METROTUNNEL

Managing noise, vibration and electromagnetic interference in Parkville

Construction is underway to build the new Parkville Station, which will connect the world-class education, health and research precinct to the rail network for the first time.

A project of the size and scale of the Metro Tunnel cannot be built without some impact on the surrounding area.

We recognise there are a number of sensitive receivers located close to the Grattan Street construction site, including residential, educational, medical and research facilities, and we are committed to minimising the impacts of construction as much as possible.

Visit us at Metro Tunnel *HQ*

125-133 Swanston Street, Melbourne

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metrotunnel.vic.gov.au

Measuring noise and vibration

The use of heavy machinery such as piling rigs, cranes, excavators and tunnel boring machines (TBMs) during construction will generate varying levels of noise and vibration.

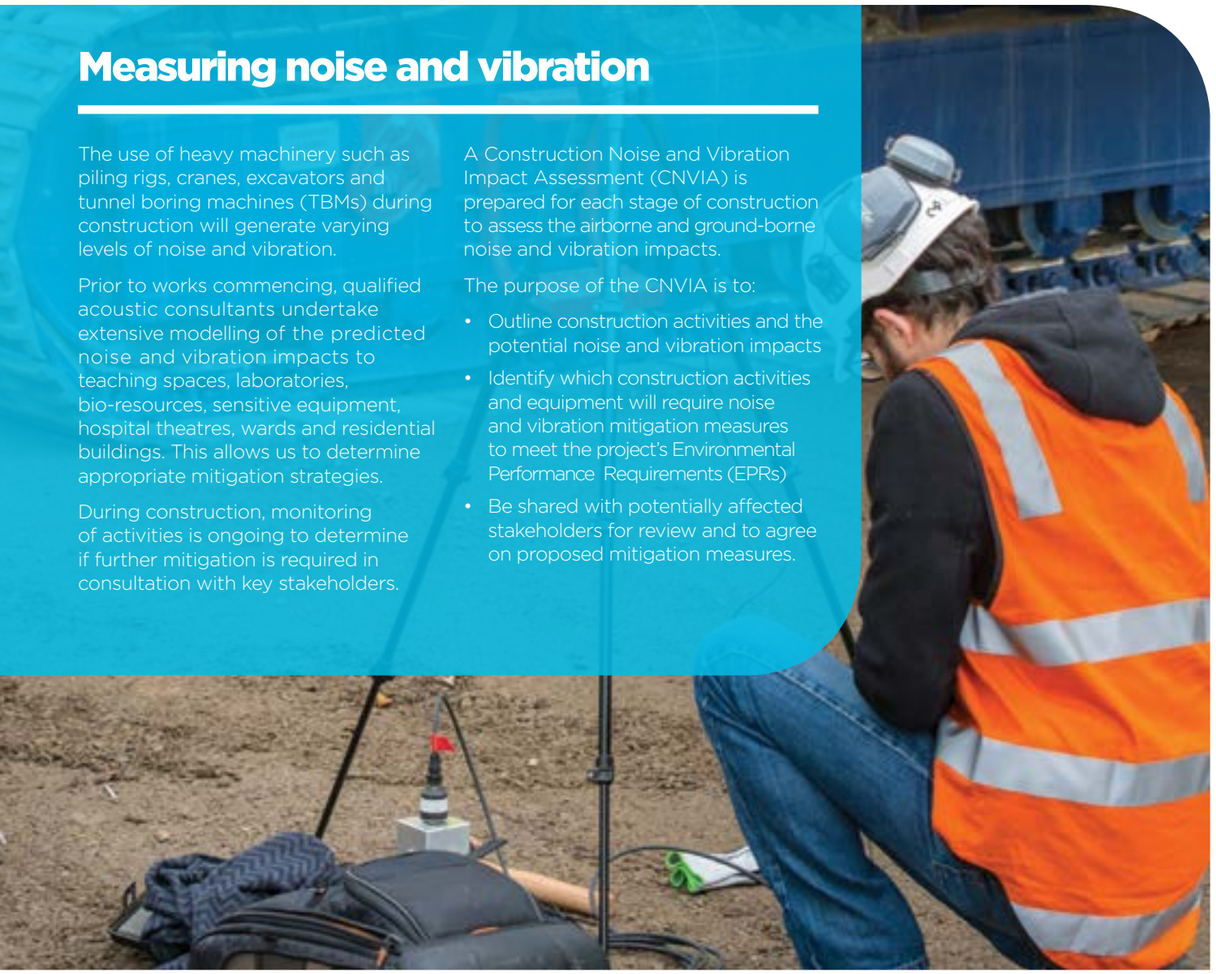
Prior to works commencing, qualified acoustic consultants undertake extensive modelling of the predicted noise and vibration impacts to teaching spaces, laboratories, bio-resources, sensitive equipment, hospital theatres, wards and residential buildings. This allows us to determine appropriate mitigation strategies.

During construction, monitoring of activities is ongoing to determine if further mitigation is required in consultation with key stakeholders.

A Construction Noise and Vibration Impact Assessment (CNVIA) is prepared for each stage of construction to assess the airborne and ground-borne noise and vibration impacts.

The purpose of the CNVIA is to:

- Outline construction activities and the potential noise and vibration impacts
- Identify which construction activities and equipment will require noise and vibration mitigation measures to meet the project's Environmental Performance Requirements (EPRs)
- Be shared with potentially affected stakeholders for review and to agree on proposed mitigation measures.



Noise and vibration modelling

Noise and vibration modelling is undertaken for each stage of construction.

To assess construction noise and vibration impacts, the following process is used to inform modelling:

- Determine baseline noise measurements at sensitive receivers near the construction site
- Determine, in consultation with potentially affected stakeholders, appropriate noise and vibration levels for each item of sensitive equipment
- Model typical construction scenarios, based on the equipment to be used, the times at which they are proposed to occur and the locations where construction activities are expected to occur
- Run models to determine predicted impacts for both noise and vibration.

Where noise and vibration modelling predicts relevant guidelines will be exceeded, we will work with key stakeholders to implement appropriate mitigation measures.

Noise and vibration monitoring

Throughout construction, attended and unattended noise and vibration monitoring is undertaken to ensure accurate recording of noise and vibration levels, and to ensure compliance with EPRs.

Attended noise and vibration monitoring is undertaken during the model validation period or if there is a change to the construction methodology. Attended monitoring provides subjective information aimed at refining construction methods to minimise impacts or to differentiate between construction sources and other sources such as road traffic.

Unattended noise and vibration monitors are installed at sensitive locations to ensure noise and vibration impacts are managed in accordance with the EPRs. These monitors measure and report noise and vibration levels to ensure we are alerted when levels are approaching guideline targets during construction so that, if required, additional mitigation measures can be applied.

Managing impacts from noise and vibration

There are a number of mitigation measures we can implement to manage noise and vibration during construction including, but not limited to:

At source

- Construction equipment location
- Equipment selection such as fitting equipment with silencers
- Acoustic enclosures and other noise attenuation measures
- Equipment use, such as designated loading/unloading areas to minimise plant movement and turning equipment off when not in use

Other controls

- Shielding stationary noise sources
- Using structures to shield residential receivers
- Programming works at appropriate times in consultation with key stakeholders
- Acoustic hoarding around the construction site
- Enclosing equipment such as piling rigs with acoustic curtains
- Fitting construction vehicles and equipment with broadband reversing beepers
- Training staff in noise reducing behaviours.
- Reviewing construction methodologies and using innovation to minimise impacts as much as possible. For example, we are using a new method to break back the piles which involves the use of mortar to create pressure and generate a horizontal cut, so the concrete can be removed using a crane. This method removes the need to use jack hammers and excavators, minimising noise, dust and vibration impacts during piling.

Terminology

Airborne noise

May be continuous, impulsive or intermittent and may contain high-pitch or low dominating tones. The perception of noise by people can vary widely and depends upon many factors. Airborne noise is measured by a sound meter using the decibel scale.

Ground-borne noise

Noise heard within a building that is generated by vibration transmitted through the ground into a structure. It is typically heard as a low-frequency 'rumbling' and is often referred to as 'regenerated noise'. Ground-borne noise is measured by a sound meter.

Vibration

The rapid movement of an object back and forth that occurs when it is displaced from its original position and returned to it. Vibration may be expressed in terms of displacement, velocity or acceleration. Construction vibration is often measured as vibration velocity using an accelerometer or geophone. Vibration Dose Value is a metric used to accumulate vibration energy to determine its impact on human comfort.

Electromagnetic compatibility (EMC)

Equipment or systems operating as intended without electromagnetic interference.

Electromagnetic interference (EMI)

Impacts to the performance of equipment or systems caused by electromagnetic disturbance.

Electromagnetic interference

Electromagnetic interference (EMI) and required mitigations are considered for both the construction and operational phases of the project.

Construction phase

Construction equipment has the potential to cause EMI. The project team is undertaking extensive investigations in conjunction with key stakeholders to identify sensitive equipment that may potentially be affected. We are also working closely with sensitive equipment manufacturers and operators to understand the equipment type, location, sensitivity and any existing mitigation measures.

Prior to works commencing, field testing and simulations of construction activities are undertaken to understand the potential effects on sensitive equipment. These results are shared with key stakeholders and will continue to be shared throughout construction.

Following these tests and simulations, a Zone of Influence is defined and established around sensitive EMI equipment to ensure construction activity does not have an adverse impact on sensitive receiver operations.

At source mitigation will be applied where required in the first instance.

Control measures for EMI impacts during construction may include:

- Scheduling works outside of sensitive equipment operating hours
- Strategic selection and placement of construction equipment
- Incorporating existing passive or active shielding mitigation capabilities.

The potential impacts and required control measures are discussed and agreed to with affected stakeholders.

Operational phase

The project team is assessing the range of electromagnetic emissions during the operation of the Metro Tunnel. Where required, mitigation measures for sensitive receivers may also be implemented to meet National and International Standards. At source mitigation will be applied where required in the first instance. These mitigation measures are specific to the equipment type, frequency (hertz) and location of the EMI source and will include:

- Implementing robust electromagnetic compatibility (EMC) design principles
- Ensuring equipment complies with relevant EMC standards
- Eliminating or minimising stray currents
- Reducing or redirecting current flow through areas of high EMI sensitivity
- Targeted solutions for specific sensitive receivers where required.

Consultation

The project team will continue to work closely with key stakeholders to implement appropriate mitigation measures for sensitive receivers, where required.

An Electromagnetic Compatibility Working Group has been established with key stakeholders in the Parkville precinct to ensure the important research, teaching and health care work undertaken is not adversely impacted.

More information

To find out more about the Metro Tunnel Project and register for future email updates:

- metrotunnel.vic.gov.au
- 1800 105 105 (24 hours a day, 7 days a week) Press 2 and follow the prompts
- facebook.com/metrotunnel
- Subscribe to eNews or construction notification emails: metrotunnel.vic.gov.au/subscribe

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Mandarin	普通话		

It should be noted that this information is current at the time of printing, however due to unforeseen circumstances, changes may occur. Please visit **metrotunnel.vic.gov.au** for the latest updates.

RAIL PROJECTS VICTORIA

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