Operational noise overview

Woolgoolga to Ballina Pacific Highway upgrade

Roads and Maritime Services | July 2018

The Australian and NSW governments are jointly funding the Woolgoolga to Ballina Pacific Highway upgrade. Roads and Maritime Services' Pacific Highway Project Office, Pacific Complete and its contractor partners are working together to deliver the upgrade.

What is operational noise?

When the Pacific Highway is upgraded between Woolgoolga and Ballina, it will be a source of traffic noise in nearby areas. This is what we call operational noise.

In cases where sections of the highway go through new areas or is closer to properties, there will be increases in the level of road traffic noise. In other cases, where the highway is further away or the project is within the existing highway corridor, there would be less of a change in the level of noise or the noise level may decrease.

This update explains how we manage operational noise impacts for the upgrade.

How is operational noise assessed?

Roads and Maritime Services uses the same methodology and guidelines for management and mitigation of operational noise on all state roads.

The NSW Environment Protection Authority (EPA) Road Noise Policy states what traffic noise levels at houses should be following the upgrade. We have provided a diagram on the next page to explain this approach.

The policies and guidelines are available to view online at **epa.nsw.gov.au/noise** and **rms.nsw.gov.au** (go to the environment page).

Assessment timeline

When developing and delivering major road upgrades, project teams take a number of steps at specific points to understand predicted operational noise levels and then ultimately the actual noise level.

We have provided a table which outlines the steps we are taking on the Woolgoolga to Ballina upgrade to understand operational noise at different stages.

Project phase	Assessment	Timing
Concept design	Predicted noise impacts are modelled as part of the Environmental Impact Statement.	2012
Detailed design	Predicted noise impacts are modelled on the detailed design. The findings are outlined in the Operational Noise Review, which was approved by the Department of Planning and Environment in June 2018.	2018
Operation	Noise impacts are measured based on actual traffic and noise levels from operational traffic.	2021

Understanding noise

Noise is defined as ‘unwanted sound’. Noise is perceived differently from one person to the next and is measured on a scale of units called decibels. We assess noise by averaging the quietest and loudest (actual or predicted) measurements while also considering how the human ear perceives it.

Unlike other types of noise, the main effects of noise from road traffic are generally annoyance and masking of other sounds such as birds and rustling leaves.

Noise from road traffic is caused by several different sources including the interaction between vehicle tyres and the road surface, engines, exhaust and braking systems of vehicles.

How is operational noise measured?

The measurement unit for sound and noise is decibels (dB). A sound level in dB represents the sound pressure level, which is the amount of sound a listener receives.

As sound levels near a road may vary, such as when a truck is driving past, the LAeq (Equivalent Continuous Level) measurement is used to show an average noise level over a given period.

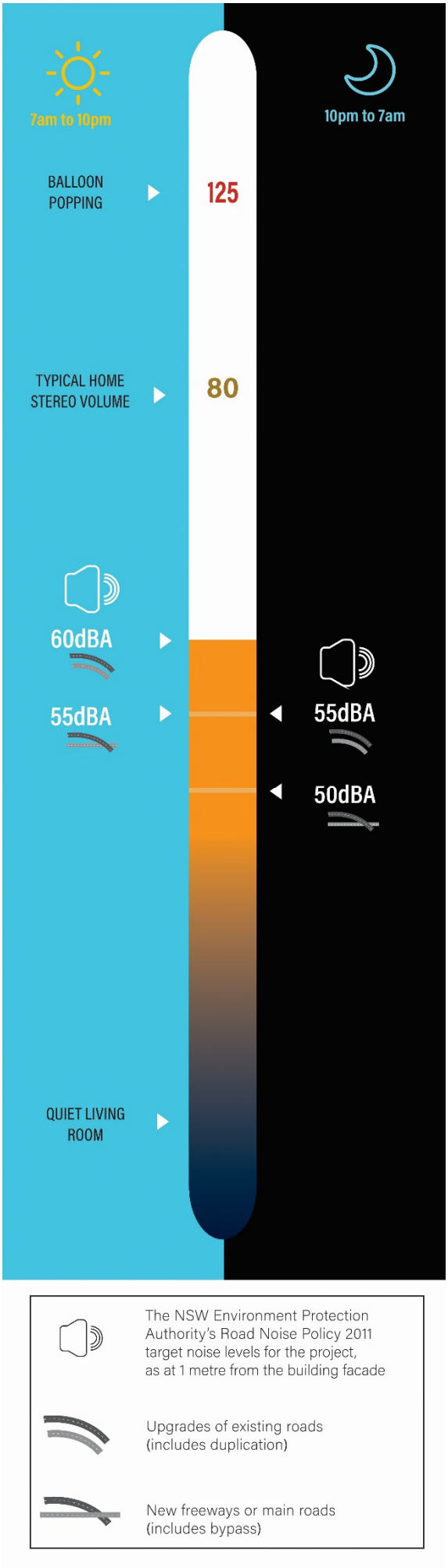
Target noise levels

During the design and noise assessment process we generally seek to achieve the following noise levels at residences:

- 55 decibels during the day and 50 decibels at night for new freeways or main roads in the new areas
- 60 decibels during the day and 55 decibels at night for upgrades of existing roads

Other noise sensitive receivers such as schools, hospitals, nursing homes and places of worship are also considered.

Did you know noise loss of 10dba or more is expected inside a house with windows closed? That means something that records at 60dBA outside is expected to be less than 50dBA inside.



Operational Noise Review

We have prepared an Operational Noise Review which outlines the expected changes in road traffic noise as a result of the project. The review includes the sections of the upgrade between Glenugie and Pimlico. This review was approved by the Department of Planning and Environment in June 2018.

The Operational Noise Review has been developed to comply with the project's approval conditions and builds on the assessment done as part of the Environmental Impact Statement (2012).

Predicting future noise

As part of our assessment, a noise model has been developed to predict the expected traffic noise impacts from the new road.

The computer noise model was developed using the Calculation of Road Traffic Noise (CoRTN) method, which is a mathematical model that has been specifically validated under Australian conditions and is accepted as the industry standard by the NSW Government.

The noise model takes into account:

- A three-dimensional road design that reflects the final height of the road, line of sight, including surrounding terrain, buildings and noise-sensitive locations
- Allowances for noise absorption over different surface types, such as ground or bodies of water
- Traffic speeds and projected volumes
- Proportion of light and heavy vehicles
- Type of road surface
- Height and location of vehicles (tyre, engine and truck exhaust noise).

As part of the assessment, noise levels were predicted for two scenarios where the project is built ('build scenario') and a 'do nothing' scenario where the project is not built. The two scenarios were evaluated at two points in time; when the project opens in 2020 and 10 years after opening.

These predicted noise levels were then assessed against the location of receivers near the project alignment to determine the expected impacts.

Noise monitoring was carried out at a number of receivers near the project alignment to measure actual noise levels.

How do we know if the noise model is accurate?

To confirm the accuracy of the noise model, models of the existing highway were prepared using traffic volume and speed data. The predicted traffic noise levels were then compared to the actual noise levels and found to be accurate.

Once the project is complete, an operational noise compliance report will be prepared to assess whether the predictions match the actual noise levels and if additional noise mitigation measures are needed.

Managing impacts

The Operational Noise Review outlines measures to reduce operational noise impacts to nearby properties. As a first priority, we look to reduce road traffic noise at the source through measures including:

- Road design and geometry
- Quieter pavement surfaces
- Noise mounds, barriers and walls.

It is generally more effective and provides greater overall benefits to reduce noise at the road than at the receiver. Where the target noise levels cannot be achieved through at-source measures, we then examine the need for at-house noise treatments.

The noise mitigation measures for the project have been identified in line with Roads and Maritime's Noise Mitigation Guideline. These include:

- Building a noise wall at Tyndale
- Installing low noise wearing surface at Gulmarrad and Broadwater (in addition to the areas identified for low noise pavement in the Environmental Impact Statement)
- Considering at-house noise treatment for more than 300 residential properties and three non-residential receivers within 600 metres of the upgrade
- Considering at-house noise treatment for 47 properties within 601 to 900 metres of the upgrade at the operational compliance stage.

We have provided a map to show the locations of noise mitigation measures for the upgrade. Detailed information about these measures is provided in the Operational Noise Review.

Map of noise mitigation measures

Note that this is a diagram only and is not necessarily indicative of the route or location of noise mitigation measures.

At-house noise treatment

The Operational Noise Review identifies properties in the project area eligible for consideration of at-house noise treatment. At-house noise treatment refers to architectural acoustic measures which aim to improve the sound-resistance of properties.

Eligible properties will receive a specific package of treatments for their home depending on the expected noise impacts and existing features of the property. The treatments may include:

- Upgrading windows and doors
- Sealing wall vents and upgrading window and door seals
- Installing ventilation such as fans or air conditioning (split system or ducted) to maintain the flow of fresh air when windows and doors are closed.

Treatments are generally only applied to 'habitable' rooms, such as bedrooms and living areas. They may only be required for certain aspects of the house (the side/s of the house facing the new road).

These factors are determined by the noise model as well as the standards outlined in the NSW guidelines and policies.

The level of noise reduction achieved will vary depending on the construction, age and condition of the property. The project team will work with property owners to find the best 'reasonable and feasible' option for the property.

Timing and next steps

At-house noise treatment is being delivered to help reduce impacts from operational noise after the project is completed and open to traffic in 2020.

There are more than 300 properties that have been identified as eligible for treatment. The delivery of at-house noise treatment is extensive and involves a number of different steps. Due to the large volume of eligible properties, we have staged the installation program.

If property owners agree to their noise treatment scope and provide access for inspections and installation, treatments will generally be installed by the time the project is completed and open to traffic.

The project team will contact eligible property owners to confirm next steps.

Post-construction noise review

Within one year of the upgrade opening and traffic travelling at full speed, we will carry out an assessment to compare actual noise levels against the predicted noise levels.

The project team will carry out noise monitoring along the corridor to measure the actual noise levels. Noise monitoring does not need to be carried out at every property to confirm the noise modelling is valid.

If noise levels are found to be greater than expected, consultation would be carried out with affected receivers and additional measures may be applied. This information will be made publically available through a report.

The report will be reviewed by the NSW Environment Protection Authority and Department of Planning and Environment to ensure regulatory requirements have been met.

Operational noise FAQs

What's the difference between operational and construction noise?

On road projects such as the Pacific Highway upgrade, there will be noise impacts as a result of construction activities.

Even though some receivers may be impacted by both types of noise, we assess construction noise differently to operational road noise. Measures to manage operational noise are not intended to reduce construction noise impacts.

For information about how we manage construction noise, the project's Construction Noise and Vibration Management Plan is available to view online at **rms.nsw.gov.au/w2b**.

What does 'reasonable and feasible' mean?

When assessing noise mitigation measures, we look at what is 'reasonable and feasible' in the circumstances. We take into consideration different factors such as noise benefits, cost, constructability, safety and maintenance requirements.

A solution is feasible if it can be engineered and is practical to build, considering issues such as safety, access and maintenance. Costs of different measures may vary greatly and not every measure is possible to build or cost effective in every situation. A measure may be feasible to build, but it's unreasonable due to the high cost.

Why isn't my property eligible for at-house noise treatment?

Eligibility and level of treatment is based on the operational noise model and relevant NSW guidelines to ensure that treatment is provided equitably.

Every property will receive a unique package of treatments based on the expected noise impacts and the construction and condition of the residential dwelling.

If a property is not eligible for at-house noise treatment, this means that the expected operational noise impacts are within the target noise levels.

At-house noise treatment is not provided for:

- Commercial or industrial buildings
- Buildings that are non-conforming land uses (such as residential buildings in an industrial zone)
- Buildings that received DA approval after the project approval (2014).

My property was identified in the EIS. Why is it no longer eligible?

Some properties that were identified as eligible in the Environmental Impact Statement have now been found to no longer require treatment. This is because adequate noise mitigation has been achieved through the road design process and at-source measures.

The changes in the mitigation identified since the Environmental Impact Statement are due to the updated road design, traffic volumes, noise modelling refinements and other factors.

Will the at-house treatments eliminate all noise?

While at-house treatments will help to minimise impacts for building occupants, they are unlikely to eliminate all noise. The level of noise reduction achieved will vary depending on the construction, age and condition of the property.

What if I am impacted by noise from existing roads?

The Operational Noise Review only recommends noise mitigation measures for the upgrade and does not consider existing non-project roads, such as indirect impacts from the project on the adjoining road network. However, residences affected by additional traffic on existing local roads due to the upgrade are considered.

Noise impacts from existing roads are considered separately under Roads and Maritime's Noise Abatement Program. More information is available at **rms.nsw.gov.au/environment**.

Contact us

If you have any questions or would like more information, please contact the project team:

1800 778 900

w2b@pacificcomplete.com.au

http://www.rms.nsw.gov.au/w2b

131 450

If you need help understanding this information, please contact the Translating and Interpreting Service on 131 450 and ask them to call us on 1800 778 900.

July 2018
RMS 18.886