24 October 2019

Director – Transport Assessments
Planning and Assessment
Department of Planning, Industry and Environment
GPO BOX 39
SYDNEY NSW 2001

Dear Sir / Madam

Re: Coffs Harbour bypass; SSI_7666
Review of Operational Noise Assessment and Human Health Assessment

I have conducted a review of the Operational Noise Assessment and the Human Health Assessment associated with the Coffs Harbour Bypass EIS in relation to potential noise impacts. I am prompted to make a submission after a review of these chapters based on the fact that a significant noise issue associated with the Pacific Highway in Northern NSW is truck noise and its impact on communities, particularly in the night period, has not adequately addressed.

The issue of truck noise has been identified before the Parliamentary Enquiry of 2006 and been the subject subsequent community complaints over the years. However the RMS noise policy has not been updated in the intervening period to address this issue and therefore I consider that the policy does not adequately address the requirements of the SEARs or the expectations of communities . A review of the EIS reveals the noise assessment gives short attention to noise levels from trucks (a major issue in annoyance and sleep disturbance) where maximum noise levels are only addressed in a qualitative review.

The Department of Planning has identified assessment of sleep disturbance and it is for this reason I request the Department of Planning's own in-house noise specialist review this submission for comment and direction prior to referral to the RMS. This will ensure that the issues raised here are adequately addressed to meet Planning's SEARs.

I am a practicing Acoustic Engineer with thirty years consulting experience and recognise that the proposed Bypass is an important major infrastructure project that will bring a great deal of benefit to the area surrounding Coffs Harbour as well as greater the NSW community.

In the context of above I support the project, however a more detailed review of the noise and community heath components of the EIS indicate that there are potential deficiencies in these components of the assessment. In the following sections I outline areas which I consider are need further work. The assessment fails to adequately address the SEARs issued by the Department of Planning, notably the noise issues associated with high percentage of truck movements particular to the north coast of NSW.

In forming my opinions I reference the following documents in the EIS

- Coffs Harbour Bypass EIS Noise and Vibration Assessment Volumes 4A, B and C and associated Appendices.
- Coffs Harbour Bypass EIS - Air quality and human health assessments Volume 10 Appendix Q – Human health risk assessment

Further, the relevant SEAR's relating to operational noise are detailed in **Item 2. Noise and Vibration - Amenity** as follows:

> **Key Issue and Desired Performance Outcome:**
>
> *Increases in noise emissions affecting nearby properties and other sensitive receivers during operation of the project are effectively managed to protect the amenity and well-being of the community.*
>
> **Requirement:**
>
> *1. The Proponent must assess construction and operational noise and vibration impacts in accordance with relevant NSW noise and vibration guidelines. The assessment must include consideration of impacts to sensitive receivers, and include any consideration of sleep disturbance and, as relevant, the characteristics of noise and vibration.*
>
> **Current Guidelines:**
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> - *NSW Road Noise Policy (DECCW, 2011)*
> - *Environmental Noise Management Manual (RMS 2001)*
> - *Noise Mitigation Guideline (RMS, 2015)*
> - *Noise Criteria Guideline (RMS, 2015)*

In summary the following areas of the noise assessment of the EIS are considered inadequate.

Noise Modelling

The noise modelling algorithm utilised for assessment (CoRTN) was developed in the 1970s and fails to adequately address the contribution of truck noise to overall traffic noise levels. Whilst some adjustment has been applied to the model all aspects of truck noise may have not been adequately assessed to address the characteristics of truck noise.

Maximum Noise Levels and Sleep Disturbance

There is no quantitative assessment of maximum noise levels and sleep disturbance, this is contrary to the requirements of the SEAR's. There has been ongoing issues for residents related to maximum noise associated with trucks on recently completed nearby sections of the Highway however the EIS provided minimal review of this issue with a "qualitative" assessment.

Conversely the Community Health assessment clearly identifies the potential significant adverse health impacts of sleep disturbance however no detailed assessment of this issue is conducted in the EIS.

DETAILED DISCUSSION

Noise Modelling

It is noted that the north coast section of the Pacific Highway is subject to significant truck operations which have seen a constant increase in B-Double operations consistent with state and federal government projections. In addition the introduction of B- Triples in the future will only increase the contribution of truck noise from the Highway. As such a significant components of road noise on the Bypass will be associated with trucks at the opening and into the future.

The CoRTN model was developed in the UK in the mid 1970's and has been used in Australia where it works reasonably well in areas where there is a high percentage of light vehicles. In the case where trucks are a major contributor to noise the model fails to adequately address issues such as the frequency of engine noise, truck acceleration and deceleration and braking activities.

It is noted that the assessment attempts to calibrate the model for trucks and includes a validation procedure. However validation locations do not contain the particular noise issues identified in the preceding paragraph. As such the validation procedure is a self-fulfilling verification of the model. It is known in the industry that CoRTN does not adequately address high percentage truck noise contributions to traffic noise and this has this been identified in research papers.

People find truck noise, due to it frequency characteristics and intermittent activities including acceleration and deceleration and engine braking activities, more annoying than light vehicle traffic. It is not clear how the noise modelling has incorporated or addressed these *characteristics of noise* in the assessment.

Maximum Noise Level and Sleep Disturbance

The noise assessment fails to adequately assess maximum noise levels / sleep disturbance in a meaningful fashion and therefore fails to meet the requirements of Item 2 of the SEAR's.

Noise criteria is presented in section 3.1.3 **Maximum noise level** of the Noise Assessment however there is no mention of Enhealth or WHO guidelines that have been identified in the Community Health Assessment. Further to this, even though some criteria is presented, no quantitative assessment is conducted against criteria for existing or future receivers along the route.

In the assessment of traffic noise in NSW it has been generally been assumed that if the $L_{Aeq\ (period)}$ noise criteria is met then sleep disturbance issues are also addressed. Whilst this may be the experience on major urban road projects it is not necessarily the case where traffic is intermittent and dominated by truck movements. In areas similar to the Coffs Bypass route, with low background noise levels and relatively high truck movements, the main source of compliant is sleep disturbance as evidenced from resident experiences at Valla Beach, Boambee, Sapphire and Emerald Beaches, and Woolgoolga. Unfortunately the noise assessment has failed to address one of the main potential noise impacts of the proposal.

It could be reasonably expected that consideration of sleep disturbance would consist of determining existing maximum noise levels with respect to applicable noise objectives, determining if they were currently acceptable and then predicting future levels. This is particularly pertinent for residences along the new alignment that are currently unaffected by traffic noise. Until such as assessment is conducted it is not possible to demonstrate *that the project are effectively managed to protect the amenity and well-being of the community.*

In addition I have reviewed Volume 10 of the EIS which clearly identifies Sleep Disturbance as an important issue to be addressed with respect to traffic noise. An extract from this Chapter states:

> ***Sleep disturbance***
>
> ***It is relatively well-established that nighttime noise exposure can have an impact on sleep (enHealth 2018; WHO 2009, 2011, 2018). Noise can cause difficulty in falling asleep, awakening and alterations to the depth of sleep, especially a reduction in the proportion of healthy rapid eye movement sleep. Other primary physiological effects induced by noise during sleep can include increased blood pressure, increased heart rate, vasoconstriction, changes in respiration and increased body movements (WHO 2011). Exposure to night-time noise also may induce secondary effects, or so-called after-effects. These are effects that can be measured the day following exposure, while the individual is awake, and include increased fatigue, depression and reduced performance.***

As no quantitative assessment of maximum noise levels / sleep disturbance has been conducted even though it has clearly been identified as a health issue in Chapter 10, no valid conclusion of health impacts can be established.

CONCLUSIONS AND RECOMMENDATIONS.

Based on a review of the EIS noise and health assessment is can be concluded that the assessment of continuous noise traffic may not adequately consider the impact of the contribution of truck noise and its characteristics at receivers surrounding the Bypass route.

In addition no meaningful assessment of sleep disturbance has been conducted to determine potential adverse health impacts even though the human health assessment clearly identifies the risks. Therefore I consider the assessment has not demonstrated that the Key Issue and Desired Performance Outcome of Item 2 have been achieved.

RECOMMENDATIONS

Based on this review it is recommended that prior to approval:

- The operational noise section of the EIS be reviewed to address the issues relating to truck noise and modelling techniques. The review should consider the impact of truck noise and its characteristics which have been identified in numerous Australian and overseas studies

- A quantitative assessment of sleep disturbance be conducted with respect to appropriate criteria in the reference to best practice including enHealth 2018 and WHO 2009, 2011, 2018.

From a longer-term perspective it is clear that the referenced RMS traffic noise policies need to be revisited to address the intent of the SEAR's as the current RMS policies and procedures with respect to traffic noise are not adequately contemporary. It is clear that the noise criteria adopted for roadways needs to be adjusted to accommodate for areas with high truck volumes and low background noise levels.

It is worth noting that in 1992 the Roads and Traffic Authority Environmental Manual identifies the issue of sleep disturbance / Non-Continuous Traffic Noise (see attached extract) and the need for further investigation, however since this time the subsequent NSW policies on road traffic noise have essentially remained silent on this issue.

In the intervening years, after a parliamentary enquiry and noise issues on other completed sections of the Pacific Highway, it would be prudent to revisit the RMS policy to address current best practice and protect, as far as practicable, the acoustic amenity of residences along major highways.

I trust this information is of assistance. Please contact us if you have any further queries.

Yours faithfully

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Extract from 1992 RTA Environmental Manual Volume 2

9.2 Non-continuous traffic noise

Most night-time noise situations of interest cannot be defined as continuous, making the Leq, not necessarily the best criterion by which to prevent sleep disturbance. In these situations, an appropriate criterion could include the peak level of individual noise events and the number of such noise peaks exceeding a particular level. Peak noise levels of 45 dBA have been suggested as the appropriate criterion level but others suggest that peak levels of 60 dBA should not occur more than 16 times in a night, or peak levels of 50 dBA more than 16 to 64 times. The literature does not resolve these differences.

With respect to setting a limit on peak levels, it should be noted that there is clear evidence that it is not so much the peak level *per se* which results in sleep disturbance, but the emergence of the peak above the background. This means that, for a given pattern of noise events, elevating the background reduces the probability of sleep disturbance. Continuously elevating the background would, of course, eventually result in the traffic noise condition changing from "noise events" to "continuous" noise.

When do "continous traffic noise conditions" become "noise events"? Some suggest this occurs when the peak levels of individual vehicles exceed the Leq by some 8 to 12 dBA. Alternative definitions of these same conditions are possible (say, based on the standard deviation of the traffic noise distribution) and it would be useful to determine the combination of traffic and propagation distance conditions under which the two different conditions apply.

The RTA will continue to investigate alternative noise descriptors and Noise Level Objectives for night-time noise which relate to the number of noise peak events.