Appendix 6.4

Title	Construction Noise and Vibration		
Project	Southleigh, Havant		
Reference	2856.AP.04.01	**Author(s)**	RM
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Overview

1. This appendix sets out a strategy to control noise and vibration relating to construction and demolition activities, as far as is reasonably practicable. The size and location of the proposed development site means that receptors would only rarely be affected by construction activity in closer proximity and any local noise/vibration related effects would be limited to relatively short durations and be temporary.

2. By following the methods set out within this appendix, it is expected that construction noise and vibration can be controlled such that significant adverse noise effects can be avoided, with any residual adverse effects reduced to a minimum.

Construction Noise and Vibration Management

Site Operational Hours

3. The hours of construction detailed in **Table 1** should be adhered to at all times unless otherwise directed by the local planning authority, subject to the commentary later in this section.

Table 1 Site operation hours

Period	Hours
Monday to Friday	08:00-18:00
Saturdays	08:00-13:00
Sundays	No works permitted
Public Holidays	No works permitted

4. Exceptionally, consent for work outside these hours may be given after any necessary consultation, particularly with the Environmental Health Officer (EHO). Appropriate noise control methods and assessment criteria would be discussed on a case by case basis with the local authority, should such working be sought.

Best Practical Means

5. Best Practical Means (BPM) as defined by the Control of Pollution Act 1974, would be implemented as part of the working methodology[1]. This would serve to minimise the noise and

[1] While the commentary in this section is provided within the noise section of this report, measures set out herein will also help to control construction related vibration as far as is practicable.

vibration effects at receptors in the vicinity of the construction works. The reduction in noise levels provided through the implementation of BPM would vary depending on the nature of the works. It is however not possible to quantify the exact reduction that would be achieved due to the high number of variables that are present when considering BPM and the wide range of activities that would occur on the site.

6. The contractor shall employ the best practical means to minimise the noise and vibration produced by their operations and shall have regard to the recommendations in BS 5228:2009 "*Code of practice for noise and vibration control on construction and open sites*" (parts 1 and 2 for noise and vibration respectively).

7. Without prejudice to the contractor's obligations set out above, the contractor shall comply in particular with the following requirements:

- As a general principle, lower noise and vibration generating demolition and construction practices must be adopted where practicable to do so.
- All vehicles and mechanical plant used for the purpose of carrying out the works shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order so that extraneous noises shall be reduced to a minimum.
- All compressors and generators shall be "*sound reduced*" models fitted with properly lined and sealed acoustic covers which shall be kept closed whenever the machines are in use.
- All ancillary pneumatic percussion tools shall be fitted with mufflers or silencers of the type recommended by the manufacturers.
- Generators shall be positioned and enclosed (if necessary) so as to minimise noise transmission to noise sensitive receptors.
- All pumps shall be positioned and enclosed so as to minimise noise transmission to nearby receptors.
- All machines in intermittent use shall be shut down in the intervening periods between work or, where this is impracticable, throttled down to a minimum.
- No machine shall be permitted which uses a system of dropping a heavy weight, power assisted or by gravity, for the purpose of breaking up paving or foundations.
- Where earth bunding, solid site hoardings and the like are to be built and may act as a noise barrier, they should be constructed as early as possible in the construction programme.
- Access to the site shall be such as to ensure a minimum of disturbance to persons in adjacent buildings by vehicles or plant entering or leaving the site. No deliveries to site shall take place outside the agreed working hours.
- Any fixed or static plant operating outside normally permitted working hours shall not give rise to a 'rating level', as defined in BS4142[2], in excess of the existing free-field background L_{A90} noise levels at noise control stations. Such scenarios should be

[2] British Standard BS 4142:2014+A1:2019 - Methods for rating and assessing industrial and commercial sound

considered on a case by case basis and guidance should be sought from a suitably qualified acoustic consultant as necessary to ensure noise is suitably controlled.

8. Without prejudice to the foregoing, the contractor shall **not** be permitted to carry out works as stated below, except where such work is absolutely necessary for the saving of life or property and the safety of the works or as is required under the terms of the contract.

- Piling, including sheet piling, by percussive methods outside the hours of 08:00 to 18:00 Mondays to Fridays.

- The maintenance of mechanical or other constructional plant in the proximity of noise sensitive buildings outside the hours of 08:00 to 18:00 on Mondays to Saturdays or at any time on Sundays and public holidays.

9. BS 5228 provides general principles of how noise levels from construction and demolition activities can be reduced at source, these principles are repeated below and should be followed as far as is reasonably practicable:

"There are many general measures that can reduce noise levels at source such as:

a) avoid unnecessary revving of engines and switch off equipment when not required;
b) keep internal haul routes well maintained and avoid steep gradients;
c) use rubber linings in, for example, chutes and dumpers to reduce impact noise;
d) minimize drop height of materials;
e) start up plant and vehicles sequentially rather than all together.

The movement of plant onto and around the site should have regard to the normal operating hours of the site and the location of any NSPs as far as is reasonably practicable."

10. Some general principles of how vibration levels from construction and demolition activities can be reduced at source are provided within section 7.3 of BS 5228-2 and are summarised below:

- Determine appropriate hours of working to account for the effects of vibration on persons in the area.

- Where reasonably practicable, low vibration working methods should be employed.

- Vibration should be controlled at source and the spread of vibration limited.

- Where processes could potentially give rise to significant level of vibration, monitoring should be undertaken.

- If levels of vibration are likely to be a hazard to those working on a site, prominent warning notices should be displayed.

Community Engagement

11. Community liaison and communication regarding construction works shall be undertaken throughout the demolition and construction stage, as appropriate. This is to provide information to people residing in properties located in the vicinity of the construction works and reduce the likelihood of adverse effects on the local community which could result in potential noise complaints. The level of engagement required would vary during the construction period, depending upon the expected effects experienced by individual receptors due to the construction works.

12. Details relating to liaison with the local community would be managed by the principal contractor. It is envisaged that community liaison would provide local residents with the information such as the following, in relation to the construction works:

- The nature of the works being undertaken;
- The expected duration of the works;
- The contractors working hours;
- Mitigation measures that have been adopted to minimise noise and vibration, as detailed in this document; and
- Contact details in the event of a disturbance.

Construction Noise Criteria

13. During the period of construction and demolition it is expected that there is unlikely to be issues with regards to noise, particularly when following the guidance outlined within this document. However, should a noise related issue arise, this section sets out noise criteria which can be adopted to allow for the significance of any impact to be quantified.

14. Guidance provided in Annex E of BS 5228-1:2009 provides proposed construction noise criteria, which are repeated in the table below. The construction noise criteria refer to the total ambient noise level including existing sources and construction noise. The following criteria (and subsequent explanatory notes) shall therefore apply, should it be deemed necessary to determine the significance of construction noise effects.

15. It may be possible to revise the thresholds below, subject to the results of representative ambient noise levels surveys, if required.

Table 2 Construction Noise Limits

Period	Hours	Total Noise Levels at Designated Noise Sensitive Locations	
		Ambient Construction Noise Level $L_{Aeq,T}$, dB	**Period T over which Ambient $L_{Aeq,T}$ is Applicable, hours**
Mondays to Fridays	08:00-18:00	65	Any 4 hours
Mondays to Fridays (if permitted)	18:00-22:00	55	Any 1 hour
Saturdays (if permitted)	08:00-13:00	65	Any 4 hours
	13:00-18:00	55	Any 1 hour
	18:00-22:00	55	
Sundays (if permitted)	08:00-09:00	55	Any 1 hour
	09:00-17:00	55	
	17:00-22:00	55	
Any day	22:00-08:00	Construction Noise Levels subject to negotiation with EHO	

- Construction noise levels in the schedule relate to free-field conditions, where designated noise sensitive locations are located more than 3.5 m from building façades or other reflective surfaces other than the ground. Where noise designated noise

sensitive locations are located within 1.0 m from building façades, the permitted noise levels can be increased by 3 dB(A).

- The ambient noise level, $L_{Aeq,T}$, at a designated noise sensitive location is the total L_{Aeq} from all the noise sources in the vicinity over the specified period.

- The existing ambient noise level, $L_{Aeq,T}$, at a designated noise sensitive location is the total L_{Aeq} from all the noise sources in the vicinity over the specified period prior to the commencement of the construction works.

16. If an investigation indicates that the thresholds have been or are likely to be exceeded, alternative construction methods would need to be considered, or specific means of mitigation adopted.

17. As previously noted, the above noise limits may be adopted in the unlikely occurrence of a noise issue arising. It would however not be considered necessary to undertake long term monitoring in such instances, rather that these limits be used as a reference if an issue arises on site. Construction noise measurement is discussed in the following section

Measurement of Construction Noise

18. In the unlikely event that employing best practicable means to mitigate construction activity as far as is reasonably practicable, and seeking engagement with local community notes still leads to adverse noise effects being reported, measurements of construction noise can be undertaken to determine the significance of any reported effect. The following steps should be followed.

- At time of a report of an adverse effect, seek to gain information about likely cause and cease related activity in the first instance to alleviate the impact on the receptor.

- Arrange for noise measurements to be undertaken as soon as possible, and recommence all previous activities at the time of the survey to allow for noise emissions to be quantified. Assistance should be sought from a suitability qualified acoustic consultant/engineer or similar. The reporting person should be made aware of the intentions above and ideally permission should be sought to measure at the location of the receptor. If measurements are not possible at the receptor, measurements should be undertaken at the nearest point on the site boundary to the receptor and allowances made to account for distance as appropriate.

- An appropriate sampling period, taken from those set out within Table G.1 within Annex G of BS 5228 should be selected to reflect the activities being undertaken (although the "*single 20 minute sample*" period should be avoided unless it is not practicable to carry out longer periods of monitoring). Monitoring should be undertaken using equipment meeting the requirements of Annex G of BS 5228.

- A report should be produced setting out the findings of the measurements, again in general accordance section G.4 within Annex G of BS 5228. If the previous defined noise criteria were found to have been breached, the triggering activity should be identified and mitigation measures proposed accordingly. Good communication with the affected receptor should be upkept through the process.

- Once mitigation measures have been implemented, recommence activity, repeating the measurement procedure above only if adverse effects are reported again (and were identified as such by the initial measurements).

19. A key principle that must be borne in mind is that many construction activities are inherently noisy. Using substantial limitations of permitted construction periods in which higher levels of noise

may be generated may protract the construction process, leading to noise impacts lasting for longer durations. Instead, it may be prudent to consider permitted noise levels exceeding the thresholds to allow construction activities to be concluded sooner; a balance must be struck. Such measures should be carefully considered and discussed with the local planning authority should any adverse effects arise.

20. The same principles described above can also be applied to the measurement of vibration, if deemed to be required, using the criteria set out in the following section and adjusting the survey methodology accordingly.

Construction Related Vibration

21. Criteria for assessing vibration impacts from construction sites on people are set out in British Standard BS 5228-2:2009+A1:2014[3] (BS 5228-2). This table is replicated below.

Table 3 Summary of BS 5228 Vibration Criteria

Vibration Level, mm/s	Effect
0.14	Vibration might just be perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.
0.3	Vibration might be just perceptible in residential environments.
1.0	It is likely that vibration of this level in residential environments will cause complaint, but can be tolerated if prior warning and explanation has been given to residents.
10	Vibration is likely to be intolerable for any more than a very brief exposure to this level.

22. Thresholds for the potential onset of cosmetic damage are well above the levels set out in the table above and not expected to be relevant for consideration at this site. If there is expected to be a risk of vibration generating activities that may generate levels greater than those set out in the table above, this could be considered on a case by case basis.

23. The vibration thresholds set out above may be used as guidance in the unlikely event of a vibration issue arising. It would not be considered necessary to undertake long term monitoring in such instances, rather that these thresholds be used as a reference if an issue arises on site.

24. For a residential scheme such as this, it is reasonable to expect that piling would be the most significant source of construction related ground borne vibration, should it occur. The potential for construction vibration effects to occur at nearby receptors is expected to be highly limited on this site for the following reasons:

- Piling on this site is not expected to be necessary at time of writing (or would only be required in limited locations), and
- Any piling would be at a significant distance from existing sensitive receptors and therefore unlikely to give rise to significant levels of vibration.

[3] BS 5228-2:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites - Vibration

25. If it is determined that piling is required, methods involving impacts of percussive means of driving piles should be avoided, instead favouring methods such as continuous flight auger (CFA) piling, for example.