



## Understanding rail noise and vibration

**The Level Crossing Removal Project: Caulfield to Dandenong is removing nine level crossings and rebuilding five stations on the Cranbourne Pakenham train line. The project will reduce congestion on the local road and rail network, and deliver a safer and more reliable train service, contributing to a 42 per cent increase in capacity.**

The proposed design for the Caulfield to Dandenong section of the train line has been developed by a team of engineers, technical and subject matter specialists and urban designers. The design removes the level crossings while creating over 225,000 square metres of new community activity spaces and parklands, as well as new car parks at stations.

Noise and vibration impacts have been carefully considered in developing the design.

### What causes rail noise and vibration?

Noise from rail lines can have a significant impact on local communities. Engines, brakes and the wheels moving on the tracks are the main source of noise from trains. Rail noise travels directly to nearby homes when the tracks are at street level.

Warning bells at level crossings and trains blasting their horns are essential safety precautions when trains cross roads or pedestrian paths, but they are noisy for residents. Vibration from rail structures can also be experienced as noise.

### How have noise and vibration been considered in the design?

The proposed design for the elevated rail sections will minimise impacts from noise and vibration. Level crossings are eliminated, reducing the use of noisy warning signals. The elevated design considers noise at street level and at nearby residents caused by train engines, brakes and wheels.

**The elevated structures reduce noise and vibration impacts through the use of:**

- walls and screens to mitigate noise transfer
- new high-quality, continuous smooth tracks
- purpose-built resilient fastenings to attach the new tracks directly to the structure
- rubber insulators under the track to dampen vibrations.



## Noise mitigation standards

The Level Crossing Removal Project: Caulfield to Dandenong will be constructed to meet the guidelines in the Victorian Government's Passenger Rail Infrastructure Noise Policy. This means that, where currently there are no requirements to protect residents against maximum noise levels, the project will be required to ensure that the levels set out in the policy are complied with.

The Passenger Rail Infrastructure Noise Policy aims to establish a process and guidelines that balance the benefits of new rail infrastructure with the possible impacts on those living nearby.

The policy includes investigation thresholds, which are noise levels provided to guide transport bodies and planning authorities when assessing the impacts of rail noise on nearby communities.

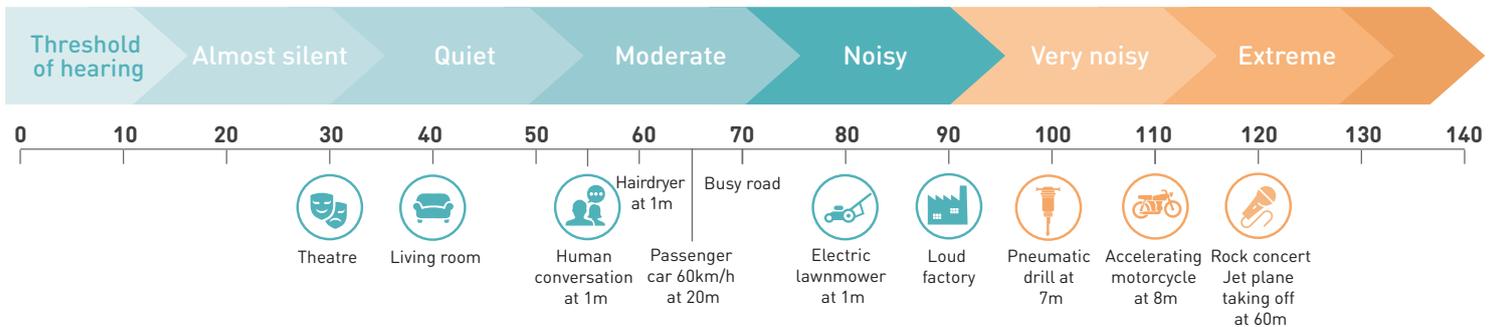
Construction noise will be managed in accordance with Environment Protection Agency (EPA) guidelines.

## Two-part investigation threshold

The investigation thresholds relevant to the Level Crossing Removal Project: Caulfield to Dandenong are triggered for daytime noise and 'noise sensitive' community buildings, such as kindergartens and libraries, and for noise at all times in residential and other buildings where people sleep. This investigation threshold has two parts, and is triggered if:

- Part One: Overall Noise  
Noise following the project's completion is predicted to exceed:
  - 65dB(A) during the day (6am-10pm) : OR,
  - 60dB(A) at night (10pm-6am) : OR,
  - A maximum level of 85dB(A) [at any time]
- AND
- Part Two: Change in Noise  
Any predicted increase in rail noise is 3dB(A) or more.

## Sound levels in decibels



## How are noise and vibration assessed?

The Level Crossing Removal Authority engaged specialist acoustic consultants to predict future noise levels associated with the new design and compare these to current noise levels.

To predict future noise levels, acoustic specialists create a 3D computer model of the local area.

The proposed new rail structure is added to this model. Samples of actual train noise are used to model the levels of noise people nearby will experience. The model also takes into account noise that may be caused by vibration of the elevated structures.

### The model considers:

- the number of train movements for rail service scenarios immediately after project completion
- the types of trains, including Metro, V/Line and freight trains, and the number of carriages in each train
- the likely speed at which each train will travel
- the distance between trains and residential or similar sensitive properties
- existing ground contours
- existing buildings and surrounding infrastructure.

## What happens next?

**The Victorian Government has released the proposed design for the project. Consultation has commenced on the proposed design and will conclude in early 2016.**

Feedback from the community will be used to enhance the design and inform decision-making by government. Outcomes from the consultation will be shared with the community and contractors who are delivering the project.

The Level Crossing Removal Authority will continue to assess noise and vibration impacts on the surrounding community to refine the proposed design.

This approach is used worldwide to assess changes in noise levels associated with new or upgraded rail infrastructure.

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