WAKA KOTAHI
NZ TRANSPORT AGENCY

27th September 2022

To Pauatahanui Residents Association

Transmission Gully noise monitoring carried out by Waka Kotahi

Overview

Knowing that a significant change in noise environment would occur for some residents when the Transmission Gully project opened to the public in March 2022, Waka Kotahi installed three small solar powered noise monitors close to the motorway alignment at Bradey Road, Flightys Road and Paekākāriki Hill Road. This fact sheet is to update you on the results of this noise monitoring.

These units will not be used to verify the post construction noise model which the CPBHEB Joint Venture are required to undertake but are suitable to give a good indication of the noise levels close to the motorway, in this instance within approximately 20 – 30 metres of the traffic lanes.

These monitors were in place for approximately two weeks prior to the motorway opening to the public. Below for you, is data demonstrating the noise levels before the motorway opened, immediately after opening when the motorway had lots of people driving it to see what it was all about, and post-opening when the motorway had settled down closer to its expected long-term pattern.

The science of sound

Road traffic noise is generated mainly by tyres travelling over the surface of the road, engines, and exhausts. The sound waves travel further from the source and expand in all directions as they go, spreading the sound energy over a rapidly widening area. Energy is also lost through atmospheric absorption. In most situations these factors result in reduced sound levels as you move further away from a road.

The wind strength and direction also have a significant effect, as sound propagates better downwind than upwind. The wind doesn't stop the spreading effect from occurring, but the combined result can be that the apparent rate of reduction is less in a downwind direction.

There is concern from some residents that the noise at their properties is louder than immediately adjacent to the motorway alignment. Due to the physics of sound and how it travels, this is very unlikely to be the case, even in downwind conditions. There may be the perception that it is louder due to the traffic noise coming from an unexpected direction on some days due to variation in weather conditions.

How loud is that?

Noise is measured in decibels (dB) and is a logarithmic scale. Noise levels in dB $L_{Aeq(duration)}$ are average noise levels. The value inside the brackets is the time duration it was averaged over, e.g. 1-min, 1-hour, or 24-hours.

As a frame of reference, the noise level in a quiet library is about 40 dB, a normal conversation about 60 dB, using a vacuum cleaner is about 70 dB, a petrol lawnmower is about 90 dB, and a leaf-blower can be over 100 dB.

Our baseline

The three noise monitors have been named after the local roads the sites were accessed from (Paekākāriki Hill Road, Flightys Road and Bradey Road). However, in all cases the monitors are adjacent to the motorway.

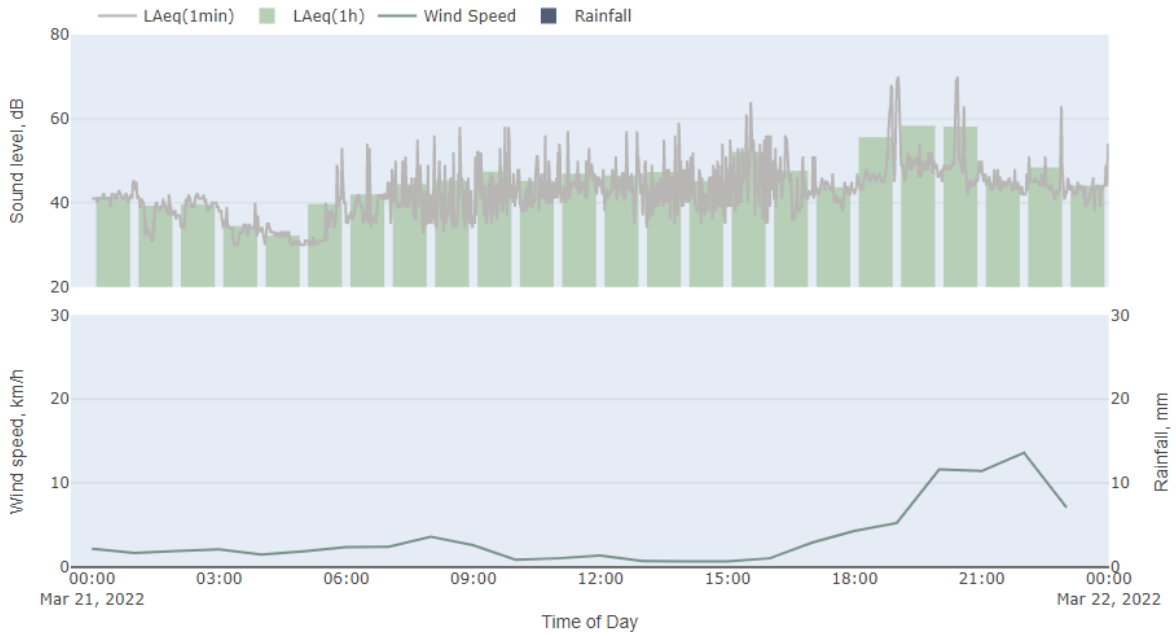
Prior to the motorway being opening to traffic, Waka Kotahi installed these noise monitors to provide a 'baseline' of noise. The noise from the construction traffic/works can be seen in some of this data. Generally, the noise levels prior to the motorway opening fall below the lowest level these devices can measure (around 30 dB $L_{Aeq(1h)}$) in the early hours of the morning at Flightys Road up to 64 dB $L_{Aeq(1h)}$ at Paekakariki Hill Road during the day.

Our graphs show the road noise average over 1 hour (the green bars) and the noise averaged over 1 minute (the grey squiggly lines).

The three sites show very different noise characteristics prior to the road opening. The absolute sound levels should not be compared between the three monitors as they are at slightly different distances from the road and are affected differently by local topography near each monitor.

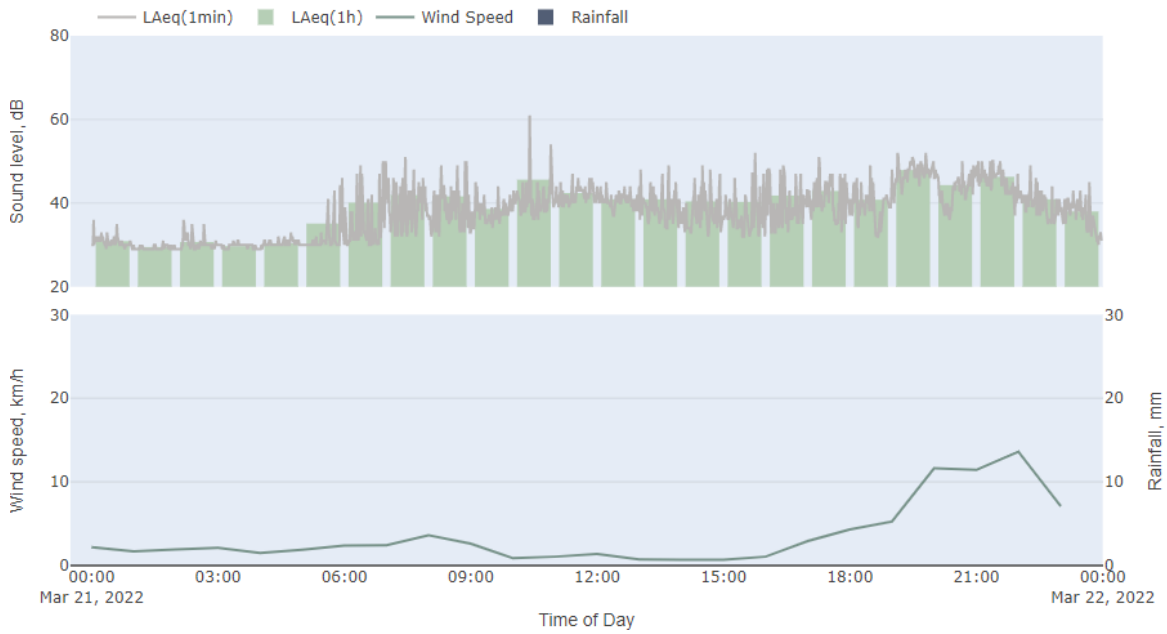
Select Date
2022-3-21

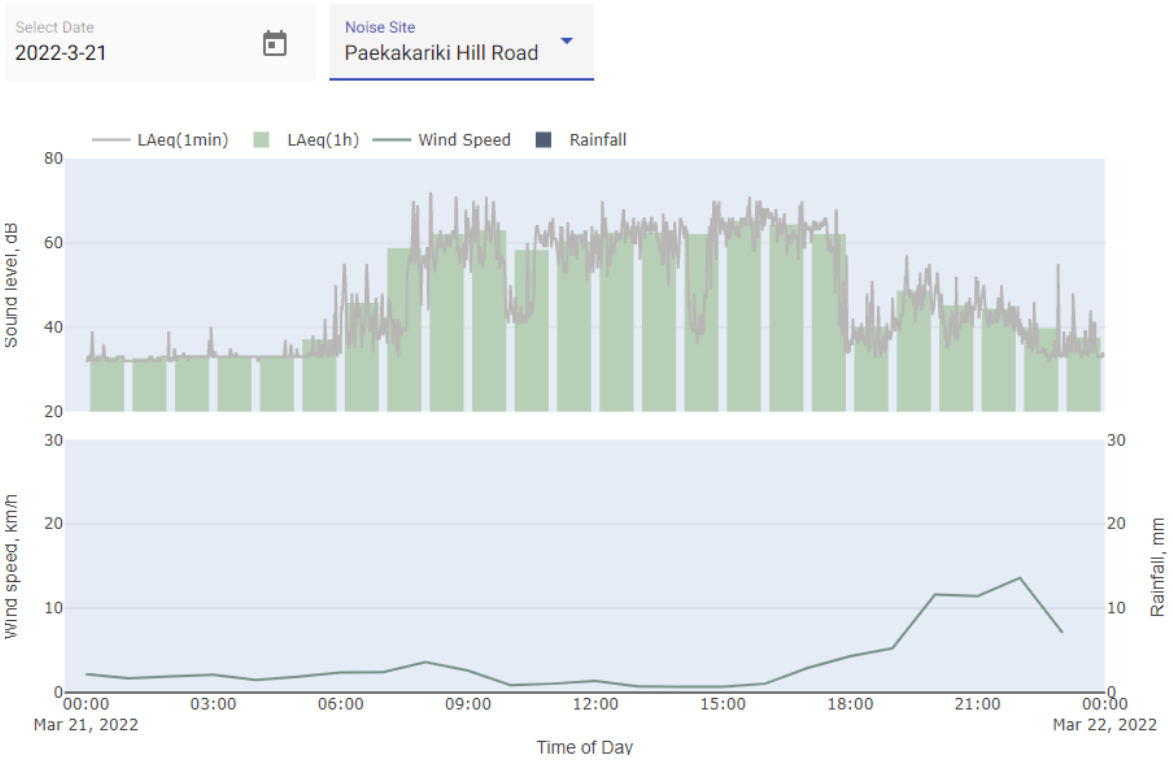
Noise Site
Bradey Road



Select Date
2022-3-21

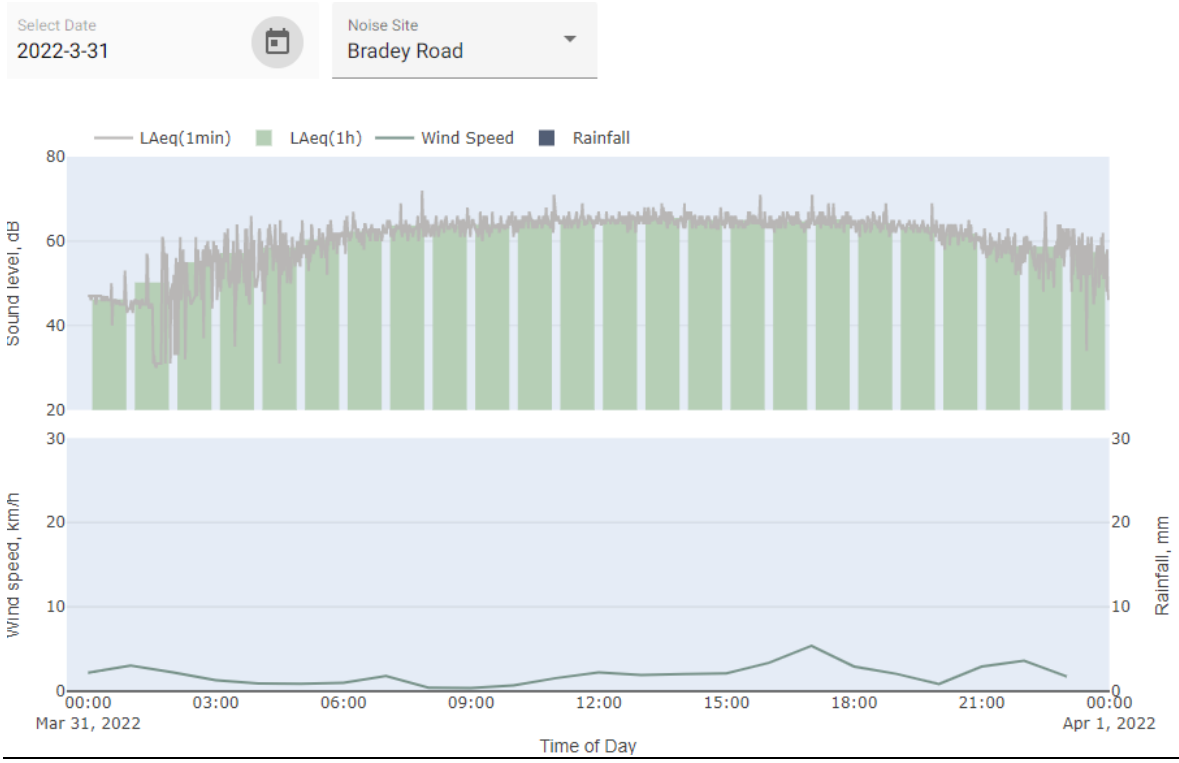
Noise Site
Flightys Road

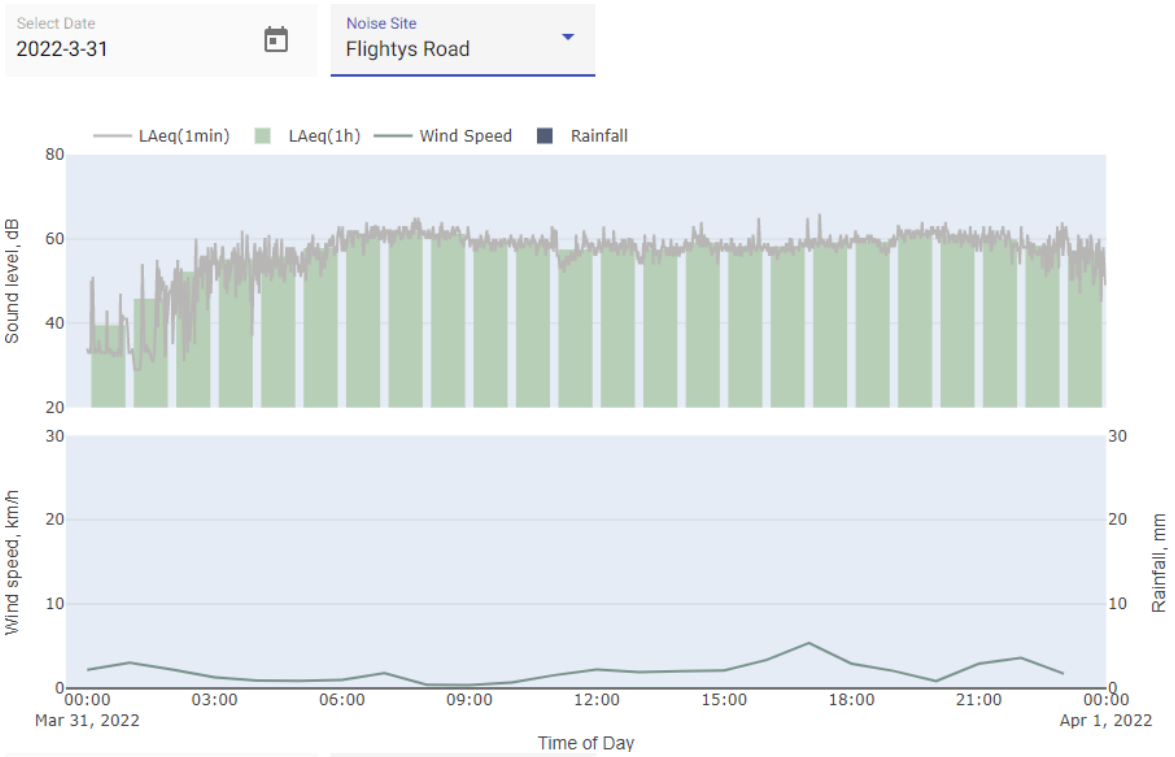


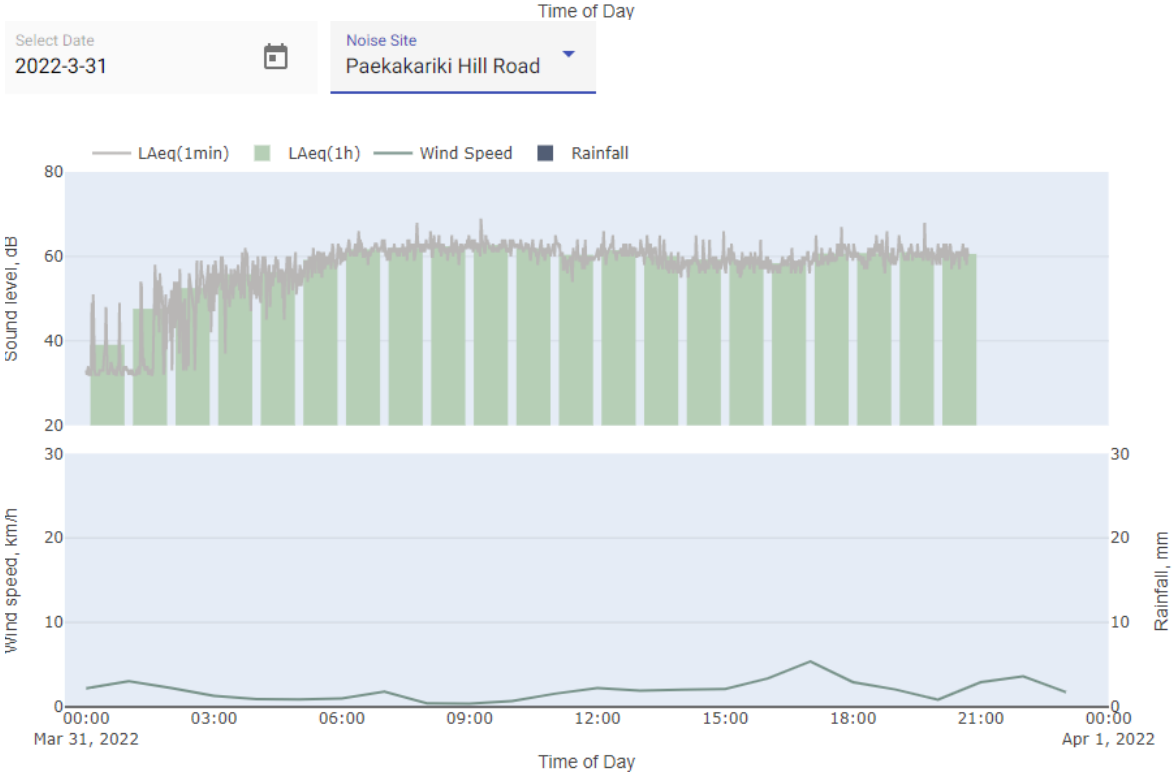


Immediately after road opening

The motorway was opened progressively using a rolling block from the early hours of the morning on 31 March 2022 and the impact of this traffic is instantly recognisable on the data loggers with early morning noise hitting 60 dB $L_{Aeq(1h)}$. The noise levels were also consistent through the day and into the evening. Generally, the noise levels sat at about 60 – 65 dB $L_{Aeq(1h)}$ during the daytime and evening at these three monitoring locations close to the road.

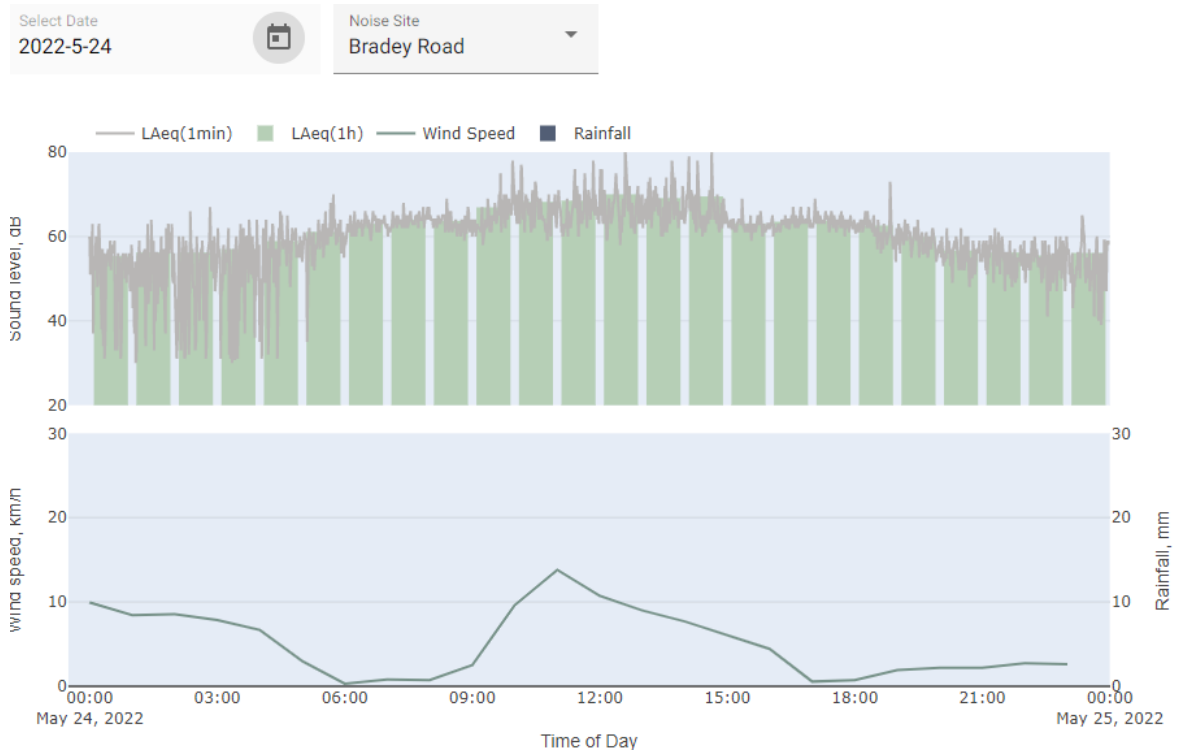


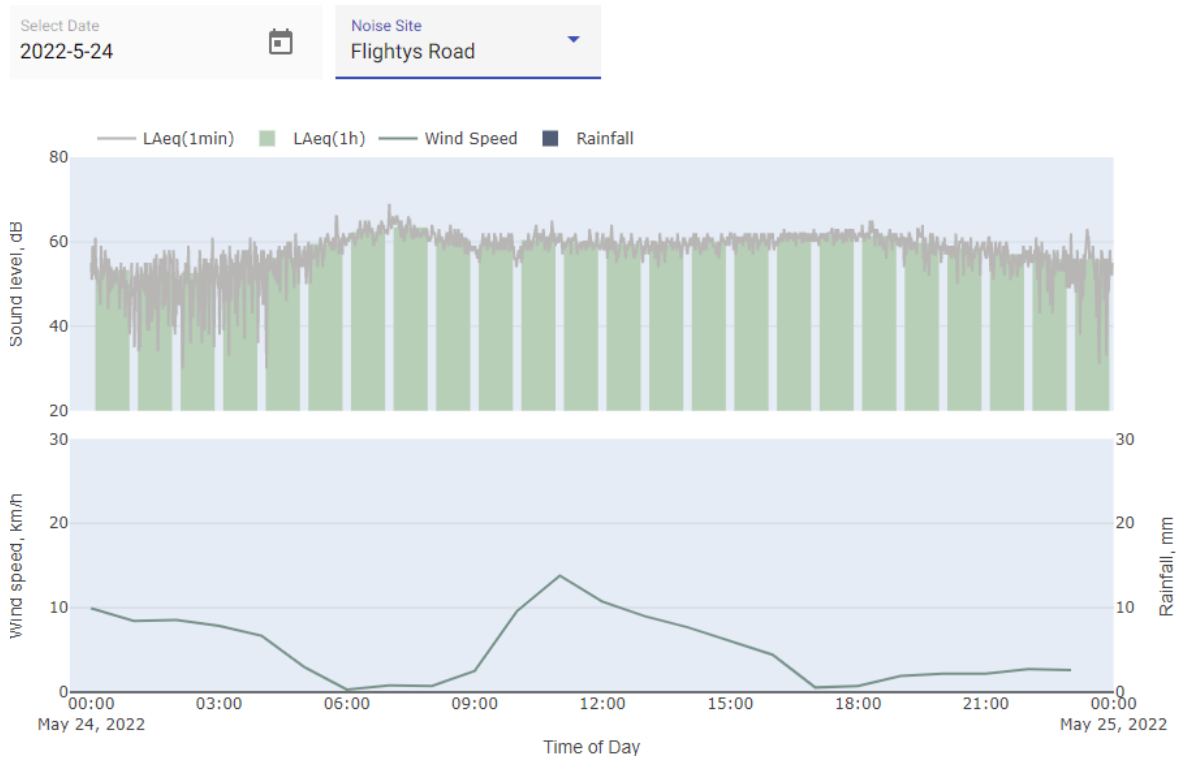


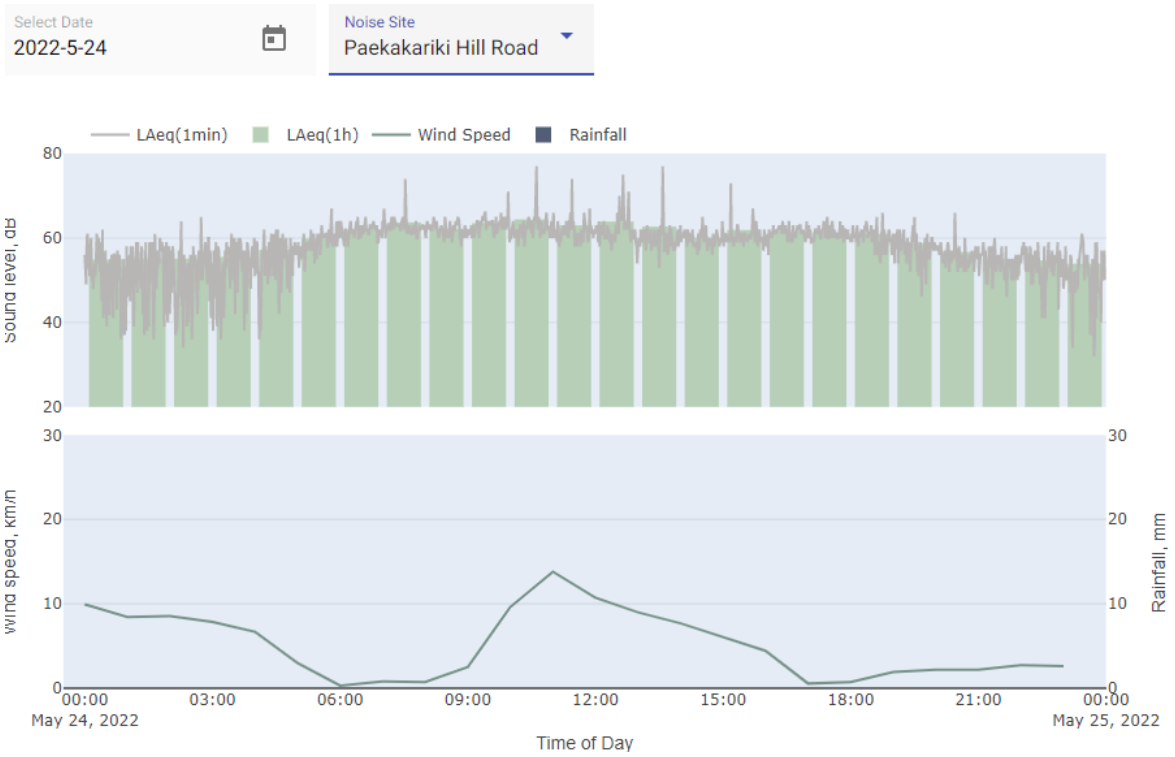


End of May

By the end of May, traffic volumes had settled down following the initial peak. This settling of traffic patterns has resulted in what appears to be consistent noise levels over the course of the day. Night-time noise levels at the monitoring stations reduced to around 52-55 dB $L_{Aeq(1h)}$ with daytime noise levels between 60 and 70 dB $L_{Aeq(1h)}$ depending on the location.


Select Date
2022-5-24
Noise Site
Bradey Road
LAeq(1min)
LAeq(1h)
Wind Speed
Rainfall
Sound level, dB
Wind speed, km/h
Rainfall, mm
00:00
May 24, 2022
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
May 25, 2022
Time of Day


Select Date
2022-5-24
Noise Site
Flightys Road
LAeq(1min)
LAeq(1h)
Wind Speed
Rainfall
Sound level, dB
Wind speed, km/h
Rainfall, mm
00:00
May 24, 2022
03:00
06:00
09:00
12:00
15:00
18:00
21:00
00:00
May 25, 2022
Time of Day



Where to from here?

The CPBHEB Joint Venture are required to undertake a post-construction verification of the noise assessment undertaken at the time of the Board of Inquiry (2014) as part of the designation conditions for the project. The post-construction verification follows a defined process that includes remodelling Transmission Gully 'as-built' and making additional noise measurements using calibrated sound level meters (different to the data loggers that have provided the results shown here). Based on the reporting of this noise verification assessment, the Regulatory Authorities will make a decision as to whether the conditions of the designation have been achieved. This reporting is expected to be issued to the Regulatory Authorities in October 2022 for their consideration.

The informal noise readings from our data loggers suggests that the noise being experienced by residents in close proximity to the motorway alignment is within what was anticipated when the Board of Inquiry released its decision. However, as can be seen from the data, there has been a significant change in noise before, versus after Transmission Gully opened to traffic, as had been highlighted by Waka Kotahi to the Board of Inquiry.

Waka Kotahi is also undertaking additional analysis of the peak noise events which can be seen in the grey spikes which show the noise levels averaged over 1 minute. These can often be the result of individual noisy vehicles passing by. This information will be available shortly and we'll be seeing if we can identify specific vehicles that may be causing excessive noise and seeing what can be done to minimise these interruptions. We will provide an update once we have this information.