

# Riverside Energy Park

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## Night-time Construction Noise Impact Validation Assessment

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Planning Act 2008 | Infrastructure Planning (Applications: Prescribed Forms and Procedure) Regulations 2009

# TECHNICAL NOTE

**Subject: Night-time Construction Noise Impact Validation Assessment**

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1.	<p data-bbox="342 426 521 453"><b>Introduction</b></p> <p data-bbox="342 489 1422 722">A noise and vibration assessment for the construction and operation of the Proposed Development was undertaken and submitted to accompany the Development Consent Order (DCO) Application. The results are presented in <b>Chapter 8 Noise and Vibration</b> of the <b>Environmental Statement (ES) (6.1, APP-045)</b>. An overview of the likely construction works to be undertaken during the night-time period is set out in <b>Paragraphs 8.9.12 and 8.9.13</b> of <b>Chapter 8 Noise and Vibration</b> of the <b>ES (6.1, APP-045)</b>.</p> <p data-bbox="342 762 1422 863">Following submission of the DCO Application, more refined details have been made available with respect to the specific activities, duration and noise levels associated with potential night-time working.</p> <p data-bbox="342 900 1422 1001">This note provides a validation of the assessment of the potential noise and vibration impact associated with the proposed night-time working based on the latest available information.</p> <p data-bbox="342 1039 1422 1140">The validation specifically includes consideration of the slip form works associated with forming a bunker on the REP site and night-time working with respect to the construction of the Electrical Connection.</p>
2.	<p data-bbox="342 1182 483 1209"><b>Guidance</b></p> <p data-bbox="342 1245 1422 1304">With respect to night-time working specifically, the following guidance is considered to be relevant.</p> <p data-bbox="342 1344 1422 1413"><b>British Standard 5228:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites (BSI 2014)</b></p> <p data-bbox="342 1451 1422 1551">BSI 2014 gives recommendations for basic methods of noise and vibration control relating to construction and open sites where work activities/operations generate significant noise and/or vibration levels.</p> <p data-bbox="342 1589 1422 1717">BS 5228: 2009+A1:2014 also provides a method for determining the sound levels associated with demolition and construction activities; and considers the numbers and types of equipment operating, their associated Sound Power Level (<math>L_w</math>); and the distance to receptors, along with the effects of any screening.</p> <p data-bbox="342 1755 1422 1881">Annex E also provides examples of significance and threshold levels which could be used as design criteria for construction noise to determine eligibility for noise insulation. During the night-time period 22:00 – 07:00 the guidance noise level is set at 55 decibel (dB) <math>L_{Aeq,T}</math>.</p>

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	<p>Therefore, the guidance level of 55 dB(A) has been selected as the Lowest Observed Adverse Effect Level (LOAEL). The Significant Observed Adverse Effect Level (SOAEL) is defined as 5 dB above this.</p> <p><b>Table 1</b> sets out the suggested LOAEL and SOAEL applicable to construction noise impact on residential properties for the night-time period.</p> <p>Table 1: Construction Noise Effect Levels for Permanent Residential Buildings</p> <table border="1" data-bbox="345 604 1336 905"> <thead> <tr> <th>Day</th> <th>Time Period, T</th> <th>LOAEL <math>L_{pAeq, T}</math> (dB)*</th> <th>SOAEL <math>L_{pAeq, T}</math> (dB)</th> </tr> </thead> <tbody> <tr> <td>Monday to Friday</td> <td>22:00hrs – 07:00hrs</td> <td>55</td> <td>60</td> </tr> <tr> <td>Saturday</td> <td>22:00hrs – 07:00hrs</td> <td>55</td> <td>60</td> </tr> </tbody> </table> <p>Construction noise levels which fall between the LOAEL and SOAEL are considered to have a Moderate impact. Construction noise levels which fall below the LOAEL are considered to be Negligible. Severe impacts are envisaged for construction levels which fall above the SOAEL.</p>	Day	Time Period, T	LOAEL $L_{pAeq, T}$ (dB)*	SOAEL $L_{pAeq, T}$ (dB)	Monday to Friday	22:00hrs – 07:00hrs	55	60	Saturday	22:00hrs – 07:00hrs	55	60				
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3.	<p><b>REP Construction Impact Assessment – Slip Form Working</b></p> <p>Details of typical construction plant noise levels at the standard reference distance of 10 m provided by BS 5228 Part 1, in the absence of noise controls such as screening and operational constraints, are given below in <b>Table 2</b>. The plant details have been provided to the Applicant by a suitably qualified contractor who has experience of undertaking similar slip form works on other sites.</p> <p>Table 2 Typical Construction Plant Noise Levels for Slip Form Working</p> <table border="1" data-bbox="354 1430 1328 1797"> <thead> <tr> <th>Plant</th> <th>Number of Plant</th> <th>Typical <math>L_{Aeq, T}</math> (dB) at 10 m (dB)</th> <th>Typical On Time*</th> </tr> </thead> <tbody> <tr> <td>Dump Truck</td> <td>6</td> <td>78</td> <td>50%</td> </tr> <tr> <td>Concrete pumps</td> <td>2</td> <td>87</td> <td>50%</td> </tr> <tr> <td>Vibratory Poker</td> <td>15</td> <td>75</td> <td>50%</td> </tr> </tbody> </table> <p>*Percentage of the full time period between 22:00 and 07:00 that the equipment is operating at its maximum.</p>	Plant	Number of Plant	Typical $L_{Aeq, T}$ (dB) at 10 m (dB)	Typical On Time*	Dump Truck	6	78	50%	Concrete pumps	2	87	50%	Vibratory Poker	15	75	50%
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	<p><b>Table 3</b> below details the likely construction noise level associated with the slip forming works at each of the noise sensitive receptors identified within ES. The receptor locations are provided within <b>Figure 8.1 Sound Survey Locations of the ES (6.2, APP-057)</b>.</p> <p>Table 3 Typical Construction Plant Noise Levels for Slip Form Working</p> <table border="1" data-bbox="345 506 1328 873"> <thead> <tr> <th data-bbox="345 506 613 638">Noise Sensitive Receptor</th> <th data-bbox="613 506 948 638">Distance from the REP Site (m)</th> <th data-bbox="948 506 1328 638">Calculated Cumulative Sound Level (dB <math>L_{Aeq,9hours}</math>)</th> </tr> </thead> <tbody> <tr> <td data-bbox="345 638 613 701">Hackney House</td> <td data-bbox="613 638 948 701">720</td> <td data-bbox="948 638 1328 701">52</td> </tr> <tr> <td data-bbox="345 701 613 772">Jutland House</td> <td data-bbox="613 701 948 772">820</td> <td data-bbox="948 701 1328 772">51</td> </tr> <tr> <td data-bbox="345 772 613 873">Dwellings on St Thomas Road</td> <td data-bbox="613 772 948 873">970</td> <td data-bbox="948 772 1328 873">49</td> </tr> </tbody> </table> <p><b>Table 8.12</b> of <b>Chapter 8 Noise and Vibration</b> of the <b>ES (6.1, APP-045)</b> summarises the existing noise levels at the relevant noise sensitive receptors. With reference to <b>Table 8.12</b> and the calculated worst case sound levels detailed above in <b>Table 3</b>, the calculated sound levels associated with the night time construction works at the nearest noise sensitive receptors are:</p> <ul style="list-style-type: none"> <li>▪ Hackney House - 2 dB below the daytime ambient sound level (<math>L_{Aeq,8hours}</math>) at Receptor 1 (Hackney House) and 3 dB below the proposed LOAEL (55dB <math>L_{Aeq,9hours}</math>);</li> <li>▪ Jutland House - Equal to the daytime ambient sound level (<math>L_{Aeq,8hours}</math>) at Receptor 2 (Jutland House) and 4 dB below the proposed LOAEL (55dB <math>L_{Aeq,9hours}</math>); and</li> <li>▪ 1 St Thomas Road - 1 dB above the daytime ambient sound level (<math>L_{Aeq,8hours}</math>) at Receptor 3 (1 St Thomas Road) and 6 dB below the proposed LOAEL (55dB <math>L_{Aeq,9hours}</math>).</li> </ul> <p>Based on the above assessment the effect on these receptors is therefore assessed as Negligible and not a significant effect, as all receptors will remain below the LOAEL.</p>	Noise Sensitive Receptor	Distance from the REP Site (m)	Calculated Cumulative Sound Level (dB $L_{Aeq,9hours}$ )	Hackney House	720	52	Jutland House	820	51	Dwellings on St Thomas Road	970	49
Noise Sensitive Receptor	Distance from the REP Site (m)	Calculated Cumulative Sound Level (dB $L_{Aeq,9hours}$ )											
Hackney House	720	52											
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4.	<p><b>Electrical Connection Route - Potential Construction Effects</b></p> <p>Details of typical construction plant noise levels at the standard reference distance of 10 m provided by BS 5228 Part 1, in the absence of noise controls such as screening and operational constraints, are given below in <b>Table 4</b>. The plant details have been provided to the Applicant by UK Power Networks and are based</p>												

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	<p>on the likely plant to be utilised during any potential night-time working on the electrical connection route.</p> <p>Table 4: Typical Construction Plant Noise Levels for Night-time Electrical Connection Route Work</p> <table border="1"> <thead> <tr> <th>Plant</th> <th>Typical <math>L_{Aeq,T}</math> (dB) at 10 m (dB)</th> <th>Typical on time*</th> </tr> </thead> <tbody> <tr> <td>Tracked Excavator</td> <td>78</td> <td>15%</td> </tr> <tr> <td>Floor Saw</td> <td>87</td> <td>5%</td> </tr> <tr> <td>Vibratory Compacter</td> <td>82</td> <td>12%</td> </tr> <tr> <td>Vibratory Roller</td> <td>67</td> <td>8%</td> </tr> </tbody> </table> <p>*(Percentage of the full time period between 22:00 and 07:00 that the equipment is likely to be operating at its maximum)</p> <p>This information has been used to derive indicative noise levels at selected distances from the construction works using the data and procedures of BS 5228, and the results are presented in <b>Table 5</b>.</p> <p>Table 5: Predicted Indicative Construction Noise Levels from Electrical Connection Route</p> <table border="1"> <thead> <tr> <th rowspan="2">Activity</th> <th colspan="5">Predicted Indicative Construction Noise Levels, (<math>L_{Aeq,9Hour}</math>) in dB at the Stated Distance from the Construction Works</th> </tr> <tr> <th>10 m</th> <th>20 m</th> <th>30 m</th> <th>50 m</th> <th>100 m</th> </tr> </thead> <tbody> <tr> <td>Construction Activities</td> <td>77</td> <td>71</td> <td>68</td> <td>63</td> <td>57</td> </tr> </tbody> </table> <p>At distances up to 100 m from the construction activities, noise levels are likely to exceed the LOAEL. The SOAEL is likely to be exceeded at distances up to 50 m from the construction activities.</p> <p>An <b>outline Code of Construction Practice (CoCP) (7.5, Rev 1)</b> has been submitted to accompany the DCO Application, secured via <b>Requirement 11</b> of the <b>draft Development Consent Order (dDCO) (3.1, Rev 1)</b> which includes measures to minimise adverse effects where practicable. These measures include:</p>	Plant	Typical $L_{Aeq,T}$ (dB) at 10 m (dB)	Typical on time*	Tracked Excavator	78	15%	Floor Saw	87	5%	Vibratory Compacter	82	12%	Vibratory Roller	67	8%	Activity	Predicted Indicative Construction Noise Levels, ( $L_{Aeq,9Hour}$ ) in dB at the Stated Distance from the Construction Works					10 m	20 m	30 m	50 m	100 m	Construction Activities	77	71	68	63	57
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	<ul style="list-style-type: none"><li>■ Ensuring the use of quiet working methods and the most suitable plant where reasonably practicable.</li><li>■ Screening fixed and mobile plant to reduce noise which cannot be reduced by increasing the distance between the source and the receiver (i.e. by installing acoustic screens/enclosures).</li><li>■ Orienting fixed and mobile plant that is known to emit noise strongly in one direction so that the noise is directed away from dwellings or sensitive receptors, where possible; and</li><li>■ Closing acoustic covers to engines when they are in use or idling.</li></ul> <p>Temporary sound reducing screens/enclosures around plant and activities (where possible) could provide 10 dB of noise attenuation from construction activities. BS 5228 Part 1 states an approximate reduction of 10 dB when the noise screen completely hides the sources from the receiver.</p> <p>With the incorporation of mitigation measures as specified in the embedded mitigation <b>Section 8.8 of Chapter 8 Noise and Vibration</b> of the <b>ES (6.1, APP-045)</b> and included in the outline CoCP at distances of 20 m from the construction works, noise levels are likely to be at the SOAEL. At distances of more than 20 m from the construction activities, noise levels are likely to be between the LOAEL and the SOAEL. At distances, greater than 50 m from the construction activities, noise levels are likely to be below the LOAEL.</p> <p>However, it should be noted that the construction noise effect levels presented in <b>Table 1</b> relate to the external noise levels which would be experienced at the dwelling (e.g. in the garden of a property) and are not the levels that would be experienced by residents inside a property. As the noise effects presented in this validation assessment would be experienced at night, it is likely that residents would be inside properties and most likely with closed windows. Conventional glazing is likely to provide a sound reduction, <math>R_w</math>, of 30 dB to the levels presented in <b>Table 1</b>. A noise reduction of 30 dB would bring all receptors below both the LOAEL and the SOAEL. Therefore, the internal noise levels are likely to be in line with guidance provided in BS 8233:2014 with regards to suitable conditions for sleeping/resting.</p> <p>Furthermore, it is noted that the duct installation is likely to be for a period of only 7 days per 200 m section of Electrical connection route. Therefore, the effects experienced at any particular property are only likely to be for a very short duration.</p> <p>Therefore, with the incorporation of mitigation measures as specified in the embedded mitigation <b>Section 8.8 of Chapter 8 Noise and Vibration</b> of the <b>ES (6.1, APP-045)</b> and included in the <b>outline CoCP (7.5, Rev 1)</b> together with the temporary (typically 7 days per 200 m section of Electrical Connection route),</p>

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	nature of the construction and resulting internal noise levels, the effects are considered to be minor and therefore not significant.
5.	<p><b>Conclusions</b></p> <p>This note provides an assessment of the likely noise and vibration impact associated with the proposed night-time working based on information provided to the Applicant by suitably qualified contractors who have experience of undertaking similar construction works.</p> <p>The assessment specifically includes consideration of the slip form works associated with forming the waste bunker on the REP site and night-time working with respect to the construction of the Electrical Connection.</p> <p>Based on the information provided, night-time works associated with slip forming are not likely to generate significant impacts at the nearest noise sensitive receptors, as noise levels generated would not exceed the proposed LOAEL.</p> <p>For potential night-time construction works associated with the Electrical Connection, unmitigated noise levels generated at up to 100 m from the works are likely to exceed the proposed LOAEL. The SOAEL is likely to be exceeded at distances up to 50 m from the construction activities. Therefore, mitigation measures as specified in the embedded mitigation section as found in <b>Section 8.8</b> of <b>Chapter 8 Noise and Vibration</b> of the <b>ES (6.1, APP-045)</b> and specified in the <b>outline CoCP (7.5, Rev 1)</b> (secured via <b>Requirement 11</b> of the <b>dDCO (3.1, Rev 1)</b>) should be included to attenuate the noise impacts.</p> <p>Incorporation of these mitigation measures, together with the temporary (typically 7 days per 200 m section of Electrical Connection route) nature of the construction works and resulting internal noise levels, will ensure that the impact from night-time construction works associated with the Electrical Connection are considered to be Minor and therefore not significant.</p>

### DOCUMENT ISSUE RECORD

Technical Note No	Rev	Date	Prepared	Reviewed (Discipline Lead)	Approved (Project Director)
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