

Report Title: Vibro-Impact Risk Assessment & Method Statement

Applicant: GR Renewables 3 UK Limited

Revision: A

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Project Address: Buxton Road, Derbyshire, SK17 7HR

1. Purpose of Document

- 1.1. This Risk Assessment and Method Statement (RAMS) has been prepared to discharge the planning condition requiring submission of a vibro-impact assessment prior to commencement of such works. The condition wording is as follows:
- 1.2. *"In the event that vibro-impact works are necessary during construction then, prior to the commencement of such activities, a risk assessment and method statement shall first be submitted to, and approved in writing by the Local Planning Authority (in consultation with Network Rail). The development shall only be carried out in accordance with the details approved."*
- 1.3. The approved planning application is on the site known as 'Buxton Road, Derbyshire, SK17 8DL'. These works are necessary to facilitate the safe management of construction works associated with the proposed development of a 20MW battery energy storage system and associated infrastructure (High Peak Borough Council Planning reference HPK/2024/0467) – hereby referred to throughout the document as the Buxton Road BESS.
- 1.4. The document addresses vibro-impact activities associated with:
 - Internal access road construction and compounds (Type 1 MOT)
 - Ground preparation and compaction prior to foundations
 - Working platforms for 20 ft BESS containers and 33 kV substation.

2. Site Overview and Sensitive Receptors

- 2.1. The Buxton Road project comprises the development of a Battery Energy Storage System (BESS) and associated infrastructure on land accessed from Buxton Road. The proposed development includes the installation of containerised battery units, power conversion systems (PCS), transformers, switchgear, control buildings, internal access tracks, and associated cabling and drainage infrastructure.

The site is located in proximity to Network Rail infrastructure, with minimum distances approximately:

- BESS units: ~126 m
 - Power station: ~133 m
 - Closest boundary: ~84 m (as per latest layout, Appendix 1)
- 2.2. Sensitive receptors include:
 - Network Rail infrastructure

3. Foundation Conditions

3.1. Ground Conditions

3.2. The site comprises three primary geotechnical units:

- Topsoil (TS): 0.30–0.50 m, soft organic clay (unsuitable for founding)
- Quaternary Clay (Qc): Firm, high plasticity clay (primary founding layer)
- Bowland Shale Clay (BSc): Stiff cohesive clay at depth

Groundwater was not encountered during investigation to 3.0 m depth.

5.3 Foundation Design

- All permanent structures will be supported on shallow concrete slab foundations
- Foundations will be:
 - Founded at approximately 0.40 m depth
 - Bearing on the Quaternary Clay (Qc)
 - Constructed after removal of topsoil
- Sulphate-resistant concrete will be used due to moderate soil aggressiveness.

4. Relevance to Vibro-Impact Works

- Compaction is required only for:
 - Sub-base layers
 - Working platforms
 - Access roads
- No piling or high-energy ground improvement is included in this scope
- Vibration transmission risk is inherently reduced due to:
 - Cohesive soils
 - Distance from railway
 - Shallow foundation approach

5. Works Description

Internal Roads (Type 1 MOT)

- Formation prepared and levelled
- Type 1 MOT placed in controlled layers (150–300 mm)
- Compaction carried out using vibratory rollers

Working Platforms

- Vegetation and topsoil removed
- Gravel layer placed in lifts
- Compaction carried out progressively

Moisture Control

- Compaction only undertaken at optimal moisture content
- Material allowed to dry or wetted as required

Verification Testing

- Moisture content testing
- Density testing
- Level verification

6. Site Risk summary

- **Primary vibration sources:** Vibratory rollers used to compact Type 1 MOT and gravel working platforms; plate compactors for local areas; proof-rolling; vehicle movements.
- **Primary receptors:** Network Rail assets (track/ballast/formation).
- **Risk drivers:** proximity to railway (>~125 m nearest), plant selection / vibration mode, ground conditions, and number of repeated passes.

7. Vibro-Impact Risk Table

Activity	Hazard	Receptor	Initial Risk	Control Measures	Residual Risk
Road compaction	Ground vibration	Railway	Low	Static rolling near boundary; monitoring	Low
Platform compaction	Vibration transmission	Substation	Low	Reduced amplitude; buffer zones	Low
Repeated passes	Accumulated vibration	Railway	Low	Limit passes; trial compaction	Low
Wet soil compaction	Rework and excess vibration	All	Low	Moisture control	Low
Vibratory rollers	Excess PPV	Railway	Low	Trigger levels; stop-work procedure	Low

Overall initial risk (without controls): **Low** given the >~125 m separation to the sensitive receptor, Network Rail infrastructure. There will not be direct work on or adjacent to railway land.

8. Ground Risk Table

Hazard	Source	Impact	Initial Risk	Control	Residual Risk
Cohesive soils	Clay layers	Vibration propagation	Low	Controlled compaction	Low
Swelling clay	High plasticity	Ground movement	Low	Moisture control	Low
Perched water	Rainfall	Poor compaction	Low	Delay works	Low
Soft topsoil	Organic layer	Settlement	Low	Remove topsoil	Low

9. Control Measures

General Principles

- No construction vibratory machinery outside of the site boundary, located c. 85 m from the railway infrastructure
- On-site vibratory works on site will be undertaken in compliance with Network Rail Developers Handbook
- Compaction in controlled lifts
- Moisture content controlled prior to compaction
- Avoid excessive passes
- Maintain full records

Plant Controls

- Prioritise static compaction as much as possible. Within 30 m of sensitive receptors, if required, only static compaction is allowed
- Reduced amplitude vibratory mode elsewhere
- Plate compactors for localised areas

10. Monitoring & trigger levels

10.1. Proposed Trigger Levels on sensitive receptors (Subject to Network Rail Agreement)

Level	PPV (mm/s)	Action
Green	< 3.0	Continue works
Amber	3.0 – 5.0	Reduce vibration settings, review method, increase monitoring
Red	> 5.0	Immediate stop, notify Network Rail and investigate

These threshold values are related to measurement at the location of the sensitive receptor and as set in the Clause 11, Monitoring Plan, during vibration-impact on-site activities.

11. Monitoring plan

- **Baseline monitoring:** install monitors for at least 48-72 hours before any high-energy compaction near the 125 m zone to measure ambient vibration/noise (establish pre-works baseline). Include at least one sensor at:
 - The site boundary nearest the railway;
- **Trial compaction (HP-2):** perform a controlled trial at the closest point to the railway. Record PPV, frequency content, plant type and settings, distances. If trial is acceptable, use the same plant/settings for production.
- **Production monitoring:** real-time vibration monitors with alarm outputs to site manager. Instruments must be tri-axial geophones / seismographs, logging PPV and dominant frequency or similar equipment. Data must be archived and available for Network Rail and LPA review.

- **Monitoring locations:** at minimum: (1) nearest railway boundary.
- **Monitoring instrumentation and sampling:** Use calibrated seismic monitors capable of recording PPV at required sample rates (e.g., >200 Hz). Real-time display with alert thresholds. Monitoring engineer to provide daily summaries and immediate notification on amber/red triggers.

12. Hold points & sequence

12.1. **HP-1 (Pre-start):** Submit the final site RAMS with measured distances (125 m shown), final plant register (models/modes), monitoring plan and contact list.

12.2. **HP-2 (Trial compaction):** Complete trial at the closest zone (84 m). Monitoring must confirm green/acceptable results. Production settings confirmed in writing.

12.3. **HP-3 (Formation sign-off):** After compaction of working platform and verification tests (moisture, density, levels) and monitoring report sign-off – then proceed to foundations/container placement.

13. Stop Work Criteria

13.1. Immediate cessation of vibro-impact works if:

- Red trigger level exceeded.
- Monitoring equipment fails within sensitive zone.
- Unexpected ground movement observed.
- Network Rail requests suspension.

Works will only resume following agreement of revised controls.

14. Verification testing – how to record

14.1. For each lift and area, record:

- Layer thickness (mm)
- Date/time, plant used (make/model), vibration mode & settings (static/vibratory and amplitude)
- Number of passes
- Moisture content (%), density test result (% of spec)
- Level verification (mm tolerance)
- Vibration monitor reading (PPV mm/s and dominant frequency) with timestamp
(Use the Daily Vibro-Impact Log template below)

15. Daily Vibro-Impact Log

15.1. Trial Compaction Record (example fields)

- Trial location (grid/ref):
- Distance to railway (m):
- Plant:
- Settings used:
- Lift thickness:

- Passes to achieve density:
- PPV recorded (tri-axial): X mm/s (peak) at location A; Y mm/s at substation monitor; ambient baseline Z mm/s.
- Conclusion: Proceed / Adjust / Stop.

16. Conclusion

16.1. Given the minimum 125 m separation from railway infrastructure, controlled compaction methodology, conservative monitoring trigger levels and defined hold points and stop criteria, the proposed vibro-impact works are considered to present a **low residual risk** to Network Rail assets and on-site electrical infrastructure, provided works are undertaken strictly in accordance with this approved RAMS.

Appendix 1: Railway Proximity Plan

