

Ballyfeeny Green Energy Project



Environmental Impact Assessment Report Volume III

Appendix 10.8 - Blasting Technical Note September 2025

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Client:
Rowan Engineering

Subject:
Ballyfeeny Wind Farm – Quarry Blasting
Investigation

Project No.:
4114

Prepared by:
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Date:
10/03/2025

1.0 Introduction

Enfonic were instructed by Rowan Engineering to investigate the potential impact of blast-induced vibrations originating from a nearby active quarry on the Wind Energy Converters ('Wind Turbines') to the proposed Ballyfeeny Wind Farm.

2.0 Background

Blasting i.e. the use of explosives, is used in this quarry to facilitate material extraction and results in vibration energy transmitted through the ground substrate. The foundations of the Wind Turbines are exposed to this vibration energy and excessive levels have the potential to cause damage to the Wind Turbine tower.

The closest Wind Turbine (T04) is approximately 150m from the quarry boundary

3.0 Investigation

3.1 Enercon documentation

The wind turbine manufacturer supplied *Specification Foundation soil tremor Status: 2017-09-028* (the "document") from the wind turbine manufacturer, makes reference to two types of vibration tremor – Non-stationary and Stationary, described as follows:

"Non-stationary tremors have a pulse-type[sic] tremor stimulation. This causes mainly horizontal substitute forces on the WEC tower. Tremors caused by individual events do not usually cause extensive resonances on building structures. Typical tremor sources include:

- Detonations
- Falling masses
- Impact hammers

Stationary tremors have a stationary tremor stimulation, meaning that there is a risk of the stimulation causing resonance tremors. To prevent the tower from "rocking" due to the resonance effect, it must be verified that the stimulation frequency is sufficiently different from the resonance frequency. Typical tremor sources include:

- Vibration rams (for pillars or sheet pile retaining walls for neighbouring plants or other structures like bridges etc.)
- Compactors such as vibrating rollers and plates and deep vibrators"

It is thus the limit of non-stationary tremor (from blasting detonations) which is pertinent to this assessment.

The document goes on to state:

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“The determined value for the vibration velocity on the WEC foundation as the result of a non-stationary tremor should not exceed a defined reference value.”

The “defined reference value” for non-stationary tremors is provided as a vibration velocity of 10mm.s^{-1} . This is therefore the appropriate criteria for this assessment.

For non-stationary tremors, the requirement to avoid a resonance (‘eigen’) frequency is not given, although for thoroughness this has been considered herein

3.2 On-site measurements

On January 9, 2025, Enfonic installed 2no. vibration monitoring systems on the site, as per Figure 1.

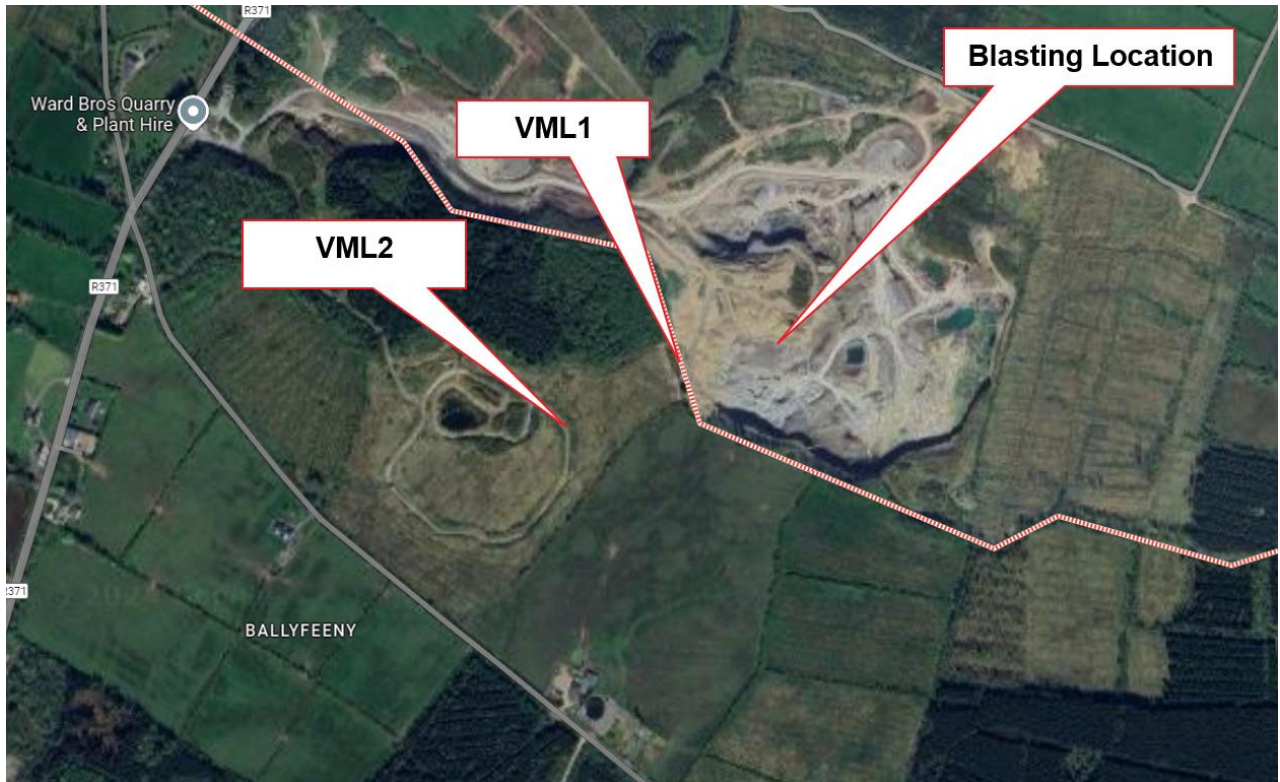


Figure 1. Blasting and Vibration Measurement Locations.

The approximate distances from the Blasting Location were:

- VML1: 155m
- VML2: 300m

The locations and distances coincided with the location of turbine T04 in the proposed Project. The systems comprised of a data logger, three-axis geophone (vibration sensor), and associated power-supply equipment as shown in Figure 2.

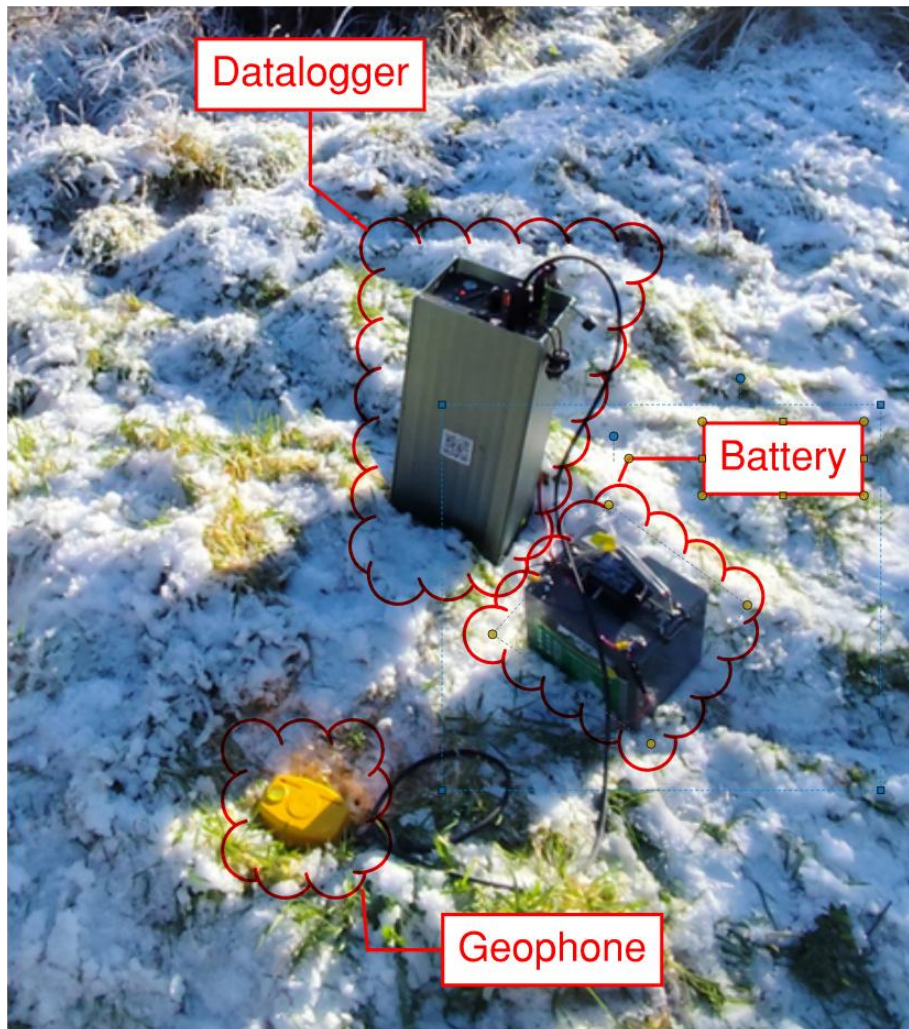


Figure 2 - Measurement Equipment

Blasts were then set off, and the ensuing vibrations measured. The quarry operator advised that the blast charges and sequences were at the likely maximum criteria and blasting events were conducted on only a few occasions annually.

3.3 Results

The maximum triaxial particle velocity (Peak Vector Sum) were as follows:

- VML1: 29.5mm.s⁻¹ between frequencies of 24.4Hz and 27Hz
- VML2: 10.8mm.s⁻¹ between frequencies of 33.3Hz and 43.5Hz

These results were brought to the attention of the wind turbine manufacturer, who confirmed the following:

1. The measured frequencies are significantly higher than the tower resonant (eigen) frequency and;
2. The duration of excitation of the WEC tower from blasting is too short for damage to occur.

3.4 Conclusion

The investigation has demonstrated that vibration tremor levels at the Wind Turbine locations were detected, however, the wind turbine manufacturer confirmed



that the energy is of such duration and frequency as not to pose any risk to the structural integrity of the wind turbine tower.

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