

Our ref: SSI-7666-PA-55

Mr Greg Nash Director, Coffs Harbour Bypass 76 Victoria Street Grafton NSW 2460

13 April 2022

Subject: Coffs Harbour Bypass Project (SSI 7666) – operational noise modelling (E45)

Dear Mr Nash

I refer to submission of the Noise Model Input Report to the Department on 1 December 2021 for the Coffs Harbour Bypass project, prepared to satisfy E45 of SSI 7666.

I note that condition E45 does not require submission of the Noise Model Input report to the Planning Secretary, however I understand that it has been submitted to assist in the timely assessment of the Operational Noise Review that is required to be submitted to, and approved by, the Planning Secretary in accordance with condition E47. I further understand that Transport for NSW has provided this report to the Department in the interest of both agencies working collaboratively to achieve appropriate operational noise outcomes for the Coffs Harbour Bypass project.

As you may be aware, the Department commissioned a peer review of the Coffs Harbour Bypass Noise Model Input Report in early 2022 to verify the accuracy of the road traffic noise model and validate its suitability to predict operational noise issues. This peer review identified a number of technical issues with the model validation contained within the Noise Model Input Report.

These technical issues are detailed in Attachment A, for your attention.

Without prejudice, I request TfNSW respond to each of the issues detailed in Attachment A prior to submission of the Operational Noise Review to the Planning Secretary for approval under condition E45. Further, please advise:

- why some validation locations were chosen near lightly trafficked roads
- whether some traffic counts are incorrect or were they taken over different periods
- whether these issues been raised in any review to date.

I note that the Department has consistently raised issues with TfNSW regarding the adequacy of operational noise model inputs being applied in recent State Significant Infrastructure projects. These



issues have most recently been raised at the TfNSW, EPA and DPE Cross Agency Working Group, and I note that some of these issues are the subject of ongoing discussions between these agencies as part of this working group.

I am aware that the Coffs Harbour Bypass project Noise Model Input in its current form will be included within tender documentation for the design and construction of the project. I consider that Noise Model Input cannot provide certainty on operational noise model inputs for tenderers who will be required to submit the Operational Noise Review to the Planning Secretary for approval under condition of approval E47.

I trust that the above provides further clarity regarding the Department's concerns.

Yours sincerely,

Matthew Todd-Jones A/Director Infrastructure Management



Attachment A: Key Issues Table

Issue	Detail			
The Operational Model use	The Operational Model used			
	The peer review raised various concerns regarding use of CoRTN as the operational model. The Department has repeatedly advised TfNSW that CoRTN is not the most appropriate tool to use on projects such as the Coffs Harbour Bypass. The Road Noise Policy specifically states that is an appropriate tool for relatively small projects, and the Department was of the of the understanding that TfNSW would use another more suitable model for the Coffs Harbour Bypass Project.			
	Please advise why CoRTN has been used for the Coffs Harbour Bypass Project given ongoing discussions indicating other models are more suitable.			
Modelling Methodology issues				
	It is stated in 4.8.1 of the Noise Impact Assessment that NSW Road & Maritime (RMS) specified the use of the same surface correction for both light and heavy vehicles, which is not considered to be best practice. Could you please advise why this is the case.			
	Please also advise why no allowance has been made for the performance deterioration of open graded asphalt, the road surface chosen for this project as a noise control measure, which exhibits a 2 dB plus increase in noise over time.			
Model Validation issues				
	Please advise why validation locations 2, 4 and 8 were near roads (Bennetts, Coramba and North Boambee) with traffic volumes at night below/well below the range CoRTN can model			
Please advise why validation locations 2 and 5 were near roads (Bennetts and North Boambee respectively) we have traffic volumes during the day period below/well below the range CoRTN can model				
	Coramba Road near validation location 4 had day period volumes that can be modelled using CoRTN if special procedures as per Section II, paragraph 30 of the CoRTN user manual 4 are followed, but there is no mention of this in the noise impact assessment;			
	Vehicle count data used for modelling traffic on Coramba Road, according to the footnote to Table 32 of the NIA, was			



based on a counter near Bishop Druitt College, which is on North Boambee Road. They are entirely separate roads approximately 2 kilometres apart with no commonality with regard to traffic movements (no direct links);
Day period HV counts reported are significantly different between locations 9 and 10 (151 versus 248) but there are no apparent alternate routes and ramps between these likely to be used by HV, and they are only in the order of 1,500 m apart. As both were surveyed from 21 to 29 June 2016, it's reasonable to expect numbers to be the same, however, it may be the case that traffic counts for different 24 hour periods (for example weekend at one, weekday the other) were used for validation at those locations, but there is no detail about this in the NIA;
Similarly, south-bound HV counts at night are very different between validation locations 9 and 10. Again, this could be due to different time periods being used, however, the relationship is the inverse of day differences (counts at 10 now much less than 9). Again, there is no detail provided about this; and
Table 30 of the NIA reports the validation traffic speed used was the measured 85th percentile, whereas CoRTN requires mean speed (Section I, paragraph 13.2 of the CoRTN user manual).

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Jake Shackleton Director- Infrastructure Management Department of Planning Industry and Environment 4 Parramatta Square, 12 Darcy Street PARRAMATTA NSW 2150

SF2021/01591

RE: SSI: 7666 Coffs Harbour Bypass: MCoA E45 Noise Model Input Report

Dear Mr Shackleton,

I refer to Condition E45 which states:

- E45 The noise model of the detailed design of the CSSI must address the following parameters:
 - (a) application of source emission corrections to take into account the proportions of heavy vehicles in line with the method detailed in the documents list in Condition A1;
 - (b) modelling heavy vehicles using three distinct sources in line with Appendix B4 of the NSW Road Noise Policy (DECCW, 2011);
 - (c) road surface corrections to address the assessment timeframes outlined in the NSW Road Noise Policy (DECCW, 2011) corresponding to the year of opening, and ten years after opening; and
 - (d) meteorological conditions in accordance with the NSW Road Noise Policy.

The operational noise modelling must be verified as being accurate and consistent with the requirements of this approval by an acoustic expert or the **AA**, who is independent of the design and construction of the CSSI.

TfNSW has prepared *Coffs Harbour Bypass Acoustic Modelling Inputs for Operational Traffic Noise Report* to satisfy the project condition of approval E45 with regard to the prescribed modelling inputs including details on heavy vehicle corrections consistent with documents listed in Condition A1, the use of three distinct source heights for heavy vehicles, appropriate road surface corrections and consideration of meteorological conditions.

As you are aware, the project is currently in the tender phase (design and construct tender) which commenced on the 15 October 2021. During the tender phase, tenderers will be required to confirm operational noise mitigation measures as part of their design

Northern Project Office: Transport for NSW 76 Victoria Street, Grafton 2460 NSW | P 02 6640 1300 | W roads-maritime.transport.nsw.gov.au | ABN 18 804 239 602 and the successful contractor will be required to prepare the Operational Noise Review (ONR) under CoA E47. TfNSW have included the attached *Coffs Harbour Bypass Acoustic Modelling Inputs for Operational Traffic Noise Report* (the report) and associated noise model inputs into the tender documents to provide a compliant and consistent approach to the noise modelling both for tender assessment purposes and to provide the successful contractor certainty in the development of the Operational Noise Review.

The report has been endorsed by the DPIE approved acoustic advisor who is satisfied the prescribed modelling inputs meet the requirements of Condition E45, with adequate detail included on heavy vehicle corrections consistent with documents listed in Condition A1; use of three distinct source heights for heavy vehicles; appropriate road surface corrections; and consideration of meteorological conditions.

It is noted that Condition E45 requires the modelling to be verified as accurate and consistent with the requirements of the Project approval by an acoustic expert or the Acoustic Advisor. As the noise modelling will be undertaken by the construction contractor this element of the Condition E45 will take place at a future date and be subject to an additional endorsement by the Acoustic Advisor.

TfNSW believe the report is compliant with the condition of approval E45 noting that the operational noise modelling will be completed at a later date as part of the detailed design process.

I note CoA E45 does not require submission of report to DPIE, however in the interest of transparency and timely advice it is TfNSW's intention to proceed with the nominated noise modelling software and noise model inputs in accordance with Condition E45.

If it is the Departments intention to engage independent consultant to review this report, we request that you consult with TfNSW on the proposed person/company to ensure there is no conflict of interest with current tenderers for Coffs Harbour Bypass and/or previous personnel involved on the Coffs Harbour Bypass Project prior to the review being undertaken.

Should you have questions or concerns regarding this matter, please contact Scott Lawrence on 0419 248 583

Yours sincerely

1/12/2021

Greg Nash Director Coffs Harbour Bypass

Northern Project Office: Transport for NSW 76 Victoria Street, Grafton 2460 NSW | P 02 6640 1300 | W roads-maritime.transport.nsw.gov.au | ABN 18 804 239 602

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Transport for New South Wales

Coffs Harbour Bypass

Acoustic Modelling Inputs for Operational Traffic Noise

Issue | 25 October 2021

This report takes into account the particular instructions and requirements of our client. It is not intended for and should not be relied upon by any third party and no responsibility is undertaken to any third party.

Job number 281967

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Document verification

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Appendix A

Acoustic Advisor Endorsement

1 Introduction

This document summarises acoustic modelling information to be used on future operational road traffic noise assessments for the Coffs Harbour Bypass project. It has been prepared to meet the requirements of the Ministers conditions of approval (MCoA) number 45 and in doing so will be used as basis for obtaining Acoustic Advisor endorsement of proposed noise modelling inputs.

This information should be read in conjunction with the detail provided in the *Amendment Report Volume 2A - Appendix B – Updated Noise and Vibration Assessment Report* and associated Environmental Documents and Conditions of Approval.

2 Conditions of Approval

MCoA E45 provides specific conditions for Noise Mitigation and Operational Noise Modelling. The table below summarises these conditions along with explanation of how existing acoustic modelling for the project incorporates these requirements.

MCoA E45	Response
Noise Mitigation - Operational Noise Modelling	-
E45 The noise model of the detailed design of the CSSI must address the following parameters:	-
(a) application of source emission corrections	Condition A1 states:
to take into account the proportions of heavy vehicles in line with the method detailed in the documents list in Condition A1;	The Proponent must carry out the CSSI in accordance with the conditions of approval and generally in accordance with the:
	(a) Coffs Harbour Bypass Environmental Impact Statement Volume 1A – 10, (TfNSW, September 2019);
	(b) Coffs Harbour Bypass Submissions Report Volume $1 - 3$ (TfNSW, June 2020); and
	(c) Coffs Harbour Bypass Amendment Report Volumes 1 – 6 (TfNSW, June 2020).
	The above listed documents summarise source emission corrections used in acoustic modelling for the project and these are reproduced in Section 3 of this report.

MCoA E45	Response
(b) modelling heavy vehicles using three distinct sources in line with Appendix B4 of the NSW Road Noise Policy (DECCW, 2011);	The NSW Road Noise Policy states: The recommended practice is to model heavy vehicles as three sources, calculating the barrier attenuation for each and adding the final result.
	Three sources have been modelled in SoundPLAN with source corrections summarised in the Environmental Documents and reproduced in Section 3 of this report.
(c) road surface corrections to address the assessment timeframes outlined in the NSW Road Noise Policy (DECCW, 2011) corresponding to the year of opening, and ten years after opening; and	Traffic data for year of opening and ten years after opening has been used as the basis of acoustic modelling in accordance with the requirements of the NSW Road Noise Policy and is summarised in detail in Appendix F of the Amendment Report.
	Pavement corrections have been implemented in accordance with the Noise Model Validation Guideline and are reproduced in Section 3 of this report.
(d) meteorological conditions in accordance with the NSW Road Noise Policy.	Section 3 of this report. The NSW Road Noise Policy states: Meteorological conditions should be accounted for by noting any wind or temperature inversion conditions characteristic of the area and discussing their effects on traffic noise from the project. Noise criteria for the project do not need to be met under adverse meteorological conditions. Section 4.5 of the Amendment Report provides the following discussion of meteorological effects: Whilst there is no strict requirement under the RNP that noise levels be met under adverse meteorological conditions, it is noted that the CoRTN algorithm predicts noise impacts under moderately adverse wind conditions. As observed from other bypass projects, the effect of temperature inversion can increase the predicted noise level by up to 3 dB at any receiver near the noise source during the period of temperature inversion. While a noticeable increase in noise level may be observed during the period of the temperature inversion, the effect over the entire 9-hour period of night-time will only likely result in
	an increase of up to 1 dB at some receivers. Therefore, temperature inversion is not expected to significantly increase the operational noise from the project.

MCoA E45	Response
The operational noise modelling must be verified as being accurate and consistent with the requirements of this approval by an acoustic expert or the AA, who is independent of the design and construction of the CSSI.	This report has been prepared to address this requirement.

3 Modelling methodology and inputs

All future operational road traffic noise assessments for the Coffs Harbour Bypass project shall be undertaken in accordance with the methodology detailed in Section 4.5 of Amendment Report Volume 2A - Appendix B – Updated Noise and Vibration Assessment Report.

Noise modelling has been undertaken by using the noise modelling software package SoundPLAN version 8.0 to implement the Calculation of Road Traffic Noise (CoRTN) methodology. This version of SoundPLAN is to be used on the Coffs Harbour Bypass.

Key information relevant to acoustic modelling of operational traffic noise is reproduced below for reference. Further detailed information, including traffic modelling inputs, shall be sought from the *Amendment Report Volume 2A* - *Appendix B* – *Updated Noise and Vibration Assessment Report*.

Specific design inputs to be used are provided in Table 1.

Input	Description	
Traffic data	Traffic data to be sourced from Appendix F of the Amendment Report.	
	Traffic volumes and % heavy vehicles based on:	
	Classified traffic counts undertaken concurrently with noise monitoring collected during EIS preparation	
	• Projected traffic model results.	
Traffic speeds	Traffic data to be sourced from Appendix F of the Amendment Report.	
	• Validation speed – Measured 85th percentile	
	• Design speed – Posted	
	 110 km/h for light vehicles and 100 km/h for heavy vehicles on the highway 	
	\circ 40-80 km/h on all other roads.	
Topography	1 m elevation LiDAR information	
Road surface	Project road segments as follows:	
	 Main carriageway – concrete as base case, OGA to be assessed as part of at-source noise mitigation strategies 	
	• Highway ramps (between the edge of gore and edge of shoulder) – concrete	

Table 1: Acoustic model input data to be used

Input	Description	
	 Highway ramps and all other roads – flexible pavement (DGA). 	
Buildings	Modelled storey heights are as follows:	
	• 1 storey residential 4 m	
	• 2 storeys residential 6 m	
	Large commercial 8 m	
Noise barriers	Existing noise barrier locations:	
	• In front of Boambee Palms Holiday and Accommodation Park	
	• In front of Kororo Public School and extending south past the residences accessed by Fern Tree Place	
	Refer to Appendix G of the Amendment Report for detail.	
Source heights	• 0.5m for light vehicles	
	• 1.5m for heavy vehicle engines	
	• 3.6m for heavy vehicle exhaust	
Tunnel portals	• Incorporate into the model via implementation of four point sources at the tunnel openings.	
	• Sound power levels to be calculated in accordance with the NORD2000 methodology	
	• Smooth concrete surfaces; road or reflecting rail bed	
	Dual separated semi-circular tunnel openings	
	• Propagation as per ISO 9613-2	
Ground absorption	Global factor of 0.75 with the exception of water which is set at 0.	
Model search radius	2500 m	
Receiver height	• Ground floor – 1.5 m	
	• First floor – 4.5 m	
	• Mitigation governed by 1st and 2nd storey only	
Contour output	Set at 1.5 m height with 20 m grid spacing.	

Table 2 summarises the corrections and adjustments applied to the CoRTN calculation methodology in the acoustic model.

Table 2: Acoustic model corrections and adjustments

Correction, dB(A)	Description
-3	Conversion from L_{10} to L_{eq}
+2.5	Façade reflection
+3 concrete	Pavement corrections
0 dense graded asphalt (DGA)	
0 stone mastic asphalt (SMA10)	
-2 open graded asphalt (OGA)	

0 tyre source	Split height corrections
-0.6 truck engine	
-8.6 truck exhaust	

It is noted that Australian Road Research Board (ARRB) corrections for Australian conditions are not to be used in acoustic modelling for the project. Corrections to CoRTN for Australian conditions calculated based on traffic mix and prevailing temperature as provided by Transport for NSW noise specialists shall be applied to all traffic strings for all stages of modelling.

The specific equation used to calculate corrections is as follows:

$$L_{WA(6-category)} = 10 \log_{10} \sum_{i=1}^{6} \left(r_{HVi} 10^{L_{WA(HVi)}} / 10 \right)$$

A full list of correction factors for each road string and scenario are included with traffic data presented in Appendix F of the Amendment Report.

3.1 SoundPLAN model

A copy of the validated No Build SoundPLAN model used for Environmental Noise and Vibration Assessments for the Coffs Harbour Bypass project will be provided for use as the basis of Detailed Design. This model includes the following information:

File name	Description
ABS_Ground absorption.geo	Ground absorption
BAR_No build.geo	Existing noise barriers
BLD_All.geo	Buildings
CLC_Study area.geo	Calculation area
DGM_Lidar 2013 existing.geo	Ground elevation points
SRC_No Build.geo	Existing roads
SPR_Loggers.geo	Validation noise logger locations

Appendix A

Acoustic Advisor Endorsement

hutchison weller

Jake Shackelton Acting Director, Infrastructure Management Department of Planning, Industry and Environment GPO Box 39 Sydney, NSW, 2001

18 November 2021

21001-LT-ED-03-1

Dear Jake

Coffs Harbour Bypass Acoustic Modelling Inputs for Operational Traffic Noise

The Acoustic Advisor has reviewed the *Coffs Harbour Bypass Acoustic Modelling Inputs for Operational Traffic Noise, Issued 16 November 2021,* prepared by ARUP for Transport for NSW.

Condition E45 of the SSI 7666 Project Approval requires the noise model of the detailed design to address a range of parameters. The above document has been prepared to provide a compliant and consistent approach to the modelling regardless of the party completing the work.

I am satisfied the prescribed modelling inputs meet the requirements of Condition E45, with adequate detail included on heavy vehicle corrections consistent with documents listed in Condition A1; use of three distinct source heights for heavy vehicles; appropriate road surface corrections; and consideration of meteorological conditions.

Condition E45 requires the modelling to be verified as accurate and consistent with the requirements of the Project approval by an acoustic expert or the Acoustic Advisor. This element of the Condition will take place at a future date and be subject to an additional endorsement.

As required by Condition of Approval A30(d), I endorse the *Acoustic Modelling Inputs for Operational Traffic Noise* as generally compliant with the requirements outlined in the Infrastructure Approval (SSI 7666).

Kind Regards

John Hutchison Acoustic Advisor Coffs Harbour Bypass

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