

**To:**  
Mr Nick Mace  
Cuadrilla Resources Ltd  
Cuadrilla House  
6 Sceptre Court, Bamber Bridge,  
Lancs, PR5 6AW  
UK

# Memo

**Subject:** Noise Management Plan Addendum

## Background & Concerns

Continuous sound levels have been measured by AECOM for Cuadrilla at the Preston New Road site since January 2017 in order to demonstrate compliance with planning conditions relating to noise limits. These limits are applied at Staining Wood Cottage and comprise a 55 dB  $L_{Aeq,1hr}$  limit during the daytime (defined as 08:00-21:00), and 39 dB  $L_{Aeq,1hr}$  and 57 dB  $L_{Amax}$  at night (21:00-08:00). It has been observed by AECOM staff attending site that road traffic noise is currently the dominant sound source at the receptor, and that direct measurement of levels at Staining Wood Cottage (or a location representative of this receptor) would be influenced significantly by road traffic noise. Demonstrating that sound levels from the Cuadrilla site are compliant with conditions at this location is therefore not straight forward.

To resolve this, two sound monitoring locations have been set up; one to measure directly at a location representative of Staining Wood Cottage (L1) and the other at a proxy location away from the main road and nearer to the Cuadrilla site (L2). This reduces the influence of road traffic noise affecting the measurement and provides a more realistic measure of the noise emissions from the site. A scaling factor (currently determined as 5 dB) is applied to the noise levels at L2 to determine the level of noise at L1 (and therefore at the receptor) as a result of the activity at the Cuadrilla site.

During the works to date, it is understood that no noise generating night time activity has taken place at the site and as such the primary focus of measured sound levels has been the daytime limits. However, it has been observed that at the current proxy location, the night time limits are frequently exceeded without any contribution from the site. This is typically due to the noise from road traffic on nearby roads.

Drilling activities are programmed to commence at the beginning of June, which would generate noise continuously throughout the day and night. It is required for Cuadrilla to demonstrate that these noise emissions do not exceed the limit(s) at the receptor for both the daytime and night time. Existing ambient noise levels already often exceed the limit at night, even when road traffic noise levels are at a minimum; therefore it is likely to be challenging to demonstrate compliance with the night time noise limits once night drilling starts.

Additionally, the drill rig location has now been specified to be situated towards the east side of the site compound. This is the furthest location on the site from both monitoring locations and is expected to result in lower noise levels at the receptor, but may exacerbate the challenge of demonstrating compliance as levels at L2 could also be affected by sound from sources other than site activities.

## Recommended Actions

Moving the L2 location closer to the site compound (new L2 location herein denoted L2B) as shown (approximately) in Figure 1 will allow the sound from drilling and any other site activities to have the greatest contribution to the levels measured at this position and will minimise the contribution of road traffic noise affecting the measurements and thus

allow the best chance to demonstrate compliance. Note a new correction factor is required to account for the greater distance between L2B and L1.



Figure 1: Approximate Locations of Cuadrilla Site Compound, Drill Rig, and Monitoring Positions

The revised L2B location is situated adjacent to the north-west site boundary 163m from the location of the drilling rig, which is 341m from the L1 monitoring location, 182m further. The previous L2 location was situated approximately 225m from the drill rig location. A new scaling factor of 8 dB is recommended (see below).

### Scaling Factor and New Proxy Limits

There is currently a 5 dB scaling factor applied between the L1 location and previous L2 location. This has been validated by measurements on site and shows generally good agreement in the variation between levels at these locations. The drill rig is assumed to be the dominant noise source at the L2 location at all times but particularly at night. A propagation loss (decay with distance) calculation between the drill rig and each monitoring location can be applied, assuming a point source with hemispherical spreading of  $20\log(r_2/r_1)$  to give a reduction of at least 6-7 dB between the L1 and L2B locations.

A number of uncertainty factors are also considered. Further reductions in sound level are likely to occur over this magnitude of distance due to ground (and to a lesser extent air) absorption. Other variations in sound level may occur as a result of different shielding by site compound structures, different topography, and any other objects in the propagation path. Ancillary equipment will also generate sound, and may be slightly closer or further from the monitoring location than the drill rig, but these sources are expected to be distributed fairly evenly around the drill rig and as such, should not significantly alter the scaling factor estimate. Some weather conditions, such as specific wind directions and temperature inversions, may allow for increased propagation of sound but this is not easily quantified and is likely to occur infrequently. Note that the prevailing wind direction for this region (south-westerly<sup>1</sup>) lends to poor propagation of sound from the Cuadrilla site to the receptor.

<sup>1</sup> <http://www.metoffice.gov.uk/climate/uk/regional-climates/nw> (accessed 04/05/17)

A further similar calculation of sound propagation from the drill rig between the L2B and L2 monitoring locations can be applied. This calculation suggests that noise levels from the drill rig would be approximately 3 dB higher at L2B than at L2, where a 5 dB scaling factor has been applied.

Overall, with regards to the above considerations, a scaling factor of 8 dB is considered by AECOM to be a suitable estimate.

The application of an 8 dB scaling factor would result in effective proxy noise limits at the L2B monitoring location of 47 dB  $L_{Aeq,1hr}$  and 65 dB  $L_{AFmax}$  at night, and 63 dB  $L_{Aeq,1hr}$  during the day.

## **Residual and Introduced Uncertainty**

As discussed above, there are several unquantified sources of uncertainty in the determination of sound levels by a proxy location. Additionally, while the potential for road traffic noise to influence measurements will be minimised, this source remains a notable residual risk, particularly during shoulder periods at the beginning and end of the night time period when traffic flows will be higher.

As well as the uncertainty in determining the scaling factor, which has not been validated by measurement or modelling, and may also fluctuate day-to-day, there is the possibility for some site activities close to the north-west boundary to affect measurements. This is more likely to occur with the new location than previously but is expected to be an infrequent occurrence and the effect usually relatively small due to the anticipated dominance of the drill rig on noise levels at this location.

Adverse weather, including high wind speeds and/or rain, has occurred frequently over the monitoring at this site and is expected to continue to disrupt the reliability of measured data. Such data are currently excluded or treated with caution where adverse weather has been measured by the weather station situated at the L2 (and now at the L2B) location. The movement of the monitoring location is not expected to affect the uncertainty introduced by adverse weather conditions.

## Quality information

**Prepared by**

---

Conor Tickner  
Graduate Acoustic Consultant

**Checked by**

---

James Block  
Associate – Acoustics

**Approved by**

---

Paul Shields  
Head of Acoustics

© 2016 AECOM Infrastructure & Environment UK Limited. All Rights Reserved.

This document has been prepared by AECOM Infrastructure & Environment UK Limited (“AECOM”) for sole use of our client (the “Client”) in accordance with generally accepted consultancy principles, the budget for fees and the terms of reference agreed between AECOM and the Client. Any information provided by third parties and referred to herein has not been checked or verified by AECOM, unless otherwise expressly stated in the document. No third party may rely upon this document without the prior and express written agreement of AECOM.