street back to the western stack at Sirius Road. The polluted air off take is just to the east of Stringybark Creek at approx chainage 1650 not east of Johnson Crescent as depicted in Fig 1 of CW report. Council's option is described in the CW Report as "*Site 1 Alternative – Polluted Air Tunnel, Sirius Road to Mid Tunnel*" and cross referenced to Option 2 (under Orion Street) and 3 (being a more direct line under houses). This option is in lieu of the much longer polluted air tunnel aligned close to the main tunnels, and which crosses under Stringybark Creek to the western stack.

[9] Consultation with Government Authorities RTA Nov 2003 – Summary of Results

This site allows the use of 4 road headers to operate continuously and for trucks to operate 24 hours a day if required.

The CW Report completely ignored these points and hence there is a savings in spoil to be managed.

Council is therefore extremely concerned at what appears to be incompetence in such an important advisory study required by Condition 243, and blindly accepted as fact by the RTA. Further, as the time to drive this tunnel is approx 29 weeks, only 3 weeks longer than 130-132 Epping Road, and completes a segment of work without redundancy, the assertion that this option extends the construction period by 4 months (16 weeks) must be proven by Connell Wagner. Council would expect that you have sought confirmation of the accuracy of the technical assessment.

The view that the construction of this tunnel is not on the critical path must be taken in the context that only 2 road headers were scheduled from Epping Road, whereas this option allows the use of 4 road headers on the main tunnels.

6.8 Interim Access to Site 1 Alternative – Polluted Air Tunnel, Sirius Road to Mid Tunnel – Option 2 from Sam Johnson Way

Although not a preferred option, Council accepted that it could be possible to construct a combined entry exit tunnel to link with the Site 1 Alternative – Polluted Air Tunnel, Sirius Road to Mid Tunnel – Option 2 route to allow mid tunnel access to be achieved earlier. This involves approx 100m of redundant tunnel at a cost of $5.8M. Once mid tunnel access is achieved, the remaining section of air tunnel can be driven to Sirius Road.

Compared to both Moore Street and 130-132 Epping Road, this option potentially has lower noise impacts during establishment and much lower during truck removal of spoil. Noise modelling would need to be undertaken to determine any limitations on night time operations, as the portal opens away from residents and initial truck movements are downhill before turning left into Epping Road.

RTA argued without any traffic modelling that access from this site would mean left in and left out, dismissing any suggestion of traffic lights to control the limited truck movements. It was agreed that a more scientific analysis was needed on the impacts of construction traffic lights.

With the inclusion of an underground stockpile and possibly extended hours of operations, issues of lead time for the building of the control centre and fit out after completion of the polluted air stack may no longer be an issue. This aspect should have been investigated by the RTA.

RTA also raised issues of affecting bushland quality as an objection to the viability of this option.

6.9 Shell Site to Proposed Polluted Air Tunnel

The Shell site provides for 80m of redundant tunnel to reach the 39m2 polluted air tunnel for the eastern tunnel and approx 800 m to reach the polluted air off take.

Access to the main tunnels could be achieved at approx chainage 950 within 7 weeks of tunnelling from which tunnel excavation could be commenced to the air off take at chainage 1650 in a similar time frame to that applicable to Moore Street

The RTA have approved a right turn slip lane with vehicle turning bay for eastbound vehicles to access the Shell Service Station and must have satisfied themselves that such a movement had an acceptable safety level for truck movements. Safety can be enhanced with temporary traffic lights activated on demand and linked in phase with adjacent lights to accommodate truck turning traffic.

The expected maximum daily output from 4 road headers simultaneously operating is less than 100 truck movements over 24 hours, i.e. 1 truck on average every 15 minutes leaving the site via the RTA approved slip lane for truck use. If the RTA only intend to use 2 road headers, with 24 hour operation, only 1 truck ever 30 minutes would leave the site. Even if truck movements increased to one truck every 6 minutes management of trucks leaving the site is not an issue as to unilaterally dismiss this site on traffic grounds.

The reporting bias shown in the CW Report is evident as no traffic management solution is proposed. Normally, when a proponent seeks professional assistance of a consultant on how the traffic impacts are managed from a development involving the removal of spoil, a traffic management plan would be devised.

The concerns expressed in the CW Report about trucks accessing the M2, crossing 3 lanes of traffic within 620m doesn't have substance and further evidence of biased reporting, as the M2 can be alternately accessed by right turn into Delhi Road, for times trucks have difficulty weaving.

6.10 Quarter Point Access From Shell Site

As discussed earlier, the Shell site offers the opportunity to commence tunnel operations in an easterly direction using 2 road headers in the main tunnel once the access tunnel reaches the level of the main tunnel, at approx chainage 950.

The site also offers the opportunity to have 2 road headers operate in a westerly direction toward the western portals, with the opportunity to make available a longer section of excavated tunnel earlier.

7 RETURNING TRUCKS

Returning trucks for the Sirius Road options or for Sam Johnson Way / Option 2 can turn into Sam Johnson Way under traffic light control or alternately can enter via entry portal arrangements off Epping Road.

The use of local residential streets will not be acceptable during establishment of any mid tunnel access site.

No assessment appears to have been undertaken to determine the truck / loading / dumping /stockpile and human resource management operations inclusive of meal and other breaks during the day. Epping Road has no layover facility for trucks to queue whilst waiting for a truck at 130-132 Epping Road to be loaded and leave the site. Trucks arriving in peak time will have to drive past the site with a very long trip back.

Out of peak period, there may be an opportunity to reduce the lanes and allow limited truck queuing similar to the arrangements on Sid Enfield Drive, Bondi Junction.

8 GENERAL COMMENTS

The following general comments are made on information provided.

8.1 Consultation with Government Authorities

No opportunity was given for consultation/ review by DEC on the options provided by Council, and therefore the intent of condition 243 has not been complied with. It is therefore extremely misleading to quote DEC (EPA and DLWC) in support of 130-132 Epping Road.

M5 east tunnel was referred to only in the context that no mid tunnel access was required in the longer M5 east tunnel despite it being completed some 7 months ahead of schedule.

8.2 Connell Wagner Report (CW Report)

The CW Report is unauthored, verified or approved for issue and is qualified as being only a preliminary assessment. Given the magnitude of errors, lack of assessment, biased reporting and misinformation this may indicate a lapse in the quality assurance processes of Connell Wagner. This aspect is important, as the Director General would be expected to rely, to a large

extent, on the integrity of their technical assessment for this important aspect of the tunnel, especially when tight timeframes for assessment are applied.

Clause 1.2 of the CW Report states that the Council alternatives are variations of options covered in MTAS Options. The Shell site, the use of a more direct line for the polluted air tunnel from Sirius Road to the mid tunnel access, the option for access via a tunnel only from Sam Johnson Way to the more direct line for the polluted air tunnel from Sirius Road for earlier mid tunnel access and ingress and egress to Epping Road clearly are **not alternate options covered in MTAS Options**.

Clause 2.1.2 of the CW Report - Site 1 Alternative – Polluted Air Tunnel, Sirius Road to Mid Tunnel Option 2 as proposed by Council to the polluted air take off point within the vicinity of the mid tunnel access point, is 940m, not 1080m. Similarly in Clause 2.1.3, the straighter option 3 is 860m, not 950m, and is located under residential properties.

The CW Report calculations are in error in quoting option 2 is only 70 m savings in polluted tunnel length, yet concurring that the original polluted air tunnel is 1470m. Savings on option 2, even on their measurement of 1080m, is 390m, not 70m.

In Clause 2.3 – Shell Site CW Report indicates that 300m of additional tunnel is required from this site. This is not correct, as the additional distance is <140m, or with a more rational alignment a total length of 880m, being a tunnel length increase of 80m required from the Shell site.

In Clause 3.1, CW Report discusses the tight 10m radius for access from the tunnel. As the internal radius proposed for 130-132 Epping Road is approx 10m, why is this an issue of concern here?

The long section for the Sirius Road options is not a serious attempt to demonstrate the manner in which the upslope can be achieved at least to a similar slope as proposed at 130-132 Epping Road.

Clause 3.4 – Site 3 Alternative Sam Johnson Way
If the authors of reports were serious about their proposition that 1 truck per 6 minutes leaving this site cannot be managed, no construction work would ever take place requiring right turns off a major arterial road via a slip lane. With the potential for extended working hours for this option, the number of truck movements per hour can be reduced and eliminated from peak hour periods.

No proof has been provided using accepted models to demonstrate that traffic impacts for this option cannot be adequately managed. The right turn slip lane is 140m at this signalized intersection compared to 115m at Moore Street, via an unsignalized intersection.

Clause 3.5 – Epping Road, West of Moore Street
The conceptual layout in Figure 3 of the CW Report did not take advantage of either removing the median or narrowing the lanes through a controlled construction zone at 40 kph.

Traffic lights at Tantallon Avenue and Sam Johnson Way already operate to provide gaps in the traffic including during peak periods. These gaps are sufficient to allow right turning peak pm traffic into Moore Street, would also provide sufficient opportunity for trucks to enter Epping Road.

Should additional controls be required, the use of temporary signals at Moore Street could be considered and should have been modelled as part of a traffic management plan.

As this site can also operate 24 hours a day, no consideration was given either to the lower frequency of truck movements of 1 per 15 minutes compared to 1 per 6 minutes from 130-132 Epping Road or to limiting truck egress during peak periods. At this stage no advice has been received on the spoil destination and whether or not the receiving site is limited in its hours of operation.

Table 4.1
This table is also used in the RTA subsequent submission, and the errors within it have been highlighted in this letter to you. Table 4.1 is included as the outcome of an investigation and assessment on *"the cost and program for the construction of the Lane Cove Tunnel"*. The assessment was not qualified here as being preliminary, yet this table is used as the basis for detailed comparative assessment.

Issues with Table 4.1 have been discussed and we believe that its contents cannot be relied on.

Table 6.1

The reader of the CW Report has to wait until this chapter to find that out that Connell Wagner's assessment was preliminary only. It can be demonstrated that the time required to achieve mid tunnel access from 130-132 Epping Road has been understated in MTAS Options, and therefore the project environment benefits and financial benefits (and total score) are overstated.

When adjustments are made for the errors in assessment outlined for Table 4.1, all of the options put forward by Lane Cove Council rate higher than Moore Street and 130 –132 Epping Road. **The methodology of rating and scoring is rudimentary and unsatisfactory for this type of assessment**.

Even so, with 1 is the worst rating, Epping Road west of Moore Street scores a 0 for safety / access! Its site specific environmental impacts are far better than 130-132 Epping Road yet receive the same score. Sirius Road Options 2 and 3 receive the same rating as Sirius 1 – Alternative – Polluted Air Tunnel, yet Options 2 and 3 is require additional 1470m of tunnel.

9 SUMMARY OF OPTIONS

130-132 Epping Road is proposed as a viable option yet it is a difficult site from which to operate, manage trucks returning to the site, maintain a stockpile, manage air/dust/noise/vibration, a site with angry residents every day for 3-4 months during the initial stage when impacts are severe, and continually for a further 14 months whilst the tunnels are driven and the a further period of some months whilst the air intake is constructed and the underground chamber / vent system is excavated.

The comparative model takes into account the benchmark cost and time to achieve mid tunnel access from 130-132 Epping Road. Times quoted relate to the commencement of tunnelling after the sites have been prepared and the portals constructed. The cost of one portal has not been included in the cost analysis as at least one portal is required for each option (even though the extent of cut and cover varies).

The comparative model is based on the use of 2 road headers only using the mid tunnel access from either Moore Street or 130-132 Epping Road given the truck movement undertakings in MTAS Options.

No data was provided to demonstrate just how critical the construction of the main tunnels is to the construction program. The RTA has based their assessment on each month adding $9M in costs. Similarly, for each month there are savings in tunnel construction by the use of additional road headers (until tunnelling becomes no longer critical), savings of $9M must equally accrue.

All options except the 39m2 polluted air tunnel as proposed from Sirius Road under Stringybark Creek and parallel to the eastbound tunnel can provide a time reduction in tunnel construction relative to130 -132 Epping Road.

Epping Road west of Moore Street provides the earliest mid tunnel access, and the better truck turn around movements with direct access to/from Epping Road, with minimal time underground. This option allows for the air

intake at the footbridge to use sections of the access tunnels with additional savings.

The savings in project costing for the polluted air tunnel being realigned to Options 2 or 3 are significant, and provided that the lead time for the control centre building and fit out can be managed, and as operations can proceed without daytime restrictions, must be seriously considered.

Use of the Shell site appears to offer the contractor the opportunity to commence tunnelling operations much earlier and add 2 extra road headers at the mid tunnel access at approx the same time as would be available from 130-132 Epping Road. RTA are encouraged to seek a negotiated sublease agreement with the owner and lessee, and recommend this site as being more feasible than either Moore Street or 130-132 Epping Road.

From this more detailed analysis using data contained within the reports, it is clear that there are feasible options to Moore Street and that if 130-132 Epping Road were used as the feasible alternative benchmark for comparisons, all options proposed by Council rate higher on time, and economics, and have far less impacts on residents.

10 Condition 243

Condition 243 states:

"Prior to any works at the proposed Moore Street compound site, the Proponent shall investigate alternative sites and alternative construction compound designs to address the potential environmental impacts. The assessment shall include as a minimum:

(a) detailed comparative assessment of all viable alternative sites and justification for use of this site and implications for the Project of not using it;
(b) results of consultation with affected residents, EPA, DLWC and Lane Cove Council;
(c) alternative construction compound designs, including locations of spoil stockpile, truck wheel wash, site access etc.;
(d) traffic management, with particular attention to management of access to Moore Street during peak periods;
(e) alternative means of spoil disposal to eliminate heavy vehicle traffic from Moore Street;
(f) all feasible options for noise and dust/air quality mitigation measures including cost effectiveness of the options considered;
(g) consideration of alternative means of operating the site including works scheduling, maintenance requirements etc.;
(h) impacts on vegetation and measures to minimise impacts for the alternative designs considered; and

(i) visual impacts for surrounding residents and options for screening to minimise those impacts.

The primary objective of the consideration of alternative designs and methods of operation shall be to minimise environmental impacts on local residents.

The assessment shall nominate a final site and construction compound design which shall require the approval of the Director-General at least one (1) month prior to the commencement of any works at Moore Street compound site."

11 FAILURE TO COMPLY

Although the RTA suggests that their report to you as Director General is in response to Condition 243, Council respectfully submits that most sub sections of condition 243 have not been complied with for the following reasons:

(a) detailed comparative assessment of all viable alternative sites and justification for use of this site and implications for the Project of not using it;

The assessment undertaken in MTAS Options failed the test of being a detailed comparative assessment of all viable alternative sites. In the CW Report, Connell Wagner confirms that each of the alternate sites nominated by Council was viable for truck assess.

The CW Report clearly acknowledged it as being a preliminary assessment. As the RTA subsequent submission is based largely on the CW Report, it also fails the test of being a detailed comparative assessment of all viable sites.

(b) results of consultation with affected residents, EPA, DLWC and Lane Cove Council;

MTAS Options was prepared without any consultation. During the limited 14 day public consultation period, the RTA appears to have only consulted with residents adjacent to 130-132 Epping Road.

As 4 viable sites identified by Lane Cove Council were not included in the MTAS Options report, no consultation has been undertaken with those affected residents, or with DEC now incorporating EPA and DLWC. It is misleading for DEC to be quoted out of context without having considered all viable sites. Clearly therefore the assessment fails the test of consultation.

Consultation with Council is not giving a briefing of what was in MTAS Options. Once Council responded to RTA they should have further

consulted with us on the issues, made available reports etc and then submitted the results of consultation to you. The manner in which they have dealt with Council also clearly fails the test of consultation.

(c) alternative construction compound designs, including locations of spoil stockpile, truck wheel wash, site access etc.;

The RTA has failed to comply with this condition. Interestingly however, 130-132 Epping Road as proposed by the RTA clearly demonstrated that an underground stockpile and materials handling of spoil was feasible, eliminating the need for an above ground compound. No details of wheel wash have been provided.

(d) traffic management, with particular attention to management of access to Moore Street during peak periods;

Traffic management plans have not been produced to demonstrate on how viable sites could be made to operate. A distinct bias is evident in favour of the RTA's position in the manner in which traffic issues have been reported.

(e) -.

(f) all feasible options for noise and dust/air quality mitigation measures including cost effectiveness of the options considered;

No details have been provided for noise and dust / air quality mitigation including cost effectiveness analysis.

(g) consideration of alternative means of operating the site including works scheduling, maintenance requirements etc.;

This condition must be implied to relate to other viable sites in the event that Moore Street isn't used. No attempt was made to consider alternate means of achieving or reducing the critical path timeframes for tunnelling. The use of Shell site for instance allows the use of 4 road headers to operate with tunnel access achieved within 7 weeks of commencement of tunnelling.

(h) impacts on vegetation and measures to minimise impacts for the alternative designs considered;

The alternate design for Moore Street did not demonstrate any reduction in the loss of vegetation.

The Shell Site was not even considered in MTAS Options even though it has the little environmental impact on vegetation.

(i) visual impacts for surrounding residents and options for screening to minimise those impacts

No details were provided on any of the viable options for minimizing visual impacts for residents. In fact, 130-132 Epping Road would dramatically

increase those impacts, which is quite contrary to your Minister's primary objective for consideration of alternate designs.

It is noted that the consortia do not intend to use tunnel boring machines on this project.

It is imperative that the RTA is transparent and honest in undertaking the required detailed assessment.

12 CONCLUSION

At this point in time, as Condition 243 has not been complied, and you are not in possession of the facts about all the sites which could justify one site over another, you must allow more time to have input from the consortia and a detailed assessment by Connell Wagner, or an independent consultant to advise DIPNR.

Yours faithfully,

John Lee
PROJECT MANAGER, LANE COVE TUNNEL COORDINATION

E-mail Address: lccouncil@lanecove.nsw.gov.au

JL1L:

The Attachments are included on the CD

Attachment 45 –DoP 12 December 2003 to LCC re Mid Tunnel Approval

Department of
Infrastructure, Planning and Natural Resources

Contact: John Wassermann
Phone: 02 9762 8109
Fax: 02 9762 8707
Email: john.wassermann@dipnr.nsw.gov

The General Manager
Lane Cove Council
PO Box 20
LANE COVE NSW 1595

Our ref: S03/02766 & D03/01476
Your ref: JL:cl

Dear Mr Brown

Subject: Lane Cove Tunnel – Mid-Tunnel Access

I refer to Lane Cove Council's letters to the Department dated 19 November 2003 and 3 December 2003 concerning a proposal by the RTA to establish a mid-tunnel access construction compound for the Lane Cove Tunnel.

The Department undertook its own independent assessment of the mid-tunnel access considering information provided by the RTA, Council and the community. In undertaking its assessment the Department specifically examined the alternatives put forward by Council in it's very detailed response to the RTA's Lane Cove Tunnel – Mid tunnel access options report.

Based on that assessment the Department has conditionally approved the RTA's request to establish a mid-tunnel access construction compound at 130-132 Epping Road. The conditions attached to the approval include requirements that the RTA:

- notify respondents to the exhibition of the *Comparative Assessment of Options Mid Tunnel Access Sites* of the decision;
- prepare a Construction Method Statement (CMS) for use of the 130-132 Epping Road site specifically assessing management of:
  - construction staging;
  - noise and vibration;
  - construction traffic, site access and pedestrian safety;
  - dust;
  - soil and water; and
  - site rehabilitation.

  The CMS will require approval of the Director-General.
- provide to the Company appointed to deliver the Lane Cove tunnel project, the Lane Cove Council's Public submission on the Lane Cove Tunnel mid-tunnel access. This is to enable further consideration of alternatives. If any changes were proposed these would require an approval from the Director-General of the Department.

Henry Deane Building 20 Lee Street Sydney NSW 2000 (GPO Box 3927 Sydney NSW 2001)
Phone 02 9762 8047 www.dipnr.nsw.gov.au

The Minister's Conditions of Approval for the Lane Cove Tunnel also apply to the site. These include specific requirements for noise, air quality and traffic management.

Should you require any additional information or clarification, please do not hesitate to contact John Wassermann on 9762 8109.

Yours sincerely

SHaddad

Sam Haddad
Executive Director
Office of Sustainable Development Assessments and Approvals

12.12.2003

Attachment 46 – DoP 3 December 2003 to RTA for Mid Tunnel Access Approval

Department of
Infrastructure, Planning and Natural Resources

Contact: John Wassermann
Phone: 02 9762 8109
Fax: 02 9762 8707
Email: john.wassermann@dipnr.nsw.gov.au

Our ref: S03/02786 & E03/00693
Your ref: letter of 26 November

Mr Mike Hannon
Director, Road Network Infrastructure
Roads and Traffic Authority
PO Box 558
BLACKTOWN NSW 2148

Dear Mr Hannon

Subject: Lane Cove Tunnel – Mid-Tunnel Access Condition 243

I refer to your letter dated 26 November 2003 requesting the approval of the Director-General to establish a mid-tunnel access construction compound at 130 - 132 Epping Road. The request was made under Condition of Approval No.243 of the Minister's Approval for Lane Cove Tunnel and was supported by two reports:

- *Comparative Assessment of Options Mid Tunnel Access Sites* prepared by RTA dated November 2003. This document was placed on public exhibition between the 3rd and 14th November 2003. The report presents an investigation of alternative sites to the Moore Street compound site; and
- *Condition 243 Compliance Report* prepared by Connell Wagner for the RTA. That document assesses submissions made in response to the public exhibition.

The Department has reviewed the information provided by the RTA and approves establishing the mid-tunnel access construction compound at 130 – 132 Epping Road subject to the following conditions:

1. The RTA must notify respondents to the exhibition of the *Comparative Assessment of Options Mid Tunnel Access Sites* that 130-132 Epping Road is approved as the mid-tunnel access.
2. The RTA must prepare and submit for the Director-General's approval a Construction Method Statement (CMS) for use of the 130-132 Epping Road site. The CMS must be prepared in accordance with Condition of Approval No 21 and include a detailed assessment of the management of:
   - construction staging;
   - noise and vibration;
   - construction traffic, site access and pedestrian safety;
   - dust;
   - soil and water; and
   - site rehabilitation.

The RTA must provide to the Company appointed to deliver the Lane Cove tunnel project, the Lane Cove Council's Public submission on the Lane Cove Tunnel comparative assessment of option Mid Tunnel Access Site dated 14.11.03 for consideration. If an alternative mid-tunnel access arrangement is identified which the RTA proposes to implement, the RTA must seek the Director General's approval.

Henry Deane Building 20 Lee Street Sydney NSW 2000 (GPO Box 3927 Sydney NSW 2001)
Phone 02 9762 8047 www.dipnr.nsw.gov.au

RECEIVED TIME 3.DEC. 8:19

Please note that nothing in this approval should be taken as authorising any action that may be in breach, limit or constrain another condition contained in any licence, approval, permit, or consent, or other legal requirement.

Should you require any additional information or clarification, please do not hesitate to contact John Wassermann on 9762 8109.

Yours sincerely

Sam Haddad

Sam Haddad
Executive Director
Office of Sustainable Development Assessments and Approvals
As Delegate for the Director General

3.12.2003.

M:\A\Transport\Roads\LaneCove\Post Approval\Compliance\Condition 243\LCT Condition 243 - Approval.doc

RECEIVED TIME 3.DEC. 8:19

Attachment 47 – RTA Garry Humphrey at World Road Conference 2003

PIARC TECHNICAL COMMITTEE C5 – Road Tunnel Operations

Australia is a newcomer to this committee having been involved for just this one term. We have very few tunnels in Australia compared to most of your countries. Australia is not a mountainous country and we do not have the same needs. Our tunnels are located predominantly in our major cities and are constructed to reduce the impact of motorways on our urban environment. We see our involvement with PIARC as important as PIARC guidelines form the basis of our tunnel specifications. The sharing of your knowledge and your experience has been most beneficial to us. The network of contacts that we have gained through PIARC is also invaluable.

Slide - View of Future

Looking ahead, how can the value we all gain from PIARC be increased. C5 has been the most productive of the PIARC committees and clearly there have been significant benefits to us all from the work done to date by the committee and there remains much to be done. However, we each have our individual needs, wants and priorities and it is worth reflecting on those at this time. What are the most pressing needs and problems? How can we work collectively to solve them.

It is quite obvious that in recent years, as a result of the European tunnel fires, our attention has been focussed on fire safety and the measures needed to ensure the safety of existing and new tunnels. Much has been achieved but given the criticality of this issue it will inevitably capture our attention for some time yet.

My intention today is not to provide you with a list of potential work activities, Evert has done that very well. My intention is to provoke some thought, as to what our priority areas are.

Slide – Operations & Maintenance Risk Table

A way of doing this is to carry out a form of risk assessment. This table is a quick assessment of our risk factors and is not meant to be exhaustive. Loss of life, tunnels closures and upgrade costs are obvious concerns.

Slide – Development Risk Table

I believe that we need to recognise that the risks are high in project development and that it is an area that we should give more time to. Scope creep, increases in cost estimates and project delay are all important

We need to carry out this type of assessment. Each country will view the risks differently but we do need a collective view and a collaborative approach.

Slide - Costs

Increasing project cost is one of our key concerns in Australia. By way of example, you can see from this slide that the costs of our two current developing projects in Sydney have increased enormously.

I am sure that there are similar situations in your countries. The A14 in Paris is one that comes to my mind.

I can see benefit in collaborating on tunnel concept development so that the good ideas to contain project scope, cost and delay can be shared between us.

One of our key risks that will influence project costs at the development stage is spiralling ventilation costs.

I was in Japan the week before last looking at tunnels on a tour organised by Mr Mizutani. Japan has some excellent cost effective longitudinal ventilation systems in long mountain tunnels employing electrostatic precipitators. They also have some very expensive applications in urban areas. They are probably one step further down the path of rapidly increasing ventilation costs than Australia.

Whilst other countries may not believe that they have this problem, it needs to be recognised as a serious threat. The ease of communication, particularly on the internet, means that information spreads very rapidly. If someone opposes one of your tunnels they will very quickly learn that air quality is a strong platform to launch from.

The other key ventilation risk is that of increasing air quality standards. The sleeper that is emerging is NO_2. Bernt Frieholtz highlighted this when we met in Stockholm. It has also emerged in Australian because of the work done in Sweden.

Slide – Future Collaboration

In terms of a way ahead I would like to suggest that we:

1) Undertake a issues identification and risk assessment exercise;
2) Include a workshop in the next term to identify development issues that are likely to increase our project costs and the ways they can be addressed;
3) Take the lead in framing exposure based air quality standards with particular regard to health impacts, recognising that if we don't we are likely to have well-meaning health professionals imposing them on us, and
4) Continue the work of preparing a best practice manual for external air quality.

Coming back to where I started from today: we do need to be focussed. There are significant risks to be faced. Our organisations would benefit by identifying these risks and targeting our work program accordingly. Our time is limited.

Thank you for this opportunity today. I hope that I have stimulated some thought as to where we should be heading.

	Cross City Tunnel	Lane Cove Tunnel
Original estimated cost	A$200m (1999)	A$550m (1999)
Final estimated cost	A$680m (2002)	A$1100m (2003)
Increase in ventilation cost	A$40m	A$60m

AUSTROADS

RTA

TECHNICAL COMMITTEE C5
WORK PROGRAM

Technical Committee C5

View of the Future

› Comprehensive program to date
› Need to consider priorities
› How to obtain best return?
› Attention captured by fires
› Other important issues?

2

Technical Committee C5

Risk	Likelihood	Consequence
Operation and Maintenance		
Multiple loss of life from fire	Moderate	High
Multiple loss of life from dangerous goods	Moderate	High
Long term tunnel closure from fire/DG	Moderate	High
Extended tunnel closure from accident or plant failure	Moderate	Moderate
Major cost increase from unprogrammed upgrade or maintenance	Moderate	Moderate/High

3

Technical Committee C5

Risk	Likelihood	Consequence
Development:		
Major cost increase from scope creep from opposition to projects	Moderate	High
Major cost increase from increased air quality standards	Moderate	High
Project delay from prolonged concept development/ environmental assessment/ approval processes	High	Moderate

4

Technical Committee C5

	Cross City Tunnel	Lane Cove Tunnel
Original estimated cost	A$200m (1999)	A$550m (1999)
Final estimated cost	A$680m (2002)	A$1100m (2003)
Increase in ventilation cost	A$40m	A$60m

5

Technical Committee C5

Future collaboration:

- Issue identification and risk assessment
- Workshop concept development
- Take the lead with exposure based in-tunnel air quality standards
- Prepare best practice guide for external air quality

6

Technical Committee C5

THANK YOU

Garry Humphrey
Roads and Traffic Authority
NSW
Representing *AUSTROADS*

7

Attachment 48 – Government Reputation not to Fund Filtration

FILTRATION OF EXHAUST EMISSIONS FROM THE CROSS CITY TUNNEL VENTILATION STACK

The Conditions of Approval for the Cross City Tunnel issued by the Minister for Planning on 12 December 2002 do not require the installation of filtration equipment for the ventilation stack proposed to be constructed as part of the Cross City Tunnel project.

Condition 251does however require that the tunnel be designed and constructed so as to allow filtration equipment to be installed at a later date in the event that this was required by the Director-General of Planning. The Director-General of Planning is entitled to require the installation of filtration equipment in circumstances where there have been breaches of the air quality requirements set down in the Conditions.

The position adopted in the Conditions of Approval reflect the consistent view of RTA and Planning NSW that filtration of exhaust emissions from a road tunnel ventilation stack is not effective having regard to current technology internationally available.

Financial close for the Cross City Tunnel transaction is scheduled to occur on Wednesday 18 December 2002. Were the Government to decide to require the installation of filtration to form part of the agreed project works for the Cross City Tunnel at this stage it is likely that financial close would be delayed by a significant period. Reasons for this include:

1. The consortia, and their contractor, would be required to investigate alternative filtration options available, to design specifically for them and to scope and price the works. Absent a competitive process the RTA would also need to seek independent certification of the scope and price of the work as well as the veracity of the design;

2. Given the reference to filtration equipment in the planning approval consultation would need to take place with Planning NSW, the Environment Protection Authority and NSW Health to ensure their satisfaction with the filtration model proposed. This consultation would be expected to take some time as community input might also be sought by those agencies;

3. It is not clear whether the consortia who have obtained all relevant approvals for the project to proceed as proposed would be prepared to extend their commitment to a revised scope of works, particularly if the revised scope of works was contingent on further approvals. In this regard both debt and equity for the project have been committed for some twelve months with the knowledge that filtration equipment was not presently required and not government policy.

Consistent with the third point above it is not clear whether debt and equity participants in the consortia would continue their commitment into the new calendar

year were financial close to be delayed. If they did remain the RTA would be exposed to significant additional underwriting costs for debt and equity investors as well as additional advisory and consultants costs for all parties. The consortia have advised that their anticipated additional costs for moving into the new financial year, absent any scope changes, is in the order of $10 million.

The estimated cost of installing filtration equipment for the Cross City Tunnel is expected to be in the order of $47 million. This amount was published in the RTA's representations report for the initial Environmental Impact Statement for the project published in 2001. It is clear that the consortia for the Cross City Tunnel project would not have the capacity to finance this additional cost without cash input from the RTA. This would undermine the basis on which the transaction has proceeded, ie that it add no cost to Government.

The reputation of both Government and the RTA in relation to the delivery of private sector project may be significantly damaged if a requirement to install filtration equipment is introduced at this late stage.

Attachment 49 – Independent Verifier Advises Air Filtration Unresolved 19/01/06

URS

APP

Independent Verifier - Lane Cove Tunnel Project

Schedule 6 - Independent Verifier's Certificate

Design Verification

FILE COPY

Date: 19 January 2006	Certificate No.: 11.2-BS01-017

Project: Lane Cove Tunnel Project

To: RTA
7 Sirius Road
LANE COVE NSW 2066
Attn: John Anderson

RECEIVED
- 3 FEB 2006

From: Independent Verifier
34 Waterloo Road
NORTH RYDE NSW 2113
Independent Verifier's Representative

Design Documentation Details:

Design Lot 11.2-BS01 Marden Street Ventilation Station, Stack and Operators Maintenance Facility (Early Works)

In accordance with the terms of clause 5.1(c) of the Project Deed between the Roads and Traffic Authority of New South Wales and the Lane Cove Tunnel Company Pty Ltd [Company] dated 4 December 2003 ("Deed") with respect to the Project, we hereby certify that the attached Design Documentation:

a) complies with all the requirements of the Deed including the Scope of Works and Technical Criteria, including (without limitation) the durability requirements of section 2.13 and the design life requirements of section 5.2 of the Scope of Works and Technical Criteria; and;

b) is documented to enable construction in compliance with the Deed;

The comments made by RTA in respect of the Design Documentation are addressed in the Schedule to this certificate.

This Certificate limited by the following issues:

- Provision needs to be made for a truck wash facility including supply and collection of wash water.
- Drawing BS01- 1313: The garage area must be of adequate height to allow for a gantry, which in turn will be of adequate height to remove a Jet Fan from a truck (not a low load truck). We estimate that a clearance **below the hook of the gantry crane should be 3.5 metres**. Currently the height allowed seems not to allow for the gantry crane beam and hook height.
- TSL has made some requests with respect to a two level office at the front of the building. This needs to be discussed on the basis of compromises made in other locations.
- Drawing DWG – BS01-1310: Please provide a detailed study on the removal of axial

fan motors. Particular questions which must be addressed include:

- When lifting a motor from the bottom row of fans, where is the collar from the fan above to rest, and will this hinder the removal of the motor to a position near the double door?
- Can the concrete planks in the plank room support the collar and/or a motor?
- How will the motors be moved from the gantry hook to the roof outside? If a trolley is proposed, can it manoeuvre easily on the planks?
- When the motor above the switch room is removed, how will it then be manoeuvred out of the double door without the concrete planks in place? Will double handling of the planks and motor be necessary?
- What provisions are made for securing openings left by the removal of planks?

o General: Comments provided to Marco Palmero on 2/11/04 are yet to be responded to. This issue has been raised previously, however we have still not seen any response to these comments.

- No power outlets have been provided in the maintenance facility. It is expected that both the garage and workshop will have 2 off 3 phase 32 amp power outlets as well as numerous 240V single-phase outlets.
- It is also assumed that a gantry crane will require an additional dedicated 3-phase power supply.
- While the amenities provided in the maintenance depot may meet the BCA they do not appear adequate to fit the functionality of a depot. It is expected that at the end of a shift multiple people will need to use the amenities at the same time. What is provided at present will not suit a workshop environment.

o Drw-1313: There is reference to the possible future monorail by operator; does this mean that the beam is in place for Transfield Services to fix a monorail to? How long is this beam? Does it traverse the length of the workshop and garage? What is its load rating? It needs to be sufficient to lift a jet fan.

o Drawing BS01-1605: How will the Jib Crane will be rigged.

- Is it equipped with an electric winch mounted at the base and enough cable to comfortably reach ground level?
- Is the hook able to be fixed at any point along the jib length (and how is this achieved)?
  - If the answer to either or both of these questions is no then the functionality of the jib crane is severely limited. Please advise on the current proposal.

- TJH to provide further evidence to demonstrate that the acoustic design of the building satisfies all relevant MCoA conditions (RTA item 72)
- Detailing of air-conditioning and ventilation to UPS and Radio rooms to be detailed and issue of required redundancy to be addressed (IV item 82 and 84)
- TJH to confirm Energy metering arrangements (RTA Item 85)
- TJH to review and confirm submain reticulation voltage drop is limited to 4% (RTA item 86)
- Earthing in section 3.2.7.9 of FDR to be separated from the Lightning Protection section. (IV item 94)

- Distribution board fault levels to be confirmed (IV item 95)
- TJH to provide full details of the Fire Prevention and Protection services – Note that response to comment was unclear (RTA item 98)
- Method of fixing pre-cast panels to be indicated on the drawings – noted that response to comment was unclear (Drawing BS01-1500: RTA item 109)
- Confirm whether access control and security systems are to standardized across the project and aligned to current RTA facilities, finalise security provisions and incorporate into design (IV item 102, 143)
- Pile capacities not shown on drawing as they should be, in case the assumed foundation data is incorrect.(Drawing BS01-0011: RTA Item 111)
- BCA Report: The updated version of the BCA report still indicates unresolved issues in Section 8, in particular the FRL of the fan support steelwork. (RTA Item 136)
- Integration of Alstom Design: The response to the RTA comment refers to TJH for a response. (RTA Item 141)
- Future Air-Filtration Treatment: TJH to provide a report. This item should remain open until the report is produced (RTA Item 142)
- Provision for cathodic protection for below ground structures to be included in design (IV item 144)
- Noted that Phase 2 portion of building is on hold pending finalisation of silencer details (FDR section 3 and Design Verification Checklist, (RTA item 159)
- Noted that final design of the transformer building is not complete (FDR section 3.2.3.2)
- Non-conformance for less than minimum pipe grade to be approved.(FDR 3.2.6)
- Outstanding issues relating to the BCA compliance report to be addressed:
    - Section 3.3 – Requirements for FRL's by the electricity provider to be further investigated
    - TJH to confirm whether plant rooms house emergency generators or battereies and to provide fire separation as necessary.
    - Total travel distances do not comply – TJH to address.
    - Issue of requirement for automatic fire protection to be supplied to tunnel structures to be addressed.
    - Issue of pressure preventing the opening of doors to be addressed (BCA report 7.2)
- Noted that the founding depth and founding rock material to the footings of the existing building on the adjacent property to be confirmed (FDR Appendix E2.1: IV item 199)
- Outstanding issues described in the Design Verification Checklist to be addressed (IV)
    - Transformer lifting procedures and sequence to be confirmed
    - Crane position for infrequent lifting arrangement of air flow straighteners in stack to be confirmed
    - Ventilation Building Steelwork supporting fans and equipment in Fan Room – Design and confirmation of fire rating performance to be finalised
    - TJH to confirm that TSL additional site functionality issues have been addressed

Attachment 50 – Federal Government Commitment 30 November 05 offering $10 million to Filtration of Lane Cove Tunnel

SENATOR THE HON IAN CAMPBELL
Minister for the Environment and Heritage
Senator for Western Australia

The Hon Carl Scully MP
Minister for Roads
Level 36, Governor Macquarie Tower
1 Farrer Place
SYDNEY NSW 2000

30 NOV 2004

Dear Minister Carl,

I am writing to confirm the Australian Government's commitment to contribute up to $10 million towards the costs of tunnel filtration to improve air quality around the new Lane Cove traffic tunnel, and to advise you that the administration of this commitment falls within my portfolio responsibilities.

As you may be aware, the Member for North Sydney, the Honourable Joe Hockey MP and I announced jointly on 28 September 2004 that the Australian Government would contribute up to $10 million towards the purchase and installation of air filtration equipment in the Lane Cove Tunnel.

This offer is made on the basis that funding is matched by NSW, with any costs beyond $20 million to be borne by NSW. It is a condition of the offer that world's best practice filtration equipment (including particulate and noxious gas removal equipment) is installed and that the NSW Government consults appropriately with relevant local government and community organisations.

I look forward to your response. If you agree to proceed, I suggest our officials meet to discuss the project in detail.

Yours sincerely

IAN CAMPBELL

M04/9904

cc The Hon John Anderson MP, Minister for Transport and Regional Services

Canberra
Parliament House, Canberra ACT 2600
Telephone: 02 6277 7640
Fax: 02 6273 6101

Perth
GPO Box B58, Perth WA 6838
Telephone: 08 9325 4227
Fax: 08 9325 7906

Attachment 51 –Hon Joe Hockey Letter to LCC 3 February 05

Mr P Brown
General Manager
Lane Cove Council
PO Box 20
Lane Cove NSW 1595

– 3 FEB 2005

Dear Mr Brown

Thank you for your letter of 23 December, 2005 concerning the full filtration of the Lane Cove Tunnel.

I share your disappointment that the NSW Government is yet to accept the Australian Government's offer to financially assist with the filtration of the Tunnel.

You will recall that I wrote to the then Minister for Roads, Carl Scully, requesting a meeting to discuss this matter. I had proposed a delegation which would include representation from Lane Cove Council and the community.

On 7 January, 2005 I received a response from the Minister indicating that he was willing to meet with such a delegation but only the basis that the Australian Government indicate that its financial commitment of up to $10 million was available for use on a pilot filtration project of the State Government's choice – that is, not specifically the Lane Cove Tunnel.

I have written to the new Minister for Roads, Michael Costa, renewing the request for a meeting and indicating that the Australian Government's commitment is specifically for the Lane Cove Tunnel and no other road project. I will keep you informed as to the response I receive.

In your letter, you conveyed the suggestion that the Australian Government introduce legislation that would require certain road tunnels to incorporate filtration. I asked my staff to research this idea. The information that I have been provided with is that it is unlikely that the Australian Government could unilaterally require filtration for tunnel projects due to the limitations of our Constitutional powers in this area.

The only option that I think would be feasible would be through the national Environment Protection and Heritage Council. This is a statutory joint Commonwealth-State body established by COAG. It has the capacity to establish mandatory standards for matters such as air quality (which it already has done). Its standards could specifically include emissions from road tunnels. The limitations of this approach are that it is a slow process, the concurrence of the States is required and the Australian Government can not unilaterally enforce standards that the States have agreed to. The timeframes involved would not assist in relation to the current construction of the Lane Cove Tunnel.

Level 2, 32 Walker Street, North Sydney **All correspondence to:** PO Box 1107, North Sydney NSW 2059
Telephone (02) 9929 9822 Facsimile (02) 9929 9833 Email: joe@joehockey.com Web: **www.joehockey.com**

I will continue to press the State Government to respond more cooperatively to this issue and will let you know what response I receive from Minister Costa.

Yours sincerely

CC: Mr Anthony Roberts MP
Ms Gladys Berejiklian MP
Senator the Hon Ian Campbell

Attachment 52 – The Hon Michael Costa Letter March 05 Regarding $70 million costing of filtration

Minister for Roads
Minister for Economic Reform
Minister for Ports
Minister for the Hunter

Councillor Ian Longbottom
Mayor
Lane Cove Council
PO Box 20
LANE COVE NSW 1595

Dear Councillor Longbottom

I refer to your recent letter about the Lane Cove Tunnel.

In relation to filtration, the Government's position remains that the Department of Infrastructure, Planning & Natural Resources in consultation with the Department of Health and Department of Environment and Conservation has set the toughest air quality standards in the world. These standards are met with all tunnels without the use of filtration.

I'm advised the approval for the Lane Cove Tunnel was granted by the Minister for Planning in line with the strict air quality conditions imposed by the Department of Infrastructure and Planning.

I recently met with representatives of the local community to discuss the Lane Cove Tunnel. At our meeting I indicated given the above information, any filtration should be on a 50/50 cost sharing basis with the Federal Government. If the Federal Government increases its offer of $10 million for filtration to a commitment to fully fund half the cost via a special purpose grant, I will direct the RTA to hold discussions with the Lane Cove Tunnel Company to achieve filtration of the ventilation stacks.

The RTA advise its most recent estimate of the cost of filtration of the stacks is approximately $70 million. I've asked the RTA to provide a detailed current costing.

As the General Manager of Lane Cove Council also wrote to me regarding this issue, it would be appreciated if you could refer this response to him.

Yours sincerely

MICHAEL COSTA

Level 31, Governor Macquarie Tower, 1 Farrer Place, Sydney NSW 2000
Tel 9228 5665 Fax 9228 5699

Attachment 53 – RTA Garry Humphrey Potential Cost Estimates of Filtration Costs

POTENTIAL COST OF INSTALLING AND OPERATING AIR SCRUBBERS IN SYDNEY TUNNELS

Issue:

Community groups in Sydney have been continually expressing concern that the air discharged from the ventilation stacks is not filtered to reduce the concentration of fine particulate matter. This briefing note addresses the cost of installing and operating air scubbers (electrostatic precipitators) in Sydney's tunnels.

Background:

Electrostatic precipitators have been installed in tunnels in Norway, Japan, and Korea. A recent paper by the key Norwegian road authority and the RTA discredited claims that electrostatic precipitators would be effective in addressing the concerns of the community in relation to the treatment of tunnel air.

In September 2000, RTA commissioned Flagstaff Consulting Group to prepare a concept estimate for the installation of Electrostatic Precipitators (ESP) for the M5 East Tunnel. This study remains that most reliable source of costing data available to RTA for the complete installation of ESP in a Sydney tunnel.

In addition to the capital cost of procuring and installing an ESP system, the report also estimates the annual operating cost and annual sinking fund charge for replacement of the equipment.

ESP Costs:

An estimate of the cost of procuring, installing, operating and replacing ESPs in the three major existing tunnels in Sydney (Sydney Harbour Tunnel, Eastern Distributor, and M5 East) and other tunnels that are planned or proposed (Cross City Tunnel, Lane Cove Tunnel, and a tunnel to Warringah). In the absence of detailed estimates, costs have been approximated from the Flagstaff estimate for the M5 East on a pro-rata basis in proportion to ventilation system capacities. By this method, the estimated costs are:

Sydney Harbour Tunnel, Eastern Distributor, M5 East, Cross City Tunnel, Lane Cove Tunnel, and a tunnel to Warringah

Capital Cost:	approximately $240 million
Annual Operating Cost:	approximately $4.0m pa (NPV approx $37 million)
Annual sinking:	approximately $6.0m pa (NPV approx $55 million)

The net present value of the recurring costs has been determined utilising a discount factor of 10.2% and an operating period of thirty years. This is consistent with RTA practice for assessing the economic value of road projects.

Contact: Garry Humphrey Telephone 8814 0006
Mobile 0412 206 306

Air Scrubbers

	Air Flow#	Supply and Install ($m 2002)	Operating Cost ($m 2002 pa)	Sinking Fund ($m 2002 pa)	NPV Operating Costs* ($m 2002)	NPV Sinking Fund Costs* ($m 2002)	Total Cost ($m 2002)
M5 East	850	38.9	0.659	0.9706	6.112	8.997	54.0
SHT	800	36.6	0.621	0.914	5.753	8.468	50.8
ED	560	25.6	0.434	0.639	4.027	5.928	35.6
CCT	510	23.3	0.396	0.582	3.667	5.398	32.4
LCT	850	38.9	0.659	0.971	6.112	8.997	54.0
Warringah	1630	74.6	1.264	1.861	11.721	17.254	103.6
Total		**238.0**	**4.0**	**5.9**	**37.4**	**55.0**	**330.5**

* NPV based on 10.2% discount rate with a thirty year cost stream

Ventilation capacities based on actual capacities of operating tunnels and estimated capacities to achieve acceptable air quality in future tunn

Attachment 54 – Corrs Chambers Westgarth Legal Advice to RTA on MCoA 151

CORRS
CHAMBERS
WESTGARTH

LAWYERS

1 June 2004

Partner
John Jardim (02) 9210 6495
Email: John_Jardim@corrs.com.au

Our reference
JJ/RTA27151-3456336

Mr Michael Najem
General Manager, Legal Branch
Roads and Traffic Authority
260 Elizabeth Street
SURRY HILLS NSW 2010

ATTENTION: Caitlin Richards

Dear Michael

LANE COVE TUNNEL PROJECT - DRAFT CONDITION 151 REPORT ON POTENTIAL OPPORTUNITIES FOR INCORPORATING THE VENTILATION STACKS WITHIN AN EXISTING, PROPOSED OR NEWLY CONSTRUCTED BUILDING

We refer to the email from Caitlin Richards dated 26 May 2004 attaching a draft Condition 151 report on the *Potential Opportunities for Incorporating the Ventilation Stacks within an Existing, Proposed or Newly Constructed Building.*

We have been instructed to review the draft report for compliance with condition 151 of the Minister's Approval for the Lane Cove Tunnel and associated road improvements. Condition 151 states:

> *"Prior to finalising the ventilation stack design, the Proponent shall, in consultation with relevant Councils, demonstrate to the satisfaction of the Director-General, that potential opportunities to incorporate the ventilation stack within an existing, proposed or newly constructed building have been appropriately considered through the selected proposal invitation and final design process".*

We **attach** a copy of the draft report in which we have marked up our suggested amendments.

We make the following comments on the draft report:

1 The stated intention of the draft report is to address:

> *"the potential opportunities to incorporate the western ventilation stack within an existing, proposed or newly*

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S/1791272

constructed building in accordance with the Requirements of Condition of Approval No 151" (section 1.1).

However, it is to be noted that Condition 151 is not restricted to the western ventilation stack and applies to both the western and eastern ventilation stack locations (see condition 150). The rationale as to why the draft report is restricted to the western ventilation stack appears to be contained in section 1.3 of the draft report which relevantly states that:

> *"While Condition of Approval No 151 requires that the RTA investigates opportunities for incorporating the stacks into buildings, it must be noted that Condition of Approval No 150 requires that two ventilation stacks be constructed, one at 5 Sirius Road, Lane Cove West and the other at 6 Marden Street, Artarmon. Given this requirement and the location commitments in the EIS and Representations Report, the investigation of opportunities under Condition of Approval No 151 must be confined to the approved western ventilation stack location at 5 Sirius Road".*

The same rationale would appear to apply in respect of the eastern ventilation stack and it is not clear from the above why the draft report is confined to the approved western ventilation stack.

2 Condition 151 requires "consultation with relevant Councils" as part of the consideration of the potential opportunities to incorporate the ventilation stacks within an existing, proposed or newly constructed building. There is no mention in the draft report of any such consultation. Such consultation is critical to compliance with condition 151. A new section headed "Consultation with relevant Councils" should be inserted in the draft report after section 2.2.1 (Previous Investigations).

3 Section 1.4 of the draft report relevantly states that:

> *"Under Schedule 9 of the Project Deed, the Lane Cove Tunnel Company (LCTC) is responsible for demonstrating to the satisfaction of the Director-General and in consultation with relevant Councils that the final ventilation stack design has appropriately considered potential opportunities to incorporate*

> *the ventilation stack within an existing, proposed or newly constructed building. These requirements will be addressed via the Detailed Urban Design Sub Plans to be prepared in consultation with relevant Councils under Condition of Approval No 87".*

The above requirements are essentially the requirements of condition 151. If it is the case that LCTC will be addressing these requirements in the Detailed Urban Design Sub Plans "to be prepared in consultation with relevant Councils under Condition of Approval No 87", the question arises as to whether the draft report is premature and whether the process undertaken for compliance with Condition 87 should take place before the Condition 151 report is prepared as the report will benefit from the Condition 87 process. We would be grateful for the RTA's view in this regard.

4 Section 2.2.2 on page 5 of the draft report states that the additional design work completed during the evaluation of proposals phase indicated that "the stack structure could be better integrated into a new building". Section 2.4 on page 13 states that the RTA concluded that "opportunities for incorporating the western ventilation stack into a new building should be considered in detail". Section 3 on page 15 relevantly refers to:

- *"the redevelopment of the site was not proposed by the previous owner or the RTA in its Representations Report and has not been pursued further"* (it is not clear what "redevelopment" means in this context); and
- *"relocating the Tunnel Control Centre to 5 Sirius Road and carefully incorporating the design* [of the] *western ventilation stack into this building"* (it is not clear what "this building" means, ie is it a reference to the existing building or a new building).

The draft report should contain a clear statement as to whether the western ventilation stack and Tunnel Control Centre will be incorporated in the "existing building" or in a "proposed or newly constructed building". From the conclusions in the draft report, we assume that the stack and Tunnel Control Centre cannot be incorporated in the existing building. However, this needs to be made clear.

CORRS
CHAMBERS
WESTGARTH

LAWYERS

Roads and Traffic Authority

LANE COVE TUNNEL PROJECT - DRAFT CONDITION 151 REPORT ON POTENTIAL OPPORTUNITIES FOR INCORPORATING THE VENTILATION STACKS WITHIN AN EXISTING, PROPOSED OR NEWLY CONSTRUCTED BUILDING

If you wish to discuss the above comments or our suggested amendments to the draft report, please do not hesitate to contact the writer.

Yours sincerely

John Jardim
Partner

encl

RICHARDS Caitlin

From: John.Jardim@corrs.com.au
Sent: Wednesday, 14 July 2004 4:44 PM
To: RICHARDS Caitlin
Cc: ANDERSON John Raymond; TARANEC Ross; DIEKMAN Chris
Subject: LCT - Condition 151 Report

Dear Caitlin,

I refer to your email of 29 June 2004 attaching a copy of the updated Condition 151 Report.

I note that the updated Report now addresses the issue of consultation with the relevant councils and confirms that the RTA met with both Lane Cove and Ryde Councils and that neither objected to or raised concerns in relation to the proposed incorporation of the western ventilation stack within the Tunnel Control Building to be constructed at 5 Serious Road.

The updated Report also clarifies why it is confined to the western ventilation stack (and not also the eastern ventilation stack) by reference to the Director General's Assessment Report. I understand that this interpretation of condition 151 has also been confirmed in subsequent discussions with DIPNR.

The other issues raised in our letter of 1 June 2004 have also been addressed in the updated Report or clarified and resolved in our subsequent discussions.

Accordingly, we now confirm that the issues raised in our letter have now been adequately addressed.

The only minor amendments suggested are as follows:

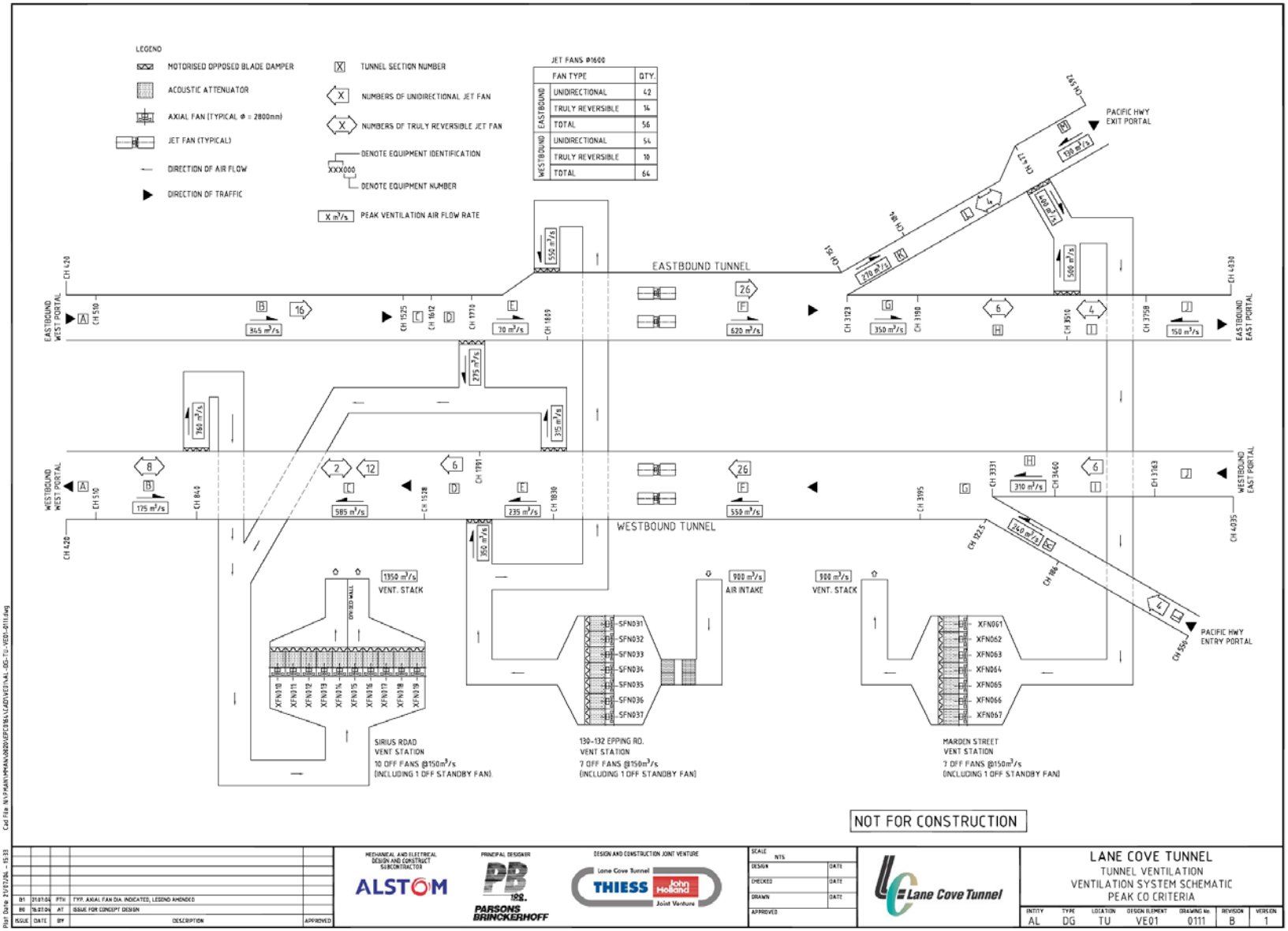
In section 1.4, the first reference to "Council" in the third line should be deleted.

In section 3, the words "prior to the finalisation of the ventilation stack design" should be inserted after the word "consulted" in the first line. In the second paragraph of section 3, the word "proposed" should be inserted before the word "relocation" in the fourth line.

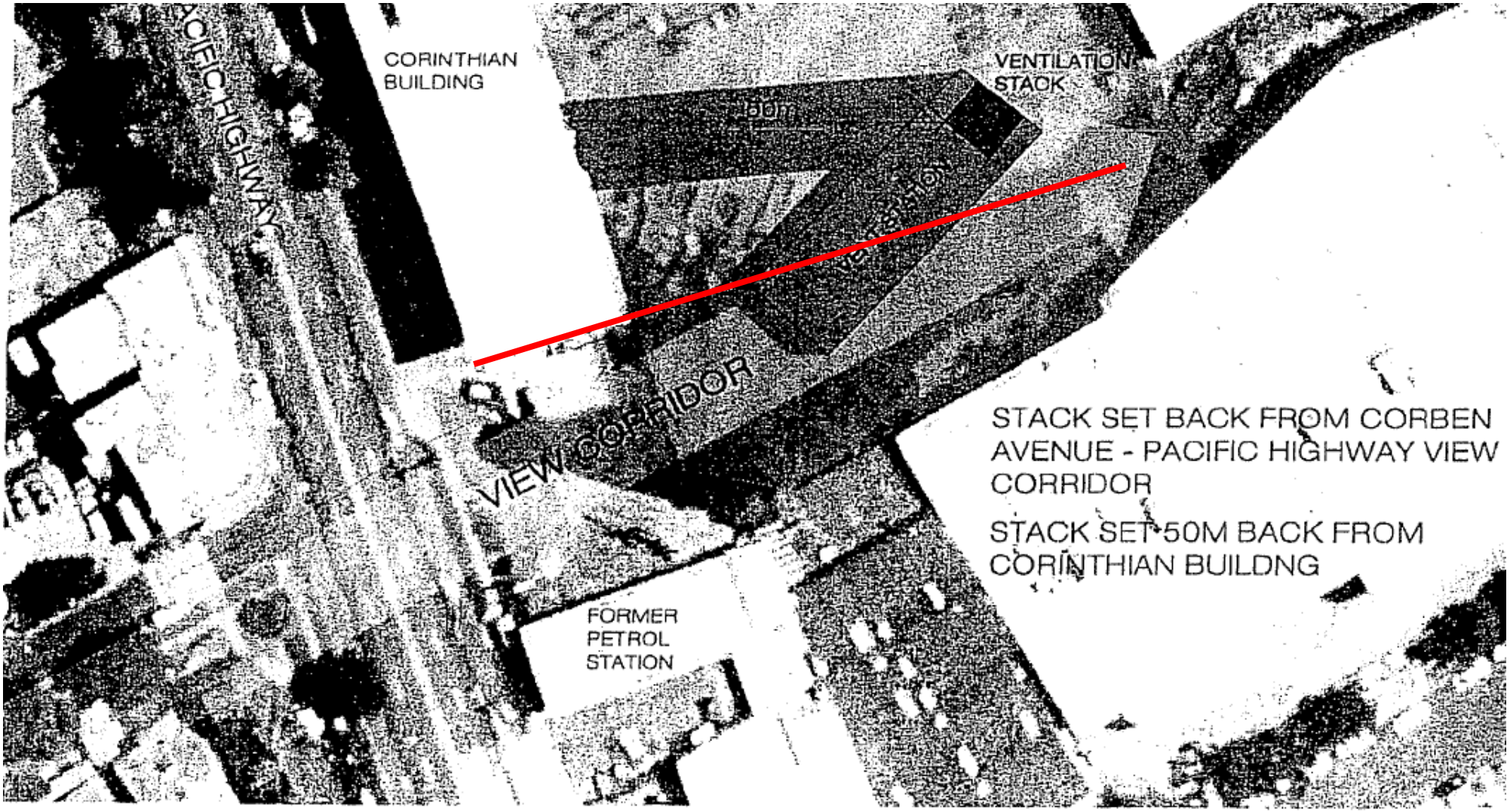
Regards,

John

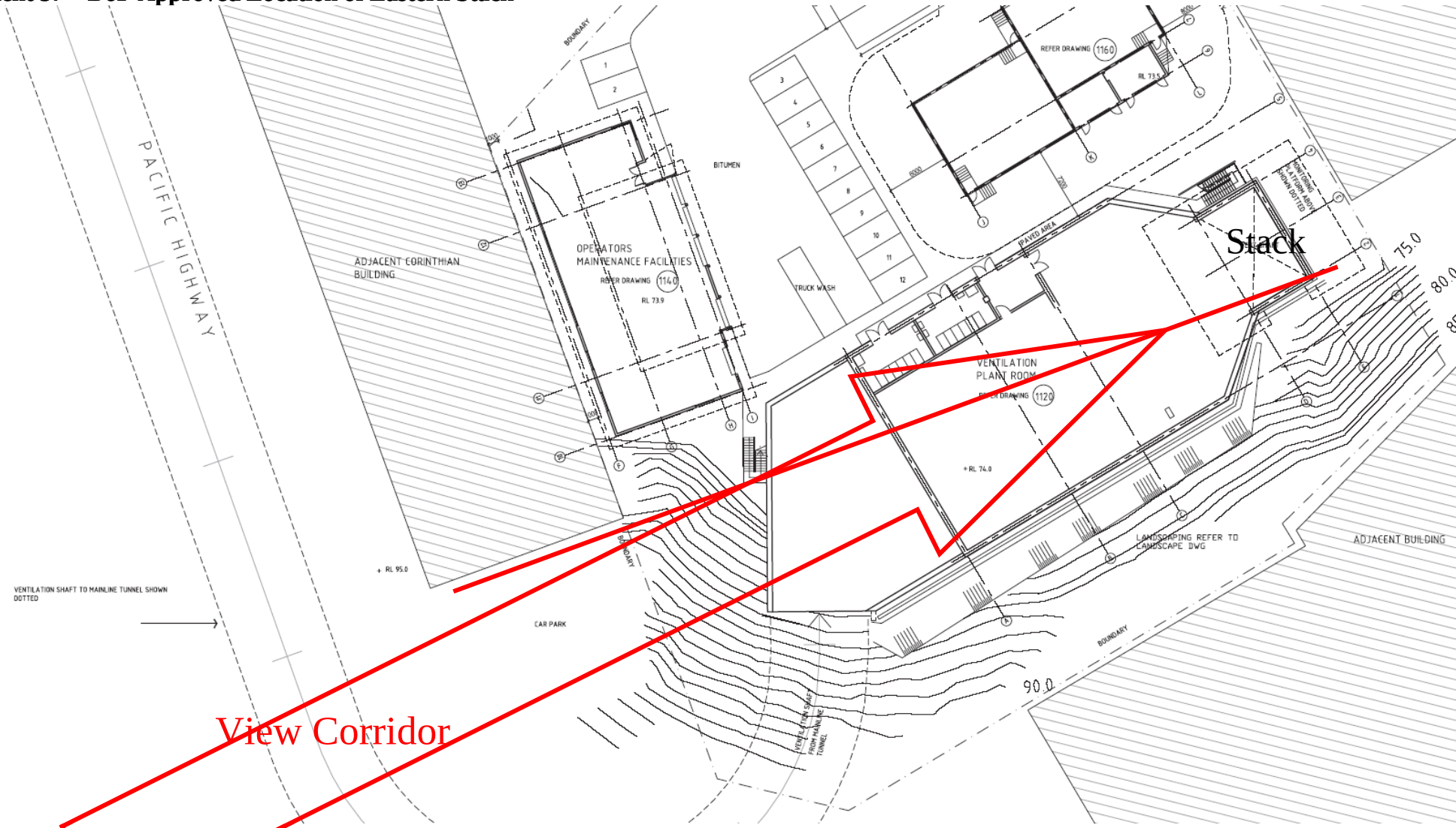
Attachment 55 – PB Ventilation design air flows


LEGEND
MOTORISED OPPOSED BLADE DAMPER
ACOUSTIC ATTENUATOR
AXIAL FAN (TYPICAL Φ = 2800mm)
JET FAN (TYPICAL)
DIRECTION OF AIR FLOW
DIRECTION OF TRAFFIC
TUNNEL SECTION NUMBER
NUMBERS OF UNIDIRECTIONAL JET FAN
NUMBERS OF TRULY REVERSIBLE JET FAN
DENOTE EQUIPMENT IDENTIFICATION
DENOTE EQUIPMENT NUMBER
PEAK VENTILATION AIR FLOW RATE
JET FANS Φ1600
EASTBOUND
WESTBOUND
FAN TYPE
QTY.
UNIDIRECTIONAL 42
TRULY REVERSIBLE 14
TOTAL 56
UNIDIRECTIONAL 54
TRULY REVERSIBLE 10
TOTAL 64
EASTBOUND TUNNEL
WESTBOUND TUNNEL
EASTBOUND WEST PORTAL
EASTBOUND EAST PORTAL
WESTBOUND WEST PORTAL
WESTBOUND EAST PORTAL
PACIFIC HWY EXIT PORTAL
PACIFIC HWY ENTRY PORTAL
1350 m³/s VENT. STACK
SIRIUS ROAD VENT STATION
10 OFF FANS @150m³/s (INCLUDING 1 OFF STANDBY FAN).
900 m³/s AIR INTAKE
130-132 EPPING RD. VENT STATION
7 OFF FANS @150m³/s (INCLUDING 1 OFF STANDBY FAN)
900 m³/s VENT. STACK
MARDEN STREET VENT STATION
7 OFF FANS @150m³/s (INCLUDING 1 OFF STANDBY FAN)
NOT FOR CONSTRUCTION
LANE COVE TUNNEL
TUNNEL VENTILATION
VENTILATION SYSTEM SCHEMATIC
PEAK CO CRITERIA

Attachment 56 – Contract Project Deed Location of Eastern Stack



Attachment 57 – DoP Approved Location of Eastern Stack



Attachment 58 - Extract of RTA response to Auditor General Report on Managing Air Quality

The RTA recognises that there are significant challenges involved in balancing accurate estimates of project lifecycle costs and provision for future project modifications. The RTA has provided for the future installation of filtration systems for the M5 East, Cross City and Lane Cove Tunnels should the need arise for their installation. The Audit report also notes that vehicle emissions including carbon monoxide, volatile organic compounds, oxides of nitrogen and particulates (PM_{10}) are forecast to fall in NSW by 62%, 40%, 55% and 40% respectively by 2020. The reductions in vehicle pollutants is expected to result in excess ventilation capacity in tunnels such as the M5 East, Cross City and Lane Cove tunnels during their design life. The RTA is keen to continue working with the other Government agencies to continue to achieve this balance between cost and appropriate project provisions.

The audit report states that 'only a proponent can initiate modifications (to Approval Conditions) but there is no incentive to do so where the modification would require significant additional costs (such as changing some air quality requirements for tunnel operators)'. However, the RTA considers that sufficient regard should be given to:

- *the fact that the RTA is the proponent for all major road tunnel projects in NSW to date; and*
- *the RTA's status as a government authority.*

The RTA has a responsibility to act in the public interest. The RTA takes its environmental obligation seriously and as such is keen to achieve good environmental outcomes in the exercise of its functions, but must also consider matters such as its role as a steward of public resources. In addition, the RTA is subject to the control and direction of the Minister for Roads. In these circumstances, the RTA considers that there is incentive for a proponent to initiate a modification of an approval for a road tunnel project.

The audit report recommends that DIPNR "monitor the need for retrospective changes to approval conditions for tunnel operations and submit proposals to the Cabinet Standing Committee for Infrastructure and Planning where changes are needed. This should be done in consultation with all relevant Ministers and their respective agencies…." . The RTA understands that an approval issued under the Environmental Planning and Assessment Act 1979 can only be modified by the proponent (as the audit report acknowledges), and also changes to approval conditions could only take effect prospectively. In addition, if a recommendation such as this were to be implemented, the RTA suggests that consultation with the RTA occurs prior to any decision to make a submission to the Cabinet Standing Committee for Infrastructure and Planning, to allow relevant information and comments to be provided for input into that decision making process.

(signed)

Paul Forward
Chief Executive

Dated: 22 March 2005