

# CHAPTER 12 NOISE AND VIBRATION



## 12. NOISE AND VIBRATION

12.1. This chapter of the ES assesses the likely environmental effects of the proposed Green Lithium Refining Limited facility, with respect to noise and vibration. Potential effects associated with construction activities and proposed plant items have been considered at existing noise sensitive receptors in the surrounding area.

12.2. In the context of this assessment, noise is defined as unwanted or undesirable sound derived from sources such as road traffic, or construction works that interfere with normal activities, including conversation, sleep or recreation. Vibration is defined as the transmission of energy through the medium of ground or air resulting in small movements of the transmitting medium, such as a building, which can cause discomfort or even damage to structures if the movements are large enough.

12.3. In summary, the chapter addresses:

- The impact of noise and vibration on existing sensitive receptors during the construction phase; and
- The likelihood of impacts from proposed plant items.

12.4. A glossary of common noise terminology is provided in Appendix 12.1 of Volume 2.

### ASSESSMENT METHODOLOGY

#### Construction Phase Methodology

12.5. The impact of noise and vibration during construction of the Proposed Development requires prediction and assessment in accordance with the guidance presented in BS 5228 1:2009+A1:2014 'Code of practice for noise and vibration control on construction and open sites. Noise' (Ref 12.1).

12.6. The following elements are considered to have the potential to give rise to significant effects during the construction stage of the Proposed Development and have, therefore, been considered within this ES chapter:

- Noise from on-site construction activities affecting nearby existing sensitive receptors; and
- Vibration from on-site construction activities affecting nearby existing sensitive receptors.

#### Fixed Plant

12.7. Information pertaining to operational plant is not yet available and details of any likely fixed plant items are not known. Consequently, limits relating to the introduction of any commercial sources are derived

based on the guidance presented by BS 4142:2014+A1:2019 (Ref 12.2). These limits will ensure that plant items can be appropriately selected to minimise the risk of adverse effects.

### Assumptions and Limitations

12.8. The adopted construction noise levels are representative of continuous activity and therefore are likely to provide a conservative assessment of the likely impacts. The calculated noise levels are therefore likely to be higher than those observed in practice. Construction noise levels have been calculated based on typical noise levels for construction activities.

12.9. Proposed plant items have not been specified and will be further considered during the progression of the detailed design. Background sound levels have been identified and should be employed as threshold limits for the rating level of proposed items. Rating levels will be considered and mitigated as appropriate to ensure the likelihood of effects remains Negligible.

### Methodology for Defining Effects

#### Sensitivity

12.10. The criteria set out in Table 12.1 below have been applied to identify noise/vibration sensitive receptors either on or adjacent to the Site.

Sensitivity	Description	Receptor
High	Receptors that are especially susceptible to noise/vibration	Residential dwellings, Schools, Hospitals, Care Homes
Moderate	Receptors where a reasonable degree of noise disturbance is acceptable	Offices
Low	Receptors where noise is tolerable	Retail shops, restaurants
Negligible	Receptors where noise is not likely to be a factor	Sports Grounds, commercial and industrial environments

#### Construction Noise

12.11. Noise levels generated by construction activities have the potential to impact upon nearby noise-sensitive receptors. However, the magnitude of the potential impact will depend upon a number of variables, such as:

- The noise generated by plant or equipment used on site;
- The period of time that construction plant is operational;
- The distance between the noise source and the receptor; and
- The level of likely attenuation is due to ground absorption and barrier effects.

12.12. BS 5228 gives several examples of acceptable limits for construction or demolition noise. The most simplistic being based upon the exceedance of fixed noise limits and states in paragraph E.2:

12.13. *“Noise from construction and demolition sites should not exceed the level at which conversation in the nearest building would be difficult with the windows shut.”*

12.14. *“Noise levels, between say 07.00 and 19.00 hours, outside the nearest window of the occupied room closest to the site boundary should not exceed: 70 decibels (dBA) in rural, suburban areas away from main road traffic and industrial noise or 75 decibels (dBA) in urban areas near main roads in heavy industrial areas. These limits are for daytime working outside living rooms and offices.”*

12.15. The construction noise impact considers the noise magnitude and adverse effect levels as provided in the Noise Policy Statement for England (NPSE) (Ref 12.3) and the Planning Policy Guidance (PPG) (Ref 12.4) provided by the Department for Communities & Local Government in its on-line planning guidance to assist with interpretation of the NPPF (Ref 12.5) as shown in Table 12.2.

Table 12.2 Construction Noise Magnitude				
Day	Time (hours)	Averaging Period T	LOAEL L <sub>Aeq,T</sub> (dB)	SOAEL L <sub>Aeq,T</sub> (dB)*
Mondays to Fridays	0700 - 0800	1 hour	60	70
	0800 - 1800	10 hours	65	75
	1800 - 1900	1 hour	60	70
	1900 - 2200	1 hour	55	65
Saturdays	0700 - 0800	1 hour	60	70
	0800 - 1300	5 hours	65	75
	1300 - 1400	1 hour	60	70
	1400 - 2200	1 hour	55	65
Sundays & Public Holidays	0700 - 2200	1 hour	55	65
Any night	2200 - 0700	1 hour	45	55

\* The measured levels should be monitored in order to ensure that the levels presented in the table are not exceeded for a period of 10 or more days of working in any 15 consecutive days or for a total number of days exceeding 40 in any 6 consecutive months.

12.16. Threshold values for the onset construction impacts are required to allow quantitative assessment of construction noise levels. The adopted values used to define the magnitude of change for construction noise impacts are based on the values presented in Table 12.3.

Table 12.3 Weekday Threshold Ranges for Construction Levels				
Impact	Negligible	Low	Medium	High
Construction Noise Level, L <sub>Aeq,T</sub> dB	< 65	65 – 70	70 - 75	> 75

12.17. It is worth noting that the purpose of the target construction noise criteria is to control the impact of construction noise insofar as is reasonably practicable, whilst recognising that it is unrealistic for developments of this nature to be constructed without causing some degree of disturbance in the locality. Hence, even if the criteria adopted for this assessment is achieved, noise from construction activities is likely to be readily noticeable. It is further noted that the local authority may restrict the hours of construction and construction related traffic on the site.

### **Construction Vibration**

12.18. Vibration may be impulsive, such as that due to hammer-driven piling; transient, such as that due to vehicle movements along a railway; or continuous, such as that due to vibratory driven piling. The primary cause of community concern generally relates to building damage from both construction and operational sources of vibration, although, the human body can perceive vibration at levels which are substantially lower than those required to cause building damage.

12.19. Damage to buildings associated solely with ground-borne vibration is not common and although vibration may be noticeable, there is little evidence to suggest that they produce cosmetic damage such as a crack in plaster unless the magnitude of the vibration is excessively high. The most likely impact, where elevated levels of vibration do occur during the construction phase, is associated with perceptibility.

12.20. BS 5228-2 indicates that the threshold of human perception to vibration is around 0.15mm/s, although it is generally accepted that for the majority of people vibration levels in excess of between 0.15 and 0.3 mm/s peak particle velocity (PPV) are just perceptible. A PPV of above 1.0 mm/s is identified as likely to cause complaint, but can be tolerated if early warning and explanation is given to residents.

12.21. Accordingly, 1 mm/s ppv has been selected as the target criteria to control the impact of construction vibration, with the adopted criteria for assessing the magnitude of vibration presented in Table 12.4.

12.22. This target criterion is based on the guidance contained within BS 5228, experience from previous sites and accepted vibration policy criteria across a range of enforcing authorities elsewhere in the UK. The limits are presented in terms of peak particle velocity (PPV) as it is the simplest indicator for both perceptibility and building damage.

**Table 12.4 Ground-vibration impact levels for permanent residential buildings**

Vibration		
Lowest Observed Adverse Effect Level	PPV mm/s	1
Significant Observed Adverse Effect Level	PPV mm/s	10

12.23. Again, it is worth noting that the purpose of the target construction vibration criteria is to control the impact of construction vibration insofar as is reasonably practicable and is entirely based on the likelihood of the vibration being perceptible, rather than causing damage to property. Hence, although vibration levels in excess of 1 mm/s ppv would be considered a Moderate Adverse impact in respect of the likelihood of perceptibility, they would not be considered significant in terms of the potential for building damage, which would require levels of at least 15 mm/s ppv to result in minor cosmetic damage in light / unreinforced buildings.

12.24. There are currently no British Standards that provide a methodology to predict levels of vibration from construction activities, other than that contained within BS 5228 which relates to percussive or vibratory piling only. Therefore, it is not possible to accurately predict levels of vibration during the site preparation and construction phases of the Proposed Development.

12.25. Notwithstanding the above, the empirical predictors for groundborne vibration arising from mechanized construction works provided within BS 85228 have been adapted to provide an indication of the distances where impacts may begin to occur. The adopted calculation is based on vibratory piling and is considered to constitute a cautious consideration when applied to all construction activity.

12.26. The resultant thresholds for identification of vibration impacts at residential dwellings, and calculated distances for the likely onset of these values, are presented in Table 12.5.

Table 12.5 Thresholds for ground-vibration effects at permanent residential buildings		
Effect Significance	PPV Threshold	Indicative Distance, m
Negligible	< 0.3	> 185.1
Minor	0.3 - 1	73.3 - 185.1
Moderate	1 – 10	12.5 – 73.3
Major	> 10	< 12.5

### Site Operation

12.27. British Standard BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound is intended to be used for the assessment of whether sound of industrial and/or commercial nature is likely to give rise to complaints from people residing in nearby dwellings. The Standard, which was updated in 2019, states that such sound can include:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train or ship movements on or around an industrial and/or commercial site.

12.28. The procedure contained in BS 4142 for assessing the likelihood of complaints is to compare the measured or predicted sound level from the source in question, the ‘specific sound level’, at the assessment position with the background sound level. Where sound contains acoustic features, such as tonality, impulsivity or other noticeable characteristics then a correction is added to the specific sound to obtain the ‘rating level’ that reflects the contextual setting of the Site.

12.29. To assess the likelihood of complaints, the measured background sound level is subtracted from the rating level. BS 4142 states:

*‘Typically, the greater this difference, the greater the magnitude of the impact;*

- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context;*

- A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and,
- The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.’

12.30. BS 4142 also states that “where a new noise-sensitive receptor is introduced and there is extant industrial and/or commercial sound, it ought to be recognized that the industrial and/or commercial sound forms a component of the acoustic environment. In such circumstances other guidance and criteria in addition to or alternative to this standard can also inform the appropriateness of both introducing a new noise-sensitive receptor and the extent of required noise mitigation.”

### Effect Significance Matrix

12.31. The significance matrix has been adopted to guide the quantitative identification of significant effects. The sensitivity of the receptor is used in conjunction with the calculated magnitude of impact to identify a likely significant effect. The matrix presented in Table 12.6 does not allow for consideration of additional context and is therefore used as a guide. Professional judgement will be applied where deemed necessary due to additional factors.

Derivation of Effect Significance		Magnitude of Impact			
		Negligible	Minor	Moderate	Major
Sensitivity	High	Negligible	Minor	Moderate	Major
	Moderate	Negligible	Negligible	Minor	Moderate
	Low	Negligible	Negligible	Negligible	Minor
	Negligible	Negligible	Negligible	Negligible	Negligible

12.32. Effects that are identified as being ‘moderate’ or ‘major’ adverse / beneficial are classified as significant effects.

### BASELINE CONDITIONS

12.33. The baseline conditions across the Site have been determined by environmental noise measurements and subjective observations at the Site. The survey of baseline noise conditions at the Site was carried out between 1<sup>st</sup> - 16<sup>th</sup> February and 25<sup>th</sup> August - 5<sup>th</sup> September 2022.



12.34. The primary purpose of the noise survey was to gather acoustic information on the sound levels representative of the nearest residential receptors during daytime and night-time periods. The measured background sound levels are used for consideration of fixed plant noise levels.

12.35. P1 was situated near residential housing on Tod Point Road, at approximately 1.2 m above local ground level. P2 was situated near housing on Broadway West, overlooking the A1085 and at approximately 2 m above local ground level. P3 was situated at approximately 2.5 m above local ground and overlooking the A1053, near to housing north of Broadway. P4 was positioned situated at approximately 1.2 m above local ground, near the A66 and close to housing off Elgin Avenue. P5 was situated near the Tees Valley Line, towards the Haven Gypsy and Travellers Site, at approximately 2.5 m above local ground level.

12.36. The microphones were fitted with protective windshields for the measurements. All measurement equipment used during the noise surveys conformed to relevant Type 1 specifications. The noise measurement locations are shown in Figure 12.1.

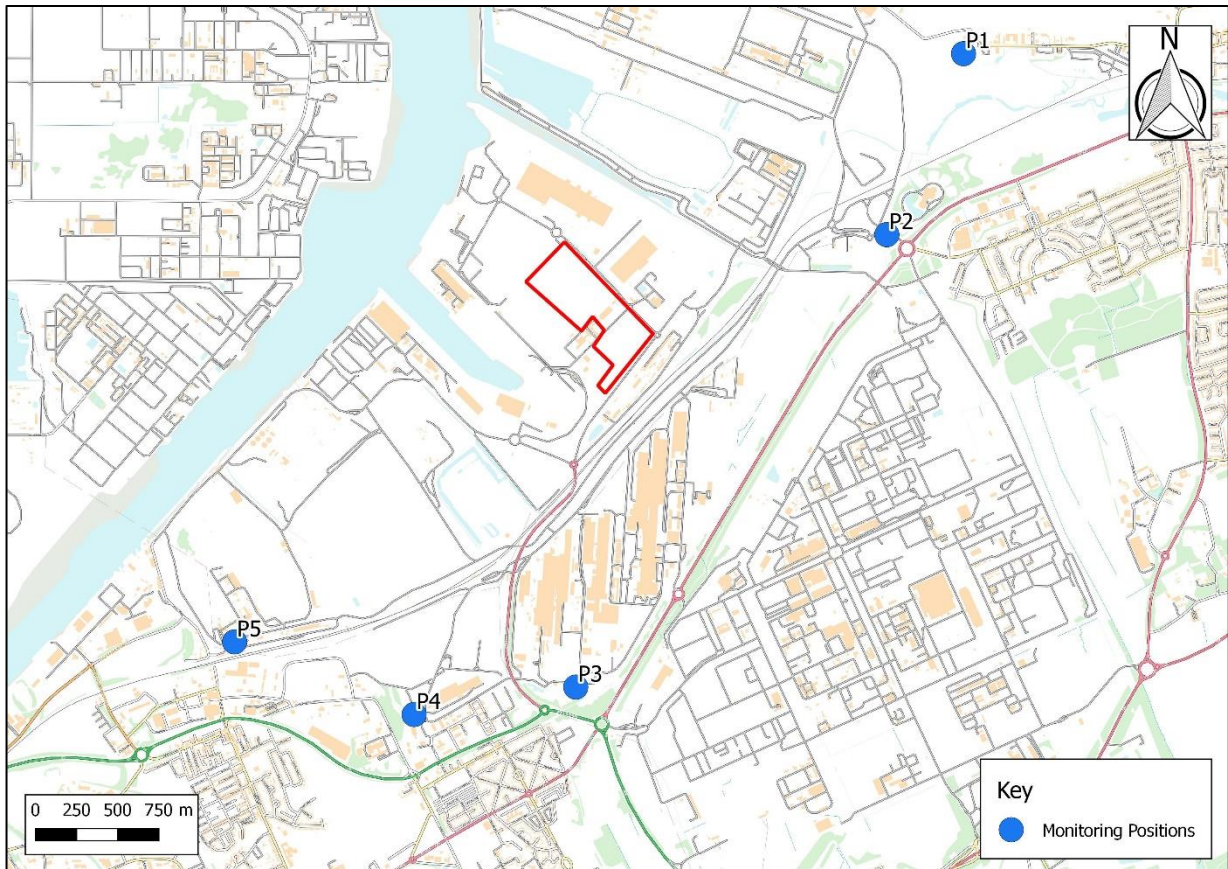


Figure 12.1 Survey Positions

12.37. Background sound levels have been obtained based on the most typically occurring  $L_{A90,15min}$  values. The adopted background sound levels are presented in Table 12.7. The full set of graphical results is shown in Appendix 12.3 to 12.7.

Table 12.7 Adopted Background Sound Levels		
Monitoring Position	Period	Noise Limit for Fixed Installations of Mechanical Plant, $L_{Ae,Tr}$ (dB)
P1	Daytime	34
	Night-Time	28
P2	Daytime	47
	Night-Time	45
P3	Daytime	45
	Night-Time	38
P4	Daytime	35
	Night-Time	30
P5	Daytime	43
	Night-Time	42

12.38. All noise measurements were undertaken by consultants competent in environmental noise monitoring, and, in accordance with the principles of BS 7445:2003 (Ref 12.6). The broadband noise parameters of  $L_{Aeq,T}$ ,  $L_{A10,T}$ ,  $L_{A90,T}$ , and  $L_{Amax,F}$  were recorded at each location.

### RECEPTORS AND RECEPTOR SENSITIVITY

12.39. Existing residential receptors have been identified for the assessment of construction activities. The existing receptors are high sensitivity. The receptor positions are presented in Figure 12.2.

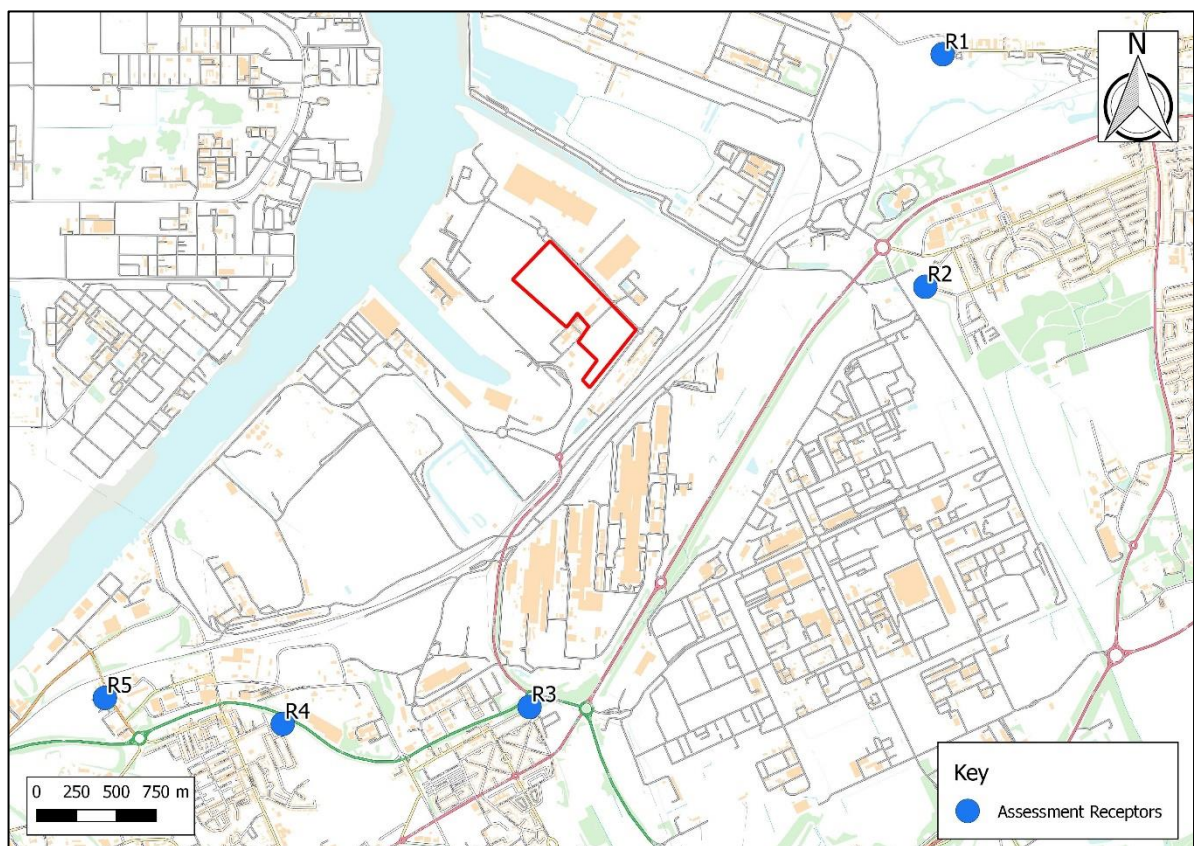


Figure 12.2 Construction Assessment Receptor Locations

### IDENTIFICATION AND EVALUATION OF POTENTIALLY SIGNIFICANT EFFECTS

#### Construction Noise

12.40. The operation of equipment associated with site preparation and construction of the Proposed Development has the potential to result in noise effects at existing noise sensitive receptors in the vicinity.

12.41. The construction noise calculations have been undertaken for the noisiest construction phases to provide assessment levels at the nearest high sensitivity receptors. The highest noise levels are from plant usually associated with earthworks, piling, concreting, road pavement and general construction site activities. Typical facade noise levels have been adopted based on measurements of similar activities and are presented below. These are representative of continuous activity and are considered a worse-case consideration.

- Enabling works - 84 dB(A) at 10m
- CFA Piling - 85 dB(A) at 10m
- Sub Structure - 80 dB(A) at 10m
- Road pavement - 81 dB(A) at 10m
- Super Structure - 85 dB(A) at 10m

12.42. With regard to barrier attenuation effects, acoustic screening would be provided by permanent structures on the intervening land between the proposed construction areas and receptor locations, in addition to the natural screening that may be afforded by the topography of the area. To provide a robust assessment however, the construction noise predictions assume no attenuation from site hoardings at receptor locations.

12.43. Indicative noise levels have been calculated using the closest separation distances between the Proposed Development site and receptors, as well as a typical distance to a more central position in order to identify the likely worse case temporary effects as well as the likely typical effects. These worse case and typical noise levels have been calculated at each receptor position during each phase of the works. The adopted distances are presented in Table 12.8.

Table 12.8 Separation Distances Between Construction Activities and Receptors, m		
Receptor	Separation Distance	
	Closest Activity	Typical Distance
R1	2500	2700
R2	1800	2150
R3	3250	3750
R4	2000	2500
R5	2800	3200
R6	3500	3800

12.44 The calculated noise levels are shown in Table 12.9.

**Table 12.9 Calculated Façade Construction Noise Levels**

Receptor	Façade Noise Level at Nearest Receptors During Likely Phases of Construction, dB(A), L <sub>Aeq,16hr</sub>				
	Enabling Works	Piling	Sub-structure	Roads	Super-structure
<b>Closest Activity</b>					
R1	<65	<65	<65	<65	<65
R2	<65	<65	<65	<65	<65
R3	<65	<65	<65	<65	<65
R4	<65	<65	<65	<65	<65
R5	<65	<65	<65	<65	<65
R6	<65	<65	<65	<65	<65
<b>Typical Distance</b>					
R1	<65	<65	<65	<65	<65
R2	<65	<65	<65	<65	<65
R3	<65	<65	<65	<65	<65
R4	<65	<65	<65	<65	<65
R5	<65	<65	<65	<65	<65
R6	<65	<65	<65	<65	<65

12.45 The resultant noise impacts are shown in Table 12.10.

**Table 12.10 Calculated Construction Noise Impacts**

Receptor	Calculated Noise Impacts During Likely Phases of Construction				
	Enabling Works	Piling	Sub-structure	Roads	Super-structure
<b>Closest Activity</b>					
R1	Negligible	Negligible	Negligible	Negligible	Negligible
R2	Negligible	Negligible	Negligible	Negligible	Negligible
R3	Negligible	Negligible	Negligible	Negligible	Negligible
R4	Negligible	Negligible	Negligible	Negligible	Negligible
R5	Negligible	Negligible	Negligible	Negligible	Negligible
R6	Negligible	Negligible	Negligible	Negligible	Negligible
<b>Typical Distance</b>					
R1	Negligible	Negligible	Negligible	Negligible	Negligible
R2	Negligible	Negligible	Negligible	Negligible	Negligible
R3	Negligible	Negligible	Negligible	Negligible	Negligible
R4	Negligible	Negligible	Negligible	Negligible	Negligible
R5	Negligible	Negligible	Negligible	Negligible	Negligible
R6	Negligible	Negligible	Negligible	Negligible	Negligible

12.46. The calculated effect significance, with consideration to the sensitivity of the nearby receptors, is presented in Table 12.11.

**Table 12.11 Calculated Construction Noise Effects**

Receptor	Calculated Effects Impacts During Likely Phases of Construction				
	Enabling Works	Piling	Sub-structure	Roads	Super-structure
<b>Closest Activity</b>					
R1	Negligible	Negligible	Negligible	Negligible	Negligible
R2	Negligible	Negligible	Negligible	Negligible	Negligible
R3	Negligible	Negligible	Negligible	Negligible	Negligible
R4	Negligible	Negligible	Negligible	Negligible	Negligible
R5	Negligible	Negligible	Negligible	Negligible	Negligible
R6	Negligible	Negligible	Negligible	Negligible	Negligible
<b>Typical Distance</b>					
R1	Negligible	Negligible	Negligible	Negligible	Negligible
R2	Negligible	Negligible	Negligible	Negligible	Negligible
R3	Negligible	Negligible	Negligible	Negligible	Negligible
R4	Negligible	Negligible	Negligible	Negligible	Negligible
R5	Negligible	Negligible	Negligible	Negligible	Negligible
R6	Negligible	Negligible	Negligible	Negligible	Negligible

12.47. The effect significance is classed as Negligible (not significant) during all construction activities. Whilst the calculated impact is Negligible, it is still prudent to employ mitigation measures to further minimise the likelihood of adverse impact. Such measures are discussed later in this Chapter.

**Construction Vibration**

12.48. The likely worse case vibration impacts at the identified separation distances have been calculated based on the methodology provided within BS 5228-2. The calculated impacts are presented in Table 12.12.

**Table 12.12 Calculated Construction Vibration Impacts**

Receptor	Calculated Construction Noise Impacts During Likely Phases of Construction				
	Enabling Works	Piling	Sub-structure	Roads	Super-structure
<b>Closest Activity</b>					
R1	Negligible	Negligible	Negligible	Negligible	Negligible
R2	Negligible	Negligible	Negligible	Negligible	Negligible
R3	Negligible	Negligible	Negligible	Negligible	Negligible
R4	Negligible	Negligible	Negligible	Negligible	Negligible
R5	Negligible	Negligible	Negligible	Negligible	Negligible
R6	Negligible	Negligible	Negligible	Negligible	Negligible
<b>Typical Distance</b>					
R1	Negligible	Negligible	Negligible	Negligible	Negligible
R2	Negligible	Negligible	Negligible	Negligible	Negligible
R3	Negligible	Negligible	Negligible	Negligible	Negligible
R4	Negligible	Negligible	Negligible	Negligible	Negligible
R5	Negligible	Negligible	Negligible	Negligible	Negligible
R6	Negligible	Negligible	Negligible	Negligible	Negligible

12.49. The resultant effect significance, with consideration to the sensitivity of the nearby receptors, is presented in Table 12.13.

**Table 12.13 Calculated Construction Vibration Effects**

Receptor	Calculated Construction Noise Impacts During Likely Phases of Construction				
	Enabling Works	Piling	Sub-structure	Roads	Super-structure
<b>Closest Activity</b>					
R1	Negligible	Negligible	Negligible	Negligible	Negligible
R2	Negligible	Negligible	Negligible	Negligible	Negligible
R3	Negligible	Negligible	Negligible	Negligible	Negligible
R4	Negligible	Negligible	Negligible	Negligible	Negligible
R5	Negligible	Negligible	Negligible	Negligible	Negligible
R6	Negligible	Negligible	Negligible	Negligible	Negligible
<b>Typical Distance</b>					
R1	Negligible	Negligible	Negligible	Negligible	Negligible
R2	Negligible	Negligible	Negligible	Negligible	Negligible
R3	Negligible	Negligible	Negligible	Negligible	Negligible
R4	Negligible	Negligible	Negligible	Negligible	Negligible
R5	Negligible	Negligible	Negligible	Negligible	Negligible
R6	Negligible	Negligible	Negligible	Negligible	Negligible

12.50. The effect significance is classed as Negligible (not significant) at all receptor locations. Whilst the calculated impact is low, it is still prudent to employ mitigation measures to further minimise the likelihood of adverse impact. Such measures are discussed later in this Chapter.

### **Site Operation**

12.51. Proposed plant items will be specified to ensure compliance with the relevant design standards contained within BS 4142.

12.52. The proposed plant has not yet been finalised and detailed data is not yet available. Limits have therefore been identified in order to inform the design of the proposed plant items/activities during the progression of the detailed design.

12.53. The proposed plant would be specified and sufficiently mitigated as required, such that suitable conditions are maintained at the nearby residential dwellings. In accordance with BS 4142, the Rating level of any plant (inclusive of penalties accounting for acoustic features) should remain below the background sound level during all periods of operation.

12.54. BS 4142 provides assessment periods of:

- Daytime, 07:00 – 23:00; and
- Night-time, 23:00 – 07:00.

12.55. The background sound levels identified for the purpose of the assessment are identified within Table 12.7. Any fixed plant would be specified such that the calculated combined Rating level at the nearest residential receptors does not exceed these limits.

## **MITIGATION AND RESIDUAL EFFECTS**

### **Construction Mitigation**

12.56. To control the impact of noise during construction of the Proposed Development, contractors will ensure that works are carried out in accordance with best practicable means (BPM) as described in BS 5228 comprising of the following:

- Where possible, ‘silenced’ plant and equipment will be used;
- Where vehicles are standing for a significant period of time, engines will be switched off;
- Acoustic enclosures will be fitted where possible to suppress noisy equipment;
- Plant will operate at low speeds, where possible, and incorporate automatic low speed idling;



- Where possible, electrically driven equipment will be selected in preference to internal combustion powered, hydraulic power in preference to pneumatic and wheeled in lieu of tracked plant;
- All plant will be properly maintained (greased, blown silencers replaced, saws kept sharpened. Teeth set and blades flat, worn bearings replaced etc.);
- Consideration will be given to temporary screening or enclosures for static noisy plant to reduce noise emissions and plant should be certified to meet any relevant EC Directives;
- All contractors will be made familiar with the guidance in BS 5228 (Parts 1 & 2) which will form a pre-requisite of their appointment; and
- Early and good public relations with the adjacent tenants and occupants of buildings will also reduce the likelihood of complaints.

12.57. These general measures to control construction noise will be incorporated within the Construction Environmental Management Plan (CEMP) and/or detailed in construction method statements. By adopting the recommended best practicable means, construction noise levels can typically be reduced by 10 dB(A).

#### **Site Operation**

12.58. The sound from fixed plant and activities will be specified such that sound levels remain below the limits specified in this chapter.

12.59. Mitigation options will be specified during the detailed design stage, as appropriate. Effects from fixed plant would be negligible following specification and assessment of proposed items.

#### **RESIDUAL EFFECTS**

##### **Construction Phase**

12.60. Construction noise and vibration effects are calculated to be Negligible (not significant). BPM measures will be adopted as far as practicable to further ensure the likelihood of effects is kept to a minimum.

##### **Site Operation**

12.61. Fixed plant items will be specified during the detailed design stage. All plant will be specified such that rating levels at the nearest residential receptors fall below the specified background sound levels.

12.62. Whilst the effect cannot be quantitatively assessed, any proposed plant will be specified such that the resulting effect is Negligible.

## CUMULATIVE EFFECTS

12.63. Nearby developments that may potentially give rise to cumulative effects are identified in ES Chapter 3.

12.64. With consideration to the calculated Negligible residual effects and intervening distance between the Site and the other development sites there are no expected significant cumulative effects during construction activities.

12.65. Cumulative effects may be observed due to operational activities. However, the proposed facility will incorporate appropriate mitigation measures into the design. Specific requirements will be identified as the design progresses. The specific sound levels arising from proposed facility and the resultant combined sound levels with consideration to other committed developments are not known at this stage. However, with appropriate consideration of mitigation measures the effect of the Proposed Development would be Negligible. Accordingly, cumulative effects are identified as unlikely. As a cautious consideration, any cumulative effects may be considered to be Minor (not significant).

## SUMMARY

12.66. This chapter has considered the likely effects of the Proposed Development with respect to noise and vibration. These include the effects of the proposed commercial aspect of the development and the effects of noise and vibration generated from construction activities pertaining to the Proposed Development on surrounding properties

12.67. The impact of noise and vibration during construction of the Proposed Development has been predicted and assessed in accordance with BS 5228. Generic mitigation measures have been recommended, which when implemented are capable of ensuring that the impact of noise and vibration during the construction of the Proposed Development is adequately controlled.

12.68. Construction noise and vibration effects are calculated to be Negligible (not significant) following consideration of receptor sensitivity.

12.69. The effects due to operation of the Proposed Development will be Negligible following appropriate consideration of fixed plant items. Fixed plant items will be specified during the progression of detailed design, such that effects from sound levels pertaining to such sources remain Negligible.

12.70. Table 12.14 overleaf shows noise summary of the operation.

Table 12.14 Noise Summary Table				
Potential Effect	Nature of Effect (Permanent or Temporary)	Significance	Mitigation/ Enhancement Measures	Residual Effects
<b>Construction</b>				
Construction noise at surrounding receptors	Direct, Temporary Short-Term Local	Negligible	Implementation of Best Practicable Means to control noise emissions	Negligible
Construction vibration at surrounding receptors	Direct, Temporary Short-Term Local	Negligible	Implementation of Best Practicable Means to control vibration	Negligible
<b>Completed Development</b>				
Noise from fixed plant at surrounding receptors	Direct, Permanent Long-Term Local	-	Appropriate mitigation, to be determined during detailed design	Negligible

---

## REFERENCES

**Ref 12.1:** British Standard 5228:-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Noise

**Ref 12.2** BS 4142:2014+A1:2019 Methods for Rating and Assessing Industrial and Commercial Sound

**Ref 12.3:** Noise Policy Statement for England, 2010 (NPSE)

**Ref 12.4:** Planning Policy Guidance PPG24 'Planning and Noise'. 1994 The Stationary Office, 1994

**Ref 12.5:** The National Planning Policy Framework, February 2019, The Stationary Office, 2012

**Ref 12.6:** British Standard 7445: 2003: Description and measurement of environmental noise. BSI, 2003