



Transport
Roads & Maritime
Services

SAPPHIRE TO WOOLGOOLGA PACIFIC HIGHWAY UPGRADE

Noise workshop summary report

OCTOBER 2014

Contents

1	Introduction.....	2
2	Methodology.....	4
3	Workshop feedback summary.....	5
4	Roads and Maritime responses to key issues raised	7
5	Next steps.....	13

Appendix A – Post-opening noise monitoring plan

Report

Monitor location maps

Appendix B – Workshop presentations

Presentation by Col Solomon, Roads and Maritime Services

Presentation by Dr Michael Chung, Renzo Tonin

Appendix C – Community feedback

Community input

Questions

Comments

1 Introduction

The Australian and NSW Governments are jointly funding the \$850 million Sapphire to Woolgoolga Pacific Highway upgrade.

The project provides a 25 kilometre four lane separated highway from Campbell Close, Sapphire, to Arrawarra Beach Road, Arrawarra.

The review of the operational noise measures was carried out by the Leighton Fulton Hogan Joint Venture, based on the detailed design.

The Operational Noise Management Report was first published in December 2011 and revised in December 2013.

Process to date:

- Environmental Assessment 2007
- Noise and Vibration Impact Assessment (Wilkinson Murray)
- Project Approval January 2009.

The project approval included requirements for:

- The review of operational noise measures
- Noise assessment after opening the highway.

As discussed in public meetings in March 2014, Roads and Maritime have proceeded with engaging a consultant to carry out the noise assessment as early as possible.

The upgrade section of the highway was opened on 30 July 2014. The Woolgoolga Bypass was opened (with temporary 100km/hr speed zone) on 16 December 2013.

The Sapphire to Woolgoolga Upgrade will provide a range of benefits in terms of economic and social wellbeing of the community. However, a balance needs to be reached between providing an efficient road infrastructure and controlling the adverse effects of road use, including noise.

Renzo Tonin have now been engaged to carry out the post operational noise monitoring to assess compliance with state government requirements. Approval has been sought and obtained from the Department of Planning and Environment to fast track the post-operational noise assessment and allow Roads and Maritime to examine the effectiveness of mitigation measures implemented.

A Post-Opening Noise Monitoring Plan has been prepared to:

- Outline the objectives of the proposed post-opening operational noise monitoring
- Identify proposed noise monitoring sites
- Describe the methodology of the proposed post-opening operational noise monitoring work

- Describe the proposed engine brake testing.

To view a copy of the Post-Opening Noise Monitoring Plan, please refer to Appendix A.

2 Methodology

The purpose of the community workshops held in September 2014 was to detail the monitoring process and take feedback from the community with an objective to achieve a shared understanding about where the noise monitors will be located and why.

Renzo Tonin have been engaged to carry out the post operational noise assessment. This is anticipated to start in late October. A minimum of seven days of valid data will be obtained from each long term monitoring site, with additional short term fifteen minute monitoring (calibrated to long term sites) conducted at other sites. The noise assessment will include an evaluation of engine brake noise events.

The aim of the noise assessment is to check the accuracy of noise predictions based on modelling carried out to date. It will take into account traffic volumes, road alignment, surrounding landscape (topography), traffic speed, percentage of heavy vehicles, road surface and the distance and height of surrounding houses and weather data. In addition to noise monitors, the assessment will also consider data obtained from two weather stations (installed at the north and south of the project) and traffic loggers.

Workshops were held on 16, 17 and 18 September 2014 to explain the noise assessment process and invite community feedback on the proposed monitoring location.

Each workshop began with a brief presentation on post construction noise monitoring by Sapphire to Woolgoolga Project Manager, Col Solomon. This was followed by a presentation by Dr Michael Chung from Renzo Tonin that outlined the regulatory requirements and the purpose of monitoring. Workshop presentations are provided in Appendix B.

At the workshops, participants sat at tables where they were provided with maps indicating the proposed monitoring sites. Following the presentations they were firstly asked to consider the Roads and Maritime proposal and then nominate any gaps that they perceived in the monitoring regime. They were asked to respond to the following series of questions as indicated below:

Question 1. What do you see as the strengths of the current monitoring proposal?

Question 2. What do you see as the weaknesses of the current proposal?

Question 3. After considering the current monitoring proposal, what additional locations for monitoring do you suggest?

Question 4. Why do you believe it is important to monitor at the locations you suggest?

Question 5. What is your top priority for additional monitoring?

A summary of key issues raised and responses to these issues has been provided in the following sections.

Participant's responses and subsequent questions and comments are recorded in Appendix C.

3 Workshop feedback summary

A number of shared themes came through at the three workshops including the need for significantly more monitoring locations than previously carried out or being proposed at the workshops.

There was a lot of discussion about how the modelling works, what is and isn't included in modelling as part of the policy, what Roads and Maritime are doing or will do about trucks, discussion about mitigation and next steps after the modelling is carried out.

Residents expressed a belief that to validate the accuracy of the noise model, monitoring needed to take place at a wider variety of locations, for longer duration of time and during different weather events including various wind conditions and rain.

A number of participants stated they would like to see a noise monitor placed at or near their house to capture the noise travelling from the highway due to the unique topography and landscape of the area.

Many residents felt that monitoring should be carried out in areas away from the highway closer to higher density populations to demonstrate the noise levels experienced in these locations.

This would then allow Roads and Maritime to take action and consider further mitigation measures.

At the Sapphire to Moonee workshop residents also raised the concern of heavy vehicle noise engine braking near the Moonee Beach interchange and would like to see noise testing at this location.

Some residents in the Sapphire area felt that the addition of the noise wall may have improved noise for some but has also created an amphitheatre for noise travelling to others on the western side of the highway.

Residents felt that contributing factors to highway noise in the area include the elevated height of the new highway and that cuttings and clearing had created a valley for noise to travel through.

Korora residents provided feedback on the change of noise as a result of vehicle braking and deceleration when changing speeds from 110km/hr to 80km/hr.

Other key reasons stated for the additional monitoring was to understand noise increases from the additional lanes of traffic, movements of and changes to speeds for vehicles using the road and on and off ramps and topographical changes. Additional comments from this workshop included monitoring in a range of different conditions such as when the air is still, when there is heavy cloud cover, in peak holiday periods and for longer periods of time.

At the Cunninghams Creek to Hearnese Lake Road workshop (including Heritage Park, Emerald Beach and Sandy Beach) residents felt that additional monitoring in this area was needed to account for perceived open space on the existing side of the highway, vegetation and trees that have been removed, the new overpass at Killara Avenue, the retention basin and flat and hilly areas.

Some residents also believe that noise is being reflected/funnelled into new areas due to the new Emerald Heights noise wall and expressed a desire to have the existing noise wall at Sandy Beach lengthened.

Residents at Heritage Park requested for noise readings to be taken from lower lying areas rather than only elevated locations. Other key areas noted for consideration of extra noise monitoring included Emerald Beach, Sandy Beach and Casuarina Court. A comment was made that both sides of the highway should be monitored at each point.

Key reasons stated for the additional monitoring included concerns of sleep disturbance, vibration, change in quality of life, amenity and property values. It was also felt that the type of noise has changed to being more high pitched.

At the Woolgoolga bypass workshop residents continued to raise a desire to see significant increase in noise monitoring locations particularly given this area is new to significant highway traffic, and requested that wind direction and engine braking, particularly at the descent to Woolgoolga Creek, be considered.

Other feedback included a request for engine braking signage and to increase noise barrier lengths and locations.

Community comments received at the workshops have been provided in Appendix C.

4 Roads and Maritime responses to key issues raised

Information in this section provides a response to issues that Roads and Maritime saw as the common concerns raised at each workshop. It is not a comprehensive response to all issues raised.

Noise modelling and the role of Renzo Tonin

Renzo Tonin and Associates are noise specialists engaged by Roads and Maritime in August 2014 to carry out the post operational noise assessment. Renzo Tonin have not been involved in the Sapphire to Woolgoolga project previously to date.

Roads and Maritime and Renzo Tonin will work together to determine noise monitoring locations for the noise assessment considering technical input, community feedback and previously monitored locations. The assessment will then be carried out by Renzo Tonin. Once the report on the assessment has been checked and reviewed by regulators including the Environmental Protection Authority and the Department of Planning and Environment, the report will be made publically available. The report will be available early in 2015.

Number and location of noise monitor locations along the project

Roads and Maritime have listened to community concerns about the number of monitoring locations along the project and have increase the locations being monitored from 8 previously to 39 locations. The 8 locations from the environmental assessment and Operational Noise Management Report have been retained and an additional 31 (14 long term and 17 short term) locations have been added.

While it is not practical to monitor at every house, the outcomes of the workshop have been used to identify additional sites.

The assessment considers all properties regardless as to whether the property has had individual noise monitoring carried out.

Proposed noise monitoring locations

Monitoring address	Original sites	Additional long term sites	Additional short term sites
280 Old Coast Road, Korora		✓	
33 Old Coast Road, Korora		✓	
219 Old Coast Road, Korora			✓
387D Old Coast Road, Korora			✓
28 Warrawee Street, Sapphire Beach	✓	✓	
6 Alpini Place, Sapphire Beach			✓
26 Gaudrons Road, Sapphire Beach			✓

11 Coachmans Close, Sapphire Beach		✓	
7 Reicks Close, Sapphire Beach		✓	
7 Wakelands Road, Sapphire beach	✓	✓	
40C Sullivans Road, Moonee Beach		✓	
545 Solitary Islands Way, Moonee Beach	✓	✓	
1579 Pacific Highway, Moonee beach	✓	✓	
20 Woodhouse Road, Moonee Beach			✓
1 Tidal Crescent, Moonee Beach			✓
40 Heritage Drive, Moonee Beach			✓
36 Pinehyrst Drive, Moonee Beach			✓
3 Fiddaman Road, Emerald Beach		✓	
1 Emerald Heights Drive, Emerald Beach		✓	
8 Bream Close, Emerald Beach			✓
29 Fishermans Drive, Emerald Beach			✓
63 Dammerel Crescent, Emerald Beach			✓
2 Anselmo Close, Emerald Beach			✓
9 Casuarina Court, Sandy Beach		✓	
8 Oak Close, Sandy Beach	✓	✓	
7 Pine Crescent, Sandy Beach		✓	
20 Redbox Crescent, Sandy Beach			✓
14 Mahogany Avenue, Sandy Beach			✓
8 Hearnese Lake Road, Woolgoolga (The Pines Estate)	✓	✓	
1719B Solitary Islands Way, Woolgoolga		✓	
25 Greys Road, Woolgoolga		✓	
17 Park Avenue, Woolgoolga		✓	
187 Newmans Road, Woolgoolga		✓	
66A Palmer Road, Woolgoolga		✓	

226 Bark Hut Road, Woolgoolga		✓	
15 Ryan Crescent, Woolgoolga			✓
21 Gresham Drive, Woolgoolga			✓
44 Whitton Place, Mullaway			✓
2324 Solitary Islands Way, Arrawarra		✓	

Engine brake noise monitoring locations

South of Bark Hut Road overpass
EB2 Approach to Woolgoolga Creek
EB3 Adjacent to southbound carriageway north of south Woolgoolga interchange
Southern end of Project, adjacent to southbound carriageway where change in speed zone from 110km/h to 80km/h

Maps of the proposed noise monitoring locations are provided in Appendix A.

Consideration of weather/wind conditions on monitoring

Wind speeds and rainfall will be monitored using weather stations which we will be installing at the southern and northern ends of the project as part of the monitoring. Any noise data that is monitored during high winds (i.e. >5m/s) and/or during rain periods will be excluded from the overall noise monitoring results, in accordance with relevant Australian Standards, and Environmental Protection Authority (EPA) guidelines and policies.

The noise modelling algorithm typically used to predict traffic noise impacts such as the CoRTN model do not include specific weather parameters, although it is recognised that it can have an effect on traffic noise levels under some conditions. Weather conditions are taken into account from the validation methodology from on-ground ‘real’ noise monitoring locations. This method is accepted practice by the EPA and the relevant criteria reflect the fact that meteorological corrections are not usually made in traffic noise predictions. The criteria must also be applied on an equitable basis across the State road network and the if worst case assumptions were used (that may only occur a small percentage of the time) this would likely result in extreme levels of noise mitigation (eg extremely high noise barriers, deep cuttings etc.) that may not be in balance with the other project objectives such as visual impact, constructability etc.

What are the relevant standards, guidelines and policies?

In accordance with Environment Protection Agency (EPA) guidelines (Environmental Criteria for Road Traffic Noise) the redevelopment of the Pacific Highway between Sapphire to Woolgoolga would be regarded as a “redevelopment of an existing arterial road” where the route follows the alignment of the existing Pacific Highway and, where the Woolgoolga

bypass alignment differs substantially from the existing Pacific Highway alignment, it is considered to be a “new arterial road corridor”. Provided in the Table below are the EPA's road traffic noise criteria for new freeway/arterial road corridors and redevelopment of existing freeway/arterial roads.

Period	Parameter	Criterion dB(A)
New Freeway or arterial road corridor¹		
Day (7am – 10pm)	L _{Aeq(15hr)}	55
Night (10pm – 7am)	L _{Aeq(9hr)}	50
Redevelopment of existing freeway/arterial road²		
Day (7am – 10pm)	L _{Aeq(15hr)}	60
Night (10pm – 7am)	L _{Aeq(9hr)}	55

Note 1: In cases where noise from an existing road already exceeds the above criteria, the ECRTN recommends “the new road should be designed so as not to increase existing noise levels by more than 0.5 dB(A). Where reasonable and feasible noise levels from existing roads should be reduced to meet the noise criteria.”

Note 2: In cases where noise from an existing road already exceeds the above criteria, the ECRTN recommends “In all cases, the redevelopment should be designed so as not to increase existing noise levels by more than 2 dB(A). Where feasible and reasonable, noise levels from existing roads should be reduced to meet the noise criteria.

We recognise that compliance with these noise levels may not resolve everyone’s concerns. Roads and Maritime is required to work within regulatory requirements for noise. The EPA has determined what the noise goals should be and Roads and Maritime must make reasonable and feasible efforts to comply with them.

Monitor for longer periods of time and at different times of the year

To accurately calibrate the noise model, at least 7 days of noise monitoring is required. Roads and Maritime have significantly increased the number of noise monitoring locations and it is considered that this will provide for an accurate noise model without the need to increase noise monitoring duration at each location.

Noise modelling allows for a calculation of noise levels at all residences, whether or not noise monitoring was conducted there. The noise model provides for noise levels at premises under a specific set of conditions. It is acknowledged that the set of conditions are not fixed, but will be characterised by constantly varying conditions. These variations in real world conditions will subsequently cause the actual sound to vary. Therefore it is important to recognise that the output of an environmental noise model will only represent an estimate for a ‘snapshot’ of the range of actual environmental noise levels that could occur in time and space.

To accurately build the noise model and provide reliable results, conditions such as school holidays and high wind and rain are not included in the noise model.

Consider noise impacts on properties away from the highway

Properties a couple of hundred metres from the highway are not considered ideal for traffic noise monitoring as noise from the highway decreases and other noise sources (e.g. insects, birds, ocean noise) contribute to the monitored noise levels and result in invalid traffic noise levels. These properties hundreds of metres from the road will still be assessed during the modelling process and any topography changes will be included in the noise model.

However, in response to community feedback, Roads and Maritime have selected a number of additional locations away from the highway to provide a wider selection of monitoring locations. The sites further away from the highway have been selected for short-term monitoring to allow noise experts to determine the highway contribution into the noise environment.

Are the noise levels considered separately for each day or averaged out across the week/ day and night?

In accordance with policies and guidelines, traffic noise levels are monitored over a week and are separated into day periods (7am to 10pm) and night periods (10pm to 7am). All day and night period noise levels are determined daily and averaged over the week's monitoring period to provide overall day and night noise levels at each monitoring location.

What is being done about sleep disturbance?

The target noise levels for the night-time period (between 10pm and 7am) are 5dB lower than the daytime target levels. Although it is acknowledged that singular noisy events can cause sleep disturbance, the relationship between maximum noise levels and sleep disturbance is not currently well defined and understood. It is the emergence of a noise event above the background that tends to lead to sleep disturbance, rather than the actual peak noise level of the event.

Disturbance to sleep as a result of environmental noise is an emotive issue. Methodology used to assess the impact of road traffic noise on sleep to predict the level of sleep disturbance has not yet been adequately demonstrated or tested.

The EPA will continue to review research on sleep disturbance as it becomes available.

How are different noise measurements taken such as road surface tyre noise and heavy vehicles noise such as truck engines and braking noises?

General road traffic noise (noise from vehicles inclusive of road/tyre noise, engine and exhaust noise) is monitored as a whole. In addition for this project, heavy vehicle engine braking noise will also be monitored separately.

What is being done about truck engines and braking noises?

Noise from heavy vehicle engine compression brakes is a significant and on-going cause of complaint for many NSW residents. Engine brakes are devices fitted to the engine of heavy vehicles to slow the vehicle down. They are often referred to as 'auxiliary braking devices' or 'secondary retarders'.

Engine brakes improve vehicle safety by reducing the load on service brakes on a steep descent. They can also extend the life of the vehicles service brakes and reduce maintenance costs.

Trucking is an important business and is a necessary part of the freight industry.

There are a number of initiatives currently being carried out across the state to assist with investigation and action on this issue. These include:

An education program providing information to encourage long-term behavioural changes among heavy vehicle operators travelling along the entire Roads and Maritime road network to encourage the appropriate use of compression brakes.

Installing signs on major truck routes at strategic locations advising truck drivers to limit the use of compression brakes in the vicinity of residential areas.

The government has been working with the National Transport Commission and other states and territories to develop a regulatory framework for managing excessive engine brake noise.

Roads and Maritime developed noise camera technology to detect vehicles with excessive engine brake noise. Roads and Maritime tested this technology at Mt Ousley and Woolgoolga and has recently resolved the remaining technical issues for its use as an enforcement tool.

It is understood that the National Transport Commission will prepare amendments to the National Heavy Vehicle Legislation to provide for the regulation of engine brake noise. The NSW Government will consider a Statewide rollout of the noise camera system when the regulation is enacted.

On the Sapphire to Woolgoolga project, Roads and Maritime is installing four (4) engine brake noise monitors within the area potentially affected by the Project and changed traffic conditions. These monitors will be monitoring for two weeks and will be used to measure the level, number, frequency and distribution of engine braking events.

This information will then be used to determine locations for additional action such as engine braking signs and to inform the National Heavy Vehicle Legislation.

What are the noise levels that trigger noise mitigation treatments?

Noise criteria are set in the Minister's Conditions of Approval which require compliance with the Environmental Criteria for Road Traffic Noise (ECRTN). Generally, the ECRTN stipulates target noise levels of 60dB (A) for the day period and 55dB (A) for the night period for a redeveloped road; and 55dB (A) for the day period and 50dB (A) for the night period for a new road (i.e. bypass area).

However, other factors also influence the noise criterion, including the practicality of achieving the criterion in high-noise areas and existing noise levels prior to project approval. For the purpose of determining environmental noise level criteria, the monitoring program will determine those areas where these criteria may already be exceeded or is likely to be

exceeded. Procedures for monitoring and determination of appropriate noise levels are set by the relevant state government policies and Australian Standards.

Full details of the ECRTN policy are available at EPA's website www.epa.nsw.gov.au

How can I apply to be considered for noise mitigation treatment?

Now that the Sapphire to Woolgoolga Upgrade has been completed, Roads and Maritime is carrying out further noise monitoring to ensure that the noise model used is accurate. It is anticipated that noise monitoring will start late October. Post opening noise measurements will assist in assessing whether the noise from the upgrade meets policy requirements. This process will allow Roads and Maritime to determine how accurate the noise predictions were, how effective the noise reduction measures are and to evaluate if there is a need to introduce additional measures.

Roads and Maritime will continue to liaise with the community regarding noise levels along the upgrade. We anticipate being able to provide noise monitoring results back to the community early in 2015.

If results from the post operational noise assessment show that the operational noise levels exceed noise goals or limits set out by the NSW Department of Planning and Environment and the Environmental Protection Authority, noise mitigation measures are reviewed to determine if further work is reasonable and feasible.

If the noise levels are less than the predicted noise levels no further noise mitigation measures will be required.

Roads and Maritime has obtained the approval of the NSW Department of Planning and Environment to undertake the noise monitoring early. Roads and Maritime is doing this in recognition of the community concerns raised and are seeking to be as responsive as possible. Any additional mitigation measures will be implemented as quickly as possible after the monitoring report has been completed.

Where additional properties are identified as being eligible for noise treatment, the owners of these properties will be contacted by Roads and Maritime representatives to discuss the process to implement the appropriate treatments.

5 Next steps

Noise monitoring will start in late October 2014. Following analysis of data, Renzo Tonin will prepare a report. Once the report on the assessment has been checked and reviewed by regulators including the Environmental Protection Authority and the Department of Planning and Environment, the report will be made publically available. We anticipate that the report will be available early in 2015.