



# Western Harbour Tunnel and Warringah Freeway Upgrade



## Noise and vibration

We have assessed the possible noise and vibration impact when we are building and when we are open to traffic. Once open to traffic some areas will benefit from less noise due to reduced traffic on the surface and the new noise walls and noise property treatments we will install.

### Assessing noise and vibration

We know our work can be noisy which is why we will use a range of measures to reduce the impact of our work when we are close to communities.

We have carried out a thorough noise and vibration assessment examining the potential impact to you when we build and operate the tunnels.

The assessments involved identifying areas which may experience changed levels of noise or vibration as a result of our work, assessing the types and significance of the impact and how we will manage them.



## Reducing the impact of our work

While we are building we will monitor noise and vibration to make sure it meets the appropriate guidelines. We will be using a range of measures to reduce the impact of our work including:

- providing additional notification and consultation about upcoming noisy work
- laying out our sites so the noisy equipment is shielded by other buildings and/or stockpiles
- using acoustic sheds for 24 hour tunnelling activities
- ensuring our equipment is serviced and maintained up to standard
- turning off machinery and equipment when not in use
- working within standard construction hours, wherever feasible
- managing construction activities to minimise major noise generating work being done at the same time at the same location
- Wherever possible, we will stage our work to avoid extended periods of consecutive night work in one area to manage our impact on our neighbours
- installing hoardings and temporary noise barriers, where required
- providing alternative accommodation, where appropriate.

All our work will be carried out in line with the project's Conditions of Approval, Environment Protection Licence and Construction Environmental Management Plan which are overseen by the Department of Planning, Industry and Environment (DPIE) and NSW Environment Protection Authority (EPA).

We will also use noise and vibration monitoring to ensure our measures are effective in complying with our licence conditions, and help us identify if we need to make changes.

# When we are building

## Noise

If you live near where we are working you are likely to hear us. This may be when we are working on the road, delivering materials and removing spoil from tunnelling sites.

How noise is perceived is personal and can depend on the environment. Because of this, sound may also seem louder to you in some situations than others. For example a neighbour mowing the lawn in the middle of the night will seem louder than if they were mowing the lawn during the day. The information below explains how we measure noise and what this will mean for you depending on which parts of our work you are near to.

### How we measure noise

We measure noise in decibels. Our ears generally do not notice changes of one to two decibels. We also do not hear changes in noise incrementally. We hear a change of 10 decibels as about half or double the previous noise. So for example a lawnmower is about 90 decibels and a motorcycle is about 100 decibels but a motorcycle is almost twice as loud to the ear as a lawnmower.

Noise is measured, predicted and assessed in accordance with the relevant legislative guidelines. When we predict you may experience noise levels over the guidelines, we will implement additional mitigation measures and monitor noise levels.

Our assessments are conservative and always assess the worst case scenario. We often find when we are working the noise generated is less than we predicted.

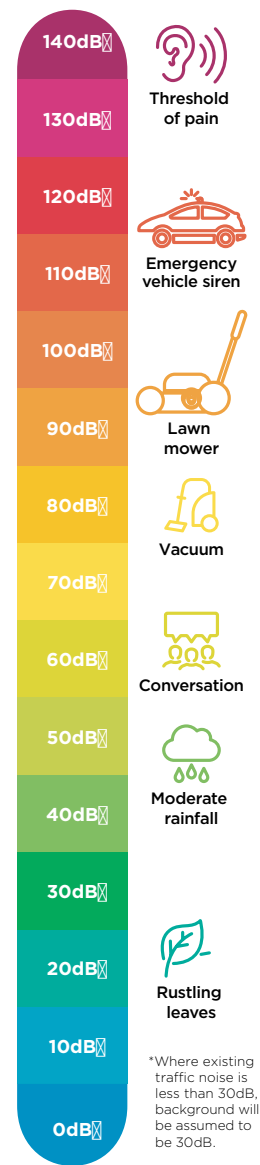
### Day and night Noise Management Levels (NMLs)

We use NMLs to assess whether you will be impacted by noise from our work. The NML is equal to the current noise level at the quietest time of the day or night, plus 10 decibels during the day or five decibels at night. You are considered to be affected by noise if our work is predicted to be 10 decibels more than your current noise levels during the day and five decibels more at night.

There are different NMLs for non-residential properties which may be more sensitive to changes in noise levels. This includes hospitals, schools, places of worship, childcare centres and recreational areas. We will work closely with any sensitive receivers to manage the potential impact of our work.

### Highly noise affected

You are considered to be highly noise affected when the noise levels are predicted to be over 75 decibels – which is comparable to the noise made by a vacuum cleaner. We will look at ways to further mitigate noise if you have been assessed as highly noise affected.



### Sleep disturbance and awakening criteria

We know some of our work can be frustrating if you live nearby, particularly when we need to work at night. As a result, we also have “a sleep-disturbance criteria”, which looks at whether we believe the noise from the work might keep you awake at night.

The criteria used to identify where there is the potential for sleep disturbance is 15 decibels above the current night time noise level, which is the background noise level without our construction work.

If we go above this criteria, we also look at an additional “awakening reaction level”. These assessments help us to identify if we need to implement additional mitigation measures such as providing respite or alternative accommodation where applicable.

### Noise from construction traffic

Our work will temporarily generate more trucks and light vehicles on the road. We expect the increase in road traffic noise will generally be less than two decibels, which is within our guidelines and you are not likely to notice any change. Some changes in traffic noise may be more noticeable if you live near the construction sites.

## What does this mean for you?

The potential noise impact varies depending on the location and type of work we are doing in your area. The below provides you with a general overview of what work will be happening and when you may be able to hear us when you are next to one of our sites.

### If you live near a tunnelling construction site

We will be tunnelling underground 24 hours a day, seven days a week.

The majority of noisy activity at these sites will be when we are setting the site up, building the acoustic shed and getting ready for tunnelling. This can take about six months to complete, weather permitting.

Once we are tunnelling, the majority of the work is underground, with most of our work taking place inside the acoustic shed. The acoustic shed helps us manage noise, dust and light from our work.

We will only remove spoil from the site during standard construction hours.

There may be occasional deliveries and some movements outside of standard construction hours.

### If you live above the tunnel

While we will be tunnelling underground 24 hours a day, seven days a week, we will only be under individual properties for about one week. This is based on our tunnelling equipment moving about 25-30 metres per week.

It is unlikely you will be able to hear the tunnelling equipment because it will be deep underground. However when we are tunnelling at shallower depths, or directly under your property, you may experience ground borne noise generated by our work. The depths of the tunnel will vary depending on where you live. For more detail on the depth of tunnel in your local area, please see pages 24 and 25 of our 'Guide to the EIS' [nswroads.work/whtportal-eisguide](https://nswroads.work/whtportal-eisguide).

Ground borne noise is a bit different to air borne noise in that you can sometimes feel it. Ground borne noise is sometimes mistaken for vibration. A good example of what ground borne noise sounds and feels like is an old refrigerator humming.

### If you live near a minor construction site

We will have to build a number of minor construction sites to support our work during construction. These sites are generally used for storage of machinery, materials and equipment, worker amenities and parking. We have generally located these within the Warringah Freeway corridor.

The hours we work will vary depending on the type of work these sites are supporting, however, they are smaller and have less activity than our main sites.

Noise on site will generally be quite low, however, you may notice our teams coming and going, and storing materials.

## If you live near our surface work

Surface work will be required to connect the tunnel into the existing road network, carry out road upgrades, build new bridges, upgrade existing bridges and build the tunnel entry and exits. You will likely be able to hear some noise from these activities.

Work at these sites will be carried out in stages and some activities will be louder than others. For example a site set up and earthworks tend to be louder than paving, bridge building and finishing work like line marking and installing lights.

### If you live near the Warringah Freeway

The Warringah Freeway presents us with a challenge as we need to keep traffic moving while we work.

To do this safely and keep traffic moving we will need to carry out a lot of work during the evening and night.

The noise from this has the potential to be temporarily disruptive to you, particularly at night. An out-of-hours work protocol will be developed in consultation with DPIE and the EPA and will be followed throughout construction. This will outline appropriate noise management and mitigation measures and will include measures such as providing respite, installing temporary noise barriers and staging our work so we are not working near the same residents for large durations of time. Details on noise reduction measures are provided on page 70 of our 'Guide to the EIS' [nswroads.work/whtportal-eisguide](https://nswroads.work/whtportal-eisguide).

Due to the safety risks of working next to live traffic, we will need to partially close the Warringah Freeway and may need to fully close it for short periods at night to allow certain work to be carried out more effectively. These activities will include paving, installing bridge sections and removing kerbs and medians.

We will be working closely with you to help minimise these impacts.

Example of a noise wall



Example of what an acoustic shed may look like



## Vibration

We are sensitive to vibration and can feel vibration at very low levels. This is why the vibration criteria we need to meet during our work to avoid annoyance to you is more stringent than the criteria to prevent damage to your property.

Our assessment considers the type of work we will be doing and whether there are any properties which may be at risk. Unlike noise, it is difficult to 'predict' vibration. There are many variables like soil type and conditions, the type of rock below the surface, building types and foundations, and the plant and equipment being used on site. Because of this, we take a conservative approach in estimating our impact.

We assessed the following types of vibration impact:

- disturbance to you in your property causing temporary discomfort
- potential damage to buildings (both cosmetic damage, like small cracks, and structural damage, like damage to foundations)
- potential damage to sensitive equipment in a building, such as electrical equipment or large internet servers.

## Property damage

We understand there has been a lot of concern about the potential for vibration and settlement when we are tunnelling to cause damage to homes. Our objective is to ensure there are no buildings at risk of damage from vibration while we are building our tunnels.

We will offer you a property condition survey if you are located within 50 metres of our work. This will provide a clear record of your property's condition before our work starts.

We will establish an Independent Property Impact Assessment Panel (IPIAP) to verify building condition survey reports, resolve any property damage disputes and establish ongoing settlement monitoring requirements. Panel members will be highly qualified in the fields of structural, geotechnical and/or civil engineering and be independent of the government and project.

If any damage is found to be directly related to our project, the damage will be fixed at no cost to you.

## When we are open to traffic

The project is predicted to reduce traffic noise for almost 60 per cent of properties near our surface roads.

We acknowledge there will be some parts of the community who live near our permanent facilities and surface road upgrades who may notice some more noise as a result of an increase in traffic going in and out of the tunnels.

We have identified and assessed all properties which may be affected by noise from the project when it is opened to traffic. A large number of properties near the Warringah Freeway already qualify for noise treatment without the project. The project will improve noise levels for many properties but they will remain above our thresholds. We will be offering noise treatment to anyone's property that is predicted to remain over the limit, even if noise is overall reduced by the project.

We always try to mitigate traffic noise at the source first, including installing low noise pavement. If this does not reduce the noise enough we then look at other options for you. This includes measures like building noise walls or providing your property with noise treatments.

**If your property is potentially eligible for noise treatment we will be in contact with you soon. We want to start our noise treatment program as early as possible so you will benefit from reduced noise before we start construction.**

You do not need to contact us as we will be in touch with you directly, if you are eligible.

## Working with you


**We know there will be some noise and vibration impact when we are working in your area. If you live above the tunnel you may also be able to hear and feel our work happening as our machinery passes below. We will be in contact with you about your individual concerns and needs throughout construction.**

## Contact the Western Harbour Tunnel and Beaches Link team

 [nswroads.work/whtbl](http://nswroads.work/whtbl)

 [whtbl@transport.nsw.gov.au](mailto:whtbl@transport.nsw.gov.au)

 1800 931 189

 Customer feedback  
Transport for NSW, Locked Bag 928  
North Sydney NSW 2059

## Visit our interactive web portal

Read the EIS, find out more or ask our team a question.

 [nswroads.work/whtportal](http://nswroads.work/whtportal)



**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 931 189.**