

# Lower Thames Crossing

## 9.89 Responses to the Examining Authority's ExQ1 Appendix E – 9. Noise & Vibration

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#### List of contents

	Page number
<b>1 Introduction .....</b>	<b>1</b>
1.1 Introduction .....	1
<b>2 Responses to the Examining Authority's ExQ1 9.....</b>	<b>2</b>

#### List of tables

	Page number
Table 1 Extract of 'Table 3.60 Determining final operational significance on noise sensitive buildings' from DMRB LA 111 .....	10

# 1 Introduction

## 1.1 Introduction

1.1.1 This document has been prepared by the Applicant to set out its responses to the Examining Authority's (ExA's) first round of written questions [[PD-029](#)]

1.1.2 These can be found in Tables set out under the following headings:

- a. Climate Change and carbon emissions (found in Appendix A)
- b. Consideration of alternatives (Found in Appendix A)
- c. Traffic and transportation (Found in Appendix B)
- d. Air quality (Found in Appendix C)
- e. Geology and soils (Found in Appendix D)
- f. Waste and materials (Found in Appendix D)
- g. Noise and vibration (Found in Appendix E)
- h. Road Drainage, water environment and flooding (Found in Appendix F)
- i. Biodiversity (Found in Appendix G)
- j. Physical effects of development and operation (Found in Appendix H)
- k. Social, economic and land-use considerations (Found in Appendix I)
- l. Draft Development Consent Order, planning obligations, agreements and adequacy of security (Found in Appendix J)
- m. The acquisition and temporary possession of land and rights (Found in Appendix J)
- n. General overarching questions (Found in Appendix J)

## 2 Responses to the Examining Authority's ExQ1 9

PINS ID	External Stakeholder (where applicable)	Question / Response
ExQ1_Q9.1.1	N/A	<p><b>Survey/ Baseline</b></p> <p>With reference to the Baseline Noise Survey Information [APP-445], can the Applicant: - Justify why data from 2018 represents a suitable baseline? - Explain why different time periods for monitoring were utilised at different locations? - Whether peak flows have been used for the noise assessment? - Why there are a number of locations where it is reported that the LAeq,T is higher than the LA10,T for these receptors?</p> <p><b>Response:</b></p> <p><u>Justify why data from 2018 represents a suitable baseline?</u></p> <p>Baseline noise surveys have been undertaken to establish an understanding of the existing noise environment, to derive the construction noise thresholds for Lowest Observed Adverse Effect Level (LOAEL) and Significant Observed Adverse Effect Level (SOAEL) as defined within Design Manual for Roads and Bridges (DMRB) LA 111<sup>1</sup> and to establish background noise levels for the assessment of noise from the tunnel ventilation system. It should be noted that the assessment of road traffic noise impacts as described within Environmental Statement (ES) Chapter 12: Noise and Vibration [APP-150] have been undertaken using a comparison of computer modelling predictions and does not rely upon any baseline noise measurements.</p> <p>It is generally accepted that, post COVID-19, the situation has returned to pre-COVID levels, whereby noise levels within an area would typically increase over time as a result of traffic growth. The 2018 study was completed prior to the implementation of government COVID-19 restrictions, which led to a temporary national drop in road traffic noise. As such, the use of the baseline survey data from 2018 to derive construction noise and tunnel ventilation noise threshold levels for use in assessments presented within ES Chapter 12: Noise and Vibration [APP-150] is considered to be robust, as lower baseline noise levels lead to more stringent threshold levels.</p> <p>Commitment NV005 (Baseline noise levels) of the Register of Environmental Actions and Commitments (REAC) within ES Appendix 2.2: Code of Construction Practice, First Iteration of Environmental</p>

<sup>1</sup> Highways England (2020). Design Manual for Roads and Bridges (DMRB), LA 111 Noise and Vibration. Revision 2. Accessed May 2020.  
<https://www.standardsforhighways.co.uk/search/cc8cfc7-c235-4052-8d32-d5398796b364>

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		<p>Management Plan [REP3-104] also commits the Contractor to establish pre-construction baseline noise levels. These updated datasets would be used in the definition of construction noise limits as part of the Control of Pollution Act 1974 (CoPA) Section 61 applications and updated construction noise assessments required under REAC commitments NV004 (Section 61 consents) and NV006 (noise and vibration assessment).</p> <p><u>Explain why different time periods for monitoring were utilised at different locations?</u></p> <p>Within ES Chapter 12: Noise and Vibration [APP-150], three durations of noise surveys have been undertaken – short-term attended noise surveys, unattended 24-hour noise surveys and unattended seven-day long-term noise surveys:</p> <ul style="list-style-type: none"> <li>• The short-term attended surveys were undertaken in accordance with Calculation of Road Traffic Noise (CRTN)<sup>2</sup> shortened measurement procedure, where measurements are recorded over three consecutive hours between 10:00 and 17:00. These measurements are mainly positioned within close proximity to busy roads where there was a dominant and steady noise source.</li> <li>• The unattended 24-hour and seven-day survey positions were mainly located along the Project alignment where the existing noise climate was considered to be low or where the Project may influence the existing night-time noise climate.</li> </ul> <p>Therefore, in accordance with guidance, the use of three-hour measurement surveys was mainly in close proximity to roads where equipment security would be problematic, and road traffic noise was the dominant source in the environment, meaning the CRTN shortened methodology was a robust representation of the noise climate.</p> <p>The decision as to whether a 24-hour or seven-day survey was undertaken was based upon professional judgement relating to the potential for impacts of the Project, security of equipment and land access provisions.</p> <p><u>Whether peak flows have been used for the noise assessment?</u></p> <p>Peak flows have not been used in the assessment presented within ES Chapter 12: Noise and Vibration [APP-150]. The noise assessment has been undertaken using 18-hour Annual Average Weekday Traffic (AAWT) flows in accordance with CRTN as required by the National Policy Statement for National</p>

<sup>2</sup> Department of Transport and Welsh Office (1988). Calculation of Road Traffic Noise (CRTN).

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		<p>Networks<sup>3</sup>, DMRB LA111 and the Noise Insulation Regulations. This approach would also align with the draft National Policy Statement for National Networks.</p> <p><u>Why there are a number of locations where it is reported that the LAeq,T is higher than the LA10,T for these receptors?</u></p> <p>At monitoring locations situated within rural areas adjacent to roads with a low traffic flow, the dB LA10 is less affected by the occasional high noise level of a vehicle passing than the LAeq. As such, in these instances the monitored LAeq can exceed the LA10, as the noise level distribution is characterised by infrequent noisy events as opposed to a constant flow of traffic.</p>
ExQ1_Q9.1.2	N/A	<p><b>Baseline</b></p> <p>Can the Applicant confirm the date of the future baseline year?</p> <p><b>Response:</b></p> <p>The Applicant can confirm that the future baseline year considered within Environmental Statement (ES) Chapter 12: Noise and Vibration [APP-150] is 2045, as stated in paragraph 12.3.63. This is the 15<sup>th</sup> year after the proposed opening year of the Project. The reference to 2044 within paragraph 12.3.62 is an error and this will be corrected in the ES Addendum for Deadline 4 [Document Reference 9.8 (4)].</p>
ExQ1_Q9.1.3	N/A	<p><b>Baseline</b></p> <p>At paragraph 2.2.6 of ES Appendix 12.4 – Construction Noise and Vibration Assessment [REP1-169] it is indicated that there has been a reduction in model flow from the future year 2030 by 20% to be representative of 2025. Can the Applicant please provide a justification for this degree of reduction?</p> <p><b>Response:</b></p> <p>This reduction has been based upon traffic projections provided within the National Road Traffic Projections 2022 (NRTP22) produced by the Department for Transport (DfT)<sup>4</sup>.</p> <p>The NRTP22 presents the latest projections of road traffic, congestion and emissions for England and Wales. These are long-term, strategic projections of future road travel demand under a range of different</p>

<sup>3</sup> Department for Transport (2014). National Policy Statement for National Networks.

<sup>4</sup> Department for Transport (2022). National Road Traffic Projections 2022. Accessed August 2023. <https://www.gov.uk/government/publications/national-road-traffic-projections>.

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		<p>plausible future scenarios. Paragraph 1.13 of NRTP22 states, '<i>In the Core Scenario, traffic on minor roads and A-roads is expected to grow by 21% and 20% respectively, while motorway traffic is projected to increase by 27% between 2025 and 2060</i>'.</p> <p>Given that forecast of traffic growth over the 35 years between 2025 and 2060 would be estimated by the NRTP to be between 20% and 27% dependent upon the road type, the Applicant considers a reduction equivalent to 20% over the five-year period between 2025 and 2030 to be an overestimate of road traffic growth over this period. The predicted noise level would be lower in 2025 due to the over estimation of the traffic reduction between 2030 and 2025, leading to a conservative construction noise threshold. As such, the 20% growth is considered a robust assumption upon which to base the assessment of noise.</p>
ExQ1_Q9.1.4	N/A	<p><b>Receptors</b></p> <p>Thamesview School (southern portal), and Gravelpit Farm (northern portal) were not identified as a Noise Sensitive Receptors in ES Figure 12.4 [APP-312]. Can the Applicant explain the methodology for selecting the identified Noise Sensitive Receptors and why these sites were not identified as such?</p> <p><b>Response:</b></p> <p>Within Environmental Statement (ES) Chapter 12: Noise and Vibration [<a href="#">APP-150</a>], the process for selecting noise sensitive receptors has been based upon professional judgement. This selection process has considered factors such as the distance to the construction activities, with generally a receptor being selected that is closest to the works. The number of receptors in an area is also taken into consideration. A receptor is also selected if it is considered to have a unique noise climate that is not represented by another nearby receptor.</p> <p>With regard to Thamesview School at the South Portal:</p> <ul style="list-style-type: none"> <li>• The chosen receptors of Three Points and 73/75 Thong Lane are closer to the southern portal than Thamesview School, and as such would be expected to be subject to higher impacts than at Thamesview School in respect of impacts from operational ventilation. The noise climate at Thamesview School is considered to be sufficiently similar to that at Three Points and 73/75 Thong Lane for it to be represented by those chosen receptors.</li> <li>• As such, the impacts at Thamesview School are considered to be represented by reasonable worst-case receptors.</li> </ul>

PINS ID	External Stakeholder (where applicable)	Question / Response
		<p>With regard to Gravelpit Farm:</p> <ul style="list-style-type: none"> <li>• The chosen receptors of Buckland and Norrshen are closer to the northern portal than Gravelpit Farm, and as such would be expected to be subject to higher impacts than at Gravelpit Farm in respect of impacts from operational ventilation. The noise climate at Thamesview School is considered to be sufficiently similar to that at Buckland and Norrshen for it to be represented by those chosen receptors.</li> <li>• As such, the impacts at Gravelpit Farm are considered to be represented by reasonable worst-case receptors.</li> </ul>
ExQ1_Q9.1.5	N/A	<p><b>Receptors</b></p> <p>Can the Applicant explain what, if any, approach was taken to considering the effect of noise and vibration on any sites with environmental designations?</p> <p><b>Response:</b></p> <p>From an ecological perspective, the effects of noise and vibration on sensitive ecological receptors during both construction and operation has been reported in Section 8.6 of Environmental Statement (ES) Chapter 8: Terrestrial Biodiversity [<a href="#">APP-146</a>]. This focuses on the effects on faunal species which may exhibit some form of disturbance reaction to changes in noise and vibration, as opposed to effects on habitats and plant species which would not be adversely affected.</p> <p>The consideration of the effects of noise and vibration on sites with ecological designations, focuses on the effects on any faunal species which form part of the site's citation/reason for designation. Any adverse effects were considered in relation to the site's integrity or its key characteristics, in line with the methodology detailed in Section 8.3 of ES Chapter 8: Terrestrial Biodiversity [<a href="#">APP-146</a>].</p> <p>The effects of noise and vibration on European site designations is assessed in the Habitats Regulations Assessment (HRA) report [<a href="#">APP-487</a>]. The approach used was developed in consultation with Natural England as described in the HRA report Appendix C: Evidence Plan [<a href="#">APP-487</a>]. The HRA report assesses the effects of changes in noise and vibration as a result of the construction (including the use of a tunnel boring machine) and operation of the Project on the qualifying bird features of the Thames Estuary and Marshes Special Protection Area and Ramsar site. The assessment is supported by predictive modelling that indicates the level of change, as shown in Figures 17, 18, 21, 25 and 26 of the HRA report [<a href="#">APP-487</a>], and evidences the effectiveness of the proposed mitigation measures as reported in Section 7.1 of the HRA report [<a href="#">APP-487</a>].</p>



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ExQ1_Q9.1.6	N/A	<p><b>Receptors</b></p> <p>The Air Quality chapter [APP-143] notes that ecological receptors were modelled in areas within 200m of the construction Affected Route Network (ARN). Can the Applicant explain why a similar approach was not taken in respect of noise and vibration?</p> <p><b>Response:</b></p> <p>The assessment of noise associated with the construction traffic has been undertaken in accordance with the guidance of Design Manual for Roads and Bridges (DMRB) LA 111<sup>5</sup>, where in paragraph 3.8 it is stated 'A construction traffic study area shall be defined to include a 50m width from the kerb line of public roads with the potential for a increase in baseline noise level (BNL) of 1 dB(A) or more as a result of the addition of construction traffic to existing traffic levels'. Under the guidance of the DMRB it is qualified that LA111 and LA105 define different study areas for assessment purposes which is appropriate for the potential zone of influence of noise and vibration, and air quality respectively.</p> <p>As set out in the answer to ExQ1_Q9.1.5, the effects of noise and vibration on sensitive ecological receptors during construction and operation has been assessed and reported in Environmental Statement (ES) Chapter 8: Terrestrial Biodiversity [APP-146] and the Habitat Regulations Assessment (HRA) report [APP-487]. This focuses on the effects on faunal species which may exhibit some form of disturbance reaction within the zone of influence of the Project so is not restricted by a defined buffer. The approach used did not separate out the effects from noise and vibration associated with changes in construction traffic but considered all construction related activities where an increase in noise levels could cause disturbance to sensitive ecological receptors. The assessments reported in ES Chapter 8: Terrestrial Biodiversity [APP-146] and the HRA report [APP-487] used outputs from the noise models informing ES Chapter 12: Noise and Vibration [APP-150].</p>
ExQ1_Q9.2.1	N/A	<p><b>Survey Timescales</b></p> <p>In paragraph 12.3.9 of ES Chapter 12 – Noise and Vibration [APP-150], it is noted that 'short term' and 'long term' temporal scales are utilised. With reference to policy and/ or guidance, can the Applicant explain the suitability of this approach for the noise assessments undertaken?</p>

<sup>5</sup> Highways England (2020). Design Manual for Roads and Bridges (DMRB), LA 111 Noise and Vibration. Revision 2. Accessed August 2023.  
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PINS ID	External Stakeholder (where applicable)	Question / Response
		<p><b>Response:</b></p> <p>The assessment presented within Environmental Statement (ES) Chapter 12: Noise and Vibration [APP-150] has been undertaken in accordance with the methodology presented within Design Manual for Roads and Bridges (DMRB) LA 111<sup>6</sup>. Paragraph 3.51 of DMRB LA 111 states:</p> <p><i>'Noise change due to the project shall be determined at noise sensitive receptors within the study area, during the periods for which LOAELs and SOAELs have been set, for:</i></p> <ol style="list-style-type: none"> <li>1) <i>Short term: DMOY [Do-Minimum Opening Year] compared against the DSOY [Do-Something Opening Year];</i></li> <li>2) <i>Long-term: DMOY compared against the DSFY [Do-Something Future Year];</i></li> <li>3) <i>Non-project noise change: Do-Minimum Future Year (DMFY) compared against the DMOY.'</i></li> </ol> <p>The short-term assessment is to consider the immediate change in road traffic noise level upon opening of the Project, and the long-term assessment considers the gradual change in road traffic noise over time as people become habituated to the noise source.</p> <p>As such, the Applicant considers the approach to be entirely suitable and fully in accordance with UK guidance on the assessment of noise from road schemes.</p>
ExQ1_Q9.2.2	N/A	<p><b>Long/ Short term effects</b></p> <p>ES Chapter 12 – Noise and Vibration [APP-150] sets out 'short term' and 'long term' effects. Please provide an explanation for these terms?</p>

<sup>6</sup> Highways England (2020). Design Manual for Roads and Bridges (DMRB), LA 111 Noise and Vibration. Revision 2. Accessed August 2023.  
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		<p><b>Response:</b> Short-term and long-term effects are defined within Design Manual for Roads and Bridges (DMRB) LA 111<sup>7</sup> as follows: <i>'Short-term: Noise change based on parallel assessment year (for example Do-Minimum opening year scenario (DMOY) against Do-Something opening year scenario (DSOY))'</i>. This is considered to represent the response to the immediate change in road traffic noise upon opening of the Project to traffic. <i>'Long-term: Noise change based on the +15 year assessment (for example DMOY against Do-Minimum future year scenario (DMFY) and DMOY against Do-Something future year scenario (DSFY))'</i>. These scenarios represent the perception of change in road traffic noise over the longer term, where habituation to the noise occurs. The definition of the magnitude of the 'short term' and 'long term' impacts, and the derivation of the semantic rating scheme in DMRB LA 111, is based upon the perception of noise change, with a change of 1dB(A) in the short-term considered the smallest perceptible change, and in the longer-term a 3dB(A) change is the smallest change considered perceptible due to habituation over time.</p>
ExQ1_Q9.2.3	N/A	<p><b>Local Circumstances</b> On a number of occasions, results of the assessment [APP-150] are adjusted by considering 'local circumstances'. - Please provide an overview of the method for applying 'local circumstances'? - Please provide clarity as to the nature of each 'local circumstance' and how these have been taken into account/ affected the conclusions for each of the relevant receptors?</p> <p><b>Response:</b> The application of local circumstance is based upon the methodology contained within Table 3.60 of Design Manual for Roads and Bridges (DMRB) LA 111<sup>8</sup>, which is reproduced in part in the table below.</p>

<sup>7</sup> Highways England (2020). Design Manual for Roads and Bridges (DMRB), LA 111 Noise and Vibration. Revision 2. Accessed August 2023.  
<https://www.standardsforhighways.co.uk/search/cc8cfcf7-c235-4052-8d32-d5398796b364>

<sup>8</sup> Highways England (2020). Design Manual for Roads and Bridges (DMRB), LA 111 Noise and Vibration. Revision 2. Accessed August 2023.  
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**Table 1 Extract of 'Table 3.60 Determining final operational significance on noise sensitive buildings' from DMRB LA 111**

Local circumstance	Influence on significance judgement
Acoustic context	1) If a project changes the acoustic character of an area, it can be appropriate to conclude a minor magnitude of change in the short term and/or long term is a likely significant effect
Likely perception of change by residents	1) If the project results in obvious changes to the landscape or setting of a receptor, it is likely that noise level changes will be more acutely perceived by the noise sensitive receptors. In these cases it can be appropriate to conclude that a minor change in the short term and/or long term is a likely significant effect. 2) Conversely, if the project results in no obvious changes for the landscape, particularly if the road is not visible from the receptor, it can be appropriate to conclude that a moderate change in the short term and/or long term is not a likely significant effect.

The assessments presented within Environmental Statement (ES) Chapter 12: Noise and Vibration [APP-150] have identified 106 noise sensitive receptors which are not predicted to experience significant adverse effects based upon the DMRB LA 111 criteria but through the consideration of local circumstances have been determined to experience a significant adverse effect. These are spread across the Project and are mentioned in paragraphs 12.6.108 (13 receptors), 12.6.120 (90 receptors) and 12.6.135 (three receptors) of ES Chapter 12: Noise and Vibration [APP-150]. The reasoning for the adjustment is consistent across all of these 106 noise sensitive receptors:

All of these receptors were concluded through the modelling to experience minor adverse increases in road traffic noise level, which would normally be concluded to not be significant.

These receptors all occur along the Project alignment in areas where consideration of the geographic setting and monitored noise levels concluded that road traffic noise, whilst potentially present in the noise climate, would not be the dominant noise source prior to the Project opening.

As such, an adjustment for 'local circumstances' based upon both a change in acoustic character (introduction of road traffic noise into the environment) and the likelihood of the perception of this change (people in the area are not currently habituated to road traffic noise) has been applied within ES Chapter 12:

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		<p>Noise and Vibration [APP-150]. Using professional judgement these 106 receptors have been classified within the conclusions of ES Chapter 12: Noise and Vibration [APP-150] as experiencing significant adverse effects, due to the change in acoustic context the receptors would experience.</p> <p>Within the assessment, no beneficial adjustment as a result of 'local circumstances' has been implemented; no significant effects have been downgraded to not significant within the scope of ES Chapter 12: Noise and Vibration [APP-150] as a result of 'local circumstances'.</p>
ExQ1_Q9.2.4	N/A	<p><b>Noise Assessment: Portals</b></p> <p>In respect of the Operational Ventilation Noise Assessments for the portals (ES Appendices 12.2 and 12.3) [APP-442- and APP-443], can the Applicant: - Explain why monitoring was undertaken for varying (ie inconsistent) times/ durations for the identified receptors (ie 24-hour and 3 hour)? - Why was this considered to be representative for each receptor? - Explain why monitoring location LT-NML-5 was considered to provide a robust baseline, noting that this location is some distance from the identified sensitive receptors? - Why there appears to be differences between the baseline (noise monitoring surveys) and assessment locations? In addition, please explain how this would allow the assessment to be representative?</p> <p><b>Response:</b></p> <p><b>Explain why monitoring was undertaken for varying (ie inconsistent) times/ durations for the identified receptors (ie 24-hour and 3-hour)?</b></p> <p>The assessment of operational fixed plant has been undertaken in accordance with BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound (BS 4142)<sup>9</sup>. With consideration to background noise surveys, BS 4142 provides no specific guidance for survey durations. Paragraph 8.1.4 of BS 4142 states, '<i>The monitoring duration should reflect the range of background sound levels for the period being assessed. In practice, there is no "single" background sound level as this is a fluctuating parameter. However, the background sound level used for the assessment should be representative of the period being assessed.</i></p> <p>The duration of the noise monitoring surveys was selected taking a number of factors into account. These include proportionality, noise sources (i.e. whether dominant), security of equipment, land access, the number of receptors represented by the position, and the intended use of the monitoring results. The noise</p>

<sup>9</sup> British Standards Institution (2019). BS 4142:2014+A1:2019: Methods for rating and assessing industrial and commercial sound. London: British Standards Institution.

PINS ID	External Stakeholder (where applicable)	Question / Response
		<p>monitoring locations used for the operational ventilation noise assessments were selected taking into account these factors. As an example, at LT-NML 03 there was no dominant noise source, a secure location could be found for the equipment, and the location represented a large number of receptors. A long-term measurement of seven days was therefore selected. On the other hand, A-NML 04 was on a public footpath, there was a dominant noise source (i.e. traffic using the A226) and it represented a small number of receptors. A short term three-hour measurement was therefore considered appropriate.</p> <p><b>Why was this considered to be representative for each receptor?</b></p> <p>The selection of survey locations was considered appropriate to cover all the possible noise climates within the study area. Based on the noise sources in the area, the survey durations were chosen to be able to capture a representative background noise level required for the assessment. The judgement on which survey location is representative of which assessment location was based on information gained from site visits during the survey periods.</p> <p><b>Explain why monitoring location LT-NML-5 was considered to provide a robust baseline, noting that this location is some distance from the identified sensitive receptors?</b></p> <p>LT-NML 05 was chosen to represent receptors to the north of the study area that were not dominated by road traffic noise from Gravesend Road. Factors such as security of equipment and access permission were considered when selecting a survey location in this area, and it was therefore necessary to select a location some distance from the South Portal. However, it is considered that this has not compromised the assessment as the measured baseline noise levels at LT-NML 05 are the lowest recorded within the area and provide a good representation of receptors away from the influence of Gravesend Road.</p> <p><b>Why there appears to be differences between the baseline (noise monitoring surveys) and assessment locations?</b></p> <p>The noise assessment locations were chosen as the closest receptors to each portal. In selecting the baseline noise survey locations, it was necessary to take other factors into consideration as has been explained earlier in this response.</p> <p><b>In addition, please explain how this would allow the assessment to be representative?</b></p> <p>When undertaking the assessment at each location, the most appropriate baseline noise level has been used to ensure the assessment was representative. The baseline survey location to use has been selected based on the noise climate at the assessment locations and this is based upon knowledge gained during the site visit and noise surveys.</p>

PINS ID	External Stakeholder (where applicable)	Question / Response
ExQ1_Q9.2.5	Local Authorities	<p><b>Duration of Effects</b></p> <p>ES Chapter 12 – Noise and Vibration [APP-150] utilises guidance in respect of the duration of an effect contained within the Design Manual for Roads and Bridges (DMRB), (ie 10 or more days in a consecutive 15 day period, or more than 15 days in a six-month period). - Please indicate how/ why you could be confident that the duration of effects would not be greater than those predicted in the ES? - Please indicate if any measures would be necessary to monitor any exceedances and, if so, whether any associated reactive mitigation measures would be necessary?</p> <p><b>Response:</b></p> <p><b><u>Please indicate how/ why you could be confident that the duration of effects would not be greater than those predicted in the ES?</u></b></p> <p>The Applicant is content that the construction durations used to assess the impacts outlined in the Environmental Statement (ES) are robust and sufficient. The information the assessments are based on include the timing of the works and the type of plant and work being undertaken. The Applicant considers the duration of the construction works, which has informed the assessment of noise and vibration effects, to be appropriate and proportionate to the scale and complexity of the construction works. The basis of this confidence is set out below.</p> <p>The development of the activity durations and sequence of works draws upon professional engineering expertise from a team of construction experts, covering highways, tunnels and utility expertise gained from a variety of similar projects. Furthermore, subject matter experts, including those in the fields of ecology and archaeology, have contributed their specialised knowledge and utilising project-specific data to mitigate risks associated with these constraints. This collaborative approach develops an integrated program that considers various constraints that may impact construction durations and work phasing. Developing the construction programme and phasing of works the following has been taken into consideration:</p> <ul style="list-style-type: none"> <li>• It is based on a mature preliminary design, and it reflects the scope of works as defined by the design.</li> </ul>

PINS ID	External Stakeholder (where applicable)	Question / Response
		<ul style="list-style-type: none"> <li>• The duration and phasing of works include common construction methodologies and has been built upon industry standard production rates for key elements. It has also drawn upon lessons learned from previous projects.</li> <li>• The production rates used to determine the duration of the construction activities have been benchmarked with projects of similar scale and complexity. Additionally, external parties have conducted reviews to validate the Applicant's approach to establishing the phasing of the works and construction durations.</li> <li>• It considers seasonal constraints. The duration and phasing of works were built-up to include for ecological and seasonal constraints. Informed by relevant ecological experts, This includes for all identified translocation windows and earth moving seasons. By building these constraints into the phasing of works increases the confidence level of the delivery timescales.</li> <li>• It includes consenting requirements: The draft DCO <a href="#">[REP3-077]</a> sets out a series of Requirements and other obligations that must be delivered prior to any works commencing on site. Timescales for meeting these obligations have been built into the front end of the reference schedule to ensure compliance with all aspects of the draft DCO documentation.</li> <li>• It considers the phasing of the utility diversions: a key aspect of the project is the relocation of significant utilities. The applicant has had extensive engagement with key utility companies and their draft timescales and works sequences, which have been incorporated into the phasing of works. This was undertaken to ensure a full understanding of the impacts of potential utility diversions.</li> <li>• It considers the phasing of construction earthworks and structures: the Applicants' durations and phasing of works has been developed to allow for earthworks to be undertaken within recognised seasonal constraints. The phasing of works was developed in conjunction with the design team and DCO specialists to ensure the delivery of key infrastructure elements were sequenced in such a way as to reduce the impacts of the works as far as reasonably practicable for this stage of the project. In addition, this has informed durations set out in Table 4.2 &amp; 4.3 of for the Outline Traffic Management Plan for Construction <a href="#">[REP3-121]</a>, which has informed impact assessments.</li> </ul> <p>Regarding pre-construction activities, as part of the Applicants' delivery strategy to minimise the risk of the construction duration the contractors will be appointed before the DCO grant. This enables the specialist</p>



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		<p>delivery team to develop the design in conjunction with the emerging considerations created as part of the DCO process.</p> <p><b><u>Please indicate if any measures would be necessary to monitor any exceedances and, if so, whether any associated reactive mitigation measures would be necessary?</u></b></p> <p>Any exceedances in these durations would be identified as the Project progresses through detailed design and during construction. Should any exceedances be identified that would lead to new significant adverse effects, these would be addressed by the measures provided within the Code of Construction Practice <a href="#">[REP3-104]</a>.</p> <p>The Applicant has set out a robust approach to monitor and manage the noise and vibration effects associated with the construction works. As committed to in the Register of Environmental Actions and Commitments (REAC) items NV002, NV005, NV007 and NV009 contained within the Code of Construction Practice <a href="#">[REP3-104]</a>:</p> <ul style="list-style-type: none"> <li>• NV002: A Noise and Vibration Management Plan (NVMP) or equivalent would be prepared for each part of the construction works subject to Section 61 control for consideration by the relevant planning authorities.</li> <li>• NV005: Pre-construction baseline noise levels would be submitted to the relevant planning authorities to establish a pre-construction baseline for monitoring compliance with construction noise limits.  [The approach within NV002 and NV005 provides a mechanism to agree Best Practicable Means for construction works on a case by case basis, which would include any monitoring though to be necessary, i.e. to monitor unforeseen instances where the limits agreed exceed the limits set out in the ES.]</li> <li>• NV007: Best Practicable Means as defined under Section 72 of the Control of Pollution Act 1974 would be employed during the construction phase to reduce noise and vibration nuisance. These would include measures such as: <ul style="list-style-type: none"> <li>– installing and maintaining hoarding around the construction areas likely to generate noise</li> <li>– keeping site access routes in good condition with condition assessments on site to inspect for defects such as potholes</li> <li>– turning off plant machinery when not in use</li> </ul> </li> </ul>

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		<ul style="list-style-type: none"> <li>– maintaining all vehicles and mobile plant such that loose body fittings or exhausts do not rattle or vibrate</li> <li>– using silenced equipment where available, in particular silenced power generators and pumps</li> <li>– no music or radios would be played for entertainment purposes outdoors on-site</li> <li>– planning site layout to ensure that reversing is kept to a reasonably practicable minimum</li> <li>– reversing manoeuvres would be supervised by a trained banksman/vehicle marshal to ensure they are conducted safely and concluded quickly</li> <li>– non-percussive demolition techniques would be adopted where reasonably practicable to reduce noise and vibration impact.</li> </ul> <ul style="list-style-type: none"> <li>• NV009: During the construction phase, day and night-time noise and vibration monitoring would be undertaken at locations identified in consultation with the relevant local planning authorities to ensure that the mitigation measures suggested are working effectively.</li> </ul> <p>Should the noise and vibration limits outlined in the Environmental Statement be exceeded, the Applicant has secured commitments to taking rectifying measures to ensure adherence to the prescribed compliance limits. This commitment is detailed in the REAC, under item NV015:</p> <ul style="list-style-type: none"> <li>• NV015: In the event that noise and vibration monitoring (as provided for in NV009) identifies that noise and vibration limits (as provided for in NV004) have been exceeded, the Contractors shall, at the earliest reasonably practicable opportunity, investigate to confirm that works being undertaken as part of the Project are the source of the noise. If this is confirmed, then the Contactor shall immediately undertake a further review of the best practicable means (as defined under the Control of Pollution Act 1974) employed for the activity to minimise noise and agree additional or modified mitigation with the relevant local authorities unless otherwise agreed with the SoS.</li> </ul> <p>Through this proactive approach, any potential impacts from construction noise associated with exceeding the durations stated in the ES are effectively managed, and the Project's adherence to the noise limits set out within the Section 61 agreements made under NV004 is assured. Through the Section 61 agreements and under the commitments made in NV015, monitoring would be stipulated to consider any exceedances of appropriate limits and, if so, ensure that reactive mitigation measures would be implemented to control noise in accordance with NV007.</p>

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ExQ1_Q9.2.6	N/A	<p><b>Short term Effects</b></p> <p>In ES Chapter 12 – Noise and Vibration (paragraph 12.6.190) [APP-150] the significant adverse effects are referred to as ‘short term’. With reference to the methodology, can the Applicant provide an explanation as to why these have been characterised as ‘short term’?</p> <p><b>Response:</b></p> <p>As described in Environmental Statement (ES) Chapter 12: Noise and Vibration [APP-150] paragraph 12.3.9, the short-term effects are those predicted to occur in the opening year of the road. Under the assessment methodology prescribed in Design Manual for Roads and Bridges (DMRB) LA 111<sup>10</sup>, short-term changes in road traffic noise are defined through the consideration of the Project on opening, in this case 2030.</p> <p>The comparison uses the Do-Minimum opening year scenario (without the Project) and compares it to the Do-Something opening year scenario (with the Project), which, when considered against the short-term magnitude of change criteria from the DMRB, assesses the effect of the immediate change in road traffic noise upon opening. This represents the most stringent DMRB change criteria and is shown in Table 3.54a of DMRB LA 111, where a 3dB(A) change can be considered as significant.</p> <p>The effects described within paragraph 12.6.190 of ES Chapter 12 are on roads that are physically unaltered as part of the Project but where the traffic flow is forecast to change in the opening year, and hence the effects are considered by DMRB LA 111 as short term.</p>
ExQ1_Q9.2.7	N/A	<p><b>Reasonable worst-case scenario</b></p> <p>In respect of noise and vibration, can the Applicant provide clarity as to how the ‘reasonable worst- case scenario’ has been identified.</p> <p><b>Response:</b></p> <p>Within Environmental Statement (ES) Chapter 12: Noise and Vibration [APP-150], paragraph 12.3.146 outlines the definition of ‘reasonable worst case’ relating to construction noise and vibration. Paragraph 12.3.146 defines the following facets of the construction assessment:</p>

<sup>10</sup> Highways England (2020). Design Manual for Roads and Bridges (DMRB), LA 111 Noise and Vibration. Revision 2. Accessed August 2023.  
<https://www.standardsforhighways.co.uk/search/cc8cfcf7-c235-4052-8d32-d5398796b364>

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		<ul style="list-style-type: none"> <li>• Within the assessment of construction noise, a selection of 140 receptors have been used to assess and consider construction noise. These receptors are selected on the basis of representing the closest and most exposed receptors to the construction works associated with the Project. The assessments presented for these receptors are then used as representative of receptors in the vicinity but further away from the works being considered. As such this assumption is concluded to represent a worst case with regard to the conclusion of impacts, as greater distance and increased screening from the receptors assessed would result in lower impacts.</li> <li>• Construction programme and plant itinerary and percentage on times. All aspects of the construction specifics informing the assessment are detailed in ES Appendix 12.4: Construction Noise and Vibration Assessment [<a href="#">REP1-169</a>]. All assumptions within this document are considered to represent a reasoned consideration of the plant necessary, provided by the construction specialists, along with reasoned consideration of the amount of time items will operate, as the assumption of 100% of time for all plant would not be likely for the majority of plant. This is therefore a reasonable worst case scenario that would happen only for a few items of plant and over short periods.</li> <li>• The noise calculations consider a single homogenous source for the plant associated with each construction activity as described. This places all noise sources in one location, which would not be physically possible, rather than spread across the working area as would occur in practice. This was necessary as a direct result of the complexity and duration of the works being modelled, and the capacity of the modelling software relating to total number of sources. This assumptions put all the plant at the closest position to a receptor, which could occur for only short periods and therefore would be worse case.</li> </ul> <p>There are also a number of worst-case assumptions made within the noise modelling which allow the conclusion that the construction noise assessment presented in ES Chapter 12: Noise and Vibration [<a href="#">APP-150</a>] is a reasonable worst case relative to these elements:</p> <ul style="list-style-type: none"> <li>• Hard reflective ground has been assumed, meaning noise would propagate a further distance in the model than in reality. In reality, there would be a mix of acoustically hard (e.g. concrete, bituminous surfaces, water) and acoustically soft (e.g. grass, agricultural land, woodlands, forests) ground across such a large area, with a prominence of soft ground in this area. The assumption of hard ground, therefore, means that the propagation of noise from the works has potentially been overestimated in the calculations.</li> </ul>

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		<ul style="list-style-type: none"> <li>The methodology assumes a positive wind vector in all directions (essentially the assumption of wind emanating from the source) which would not occur in reality. Upwind noise propagation would be lower at greater distances than downwind propagation. As such, this is a worst case assumption which potentially overestimates noise in areas that would be predominantly upwind of the Project.</li> <li>No acoustic screening has been assumed in the modelling relative to buildings and structures, or ground contours (including any operational groundworks mitigation proposed under the Project design). This was necessary as a result of the complexity of the Project and to ensure that any effects of screening were not overestimated in the calculations.</li> </ul>
ExQ1_Q9.2.8	N/A	<p><b>Reasonable worst-case scenario</b> Can the Applicant confirm whether the peak traffic flows have been used to represent a worst-case scenario for the operational noise assessment?</p> <p><b>Response:</b> Peak flows have not been used in the assessment presented within Environmental Statement (ES) Chapter 12: Noise and Vibration [APP-150]. The assessment has been undertaken using 18-hour Annual Average Weekday Traffic (AAWT) flows in accordance with the Calculation of Road Traffic Noise (CRTN)<sup>11</sup> as required by the National Policy Statement for National Networks<sup>12</sup>, Design Manual for Roads and Bridges (DMRB) LA 111<sup>13</sup> and the Noise Insulation Regulations.</p>
ExQ1_Q9.3.1	N/A	<p><b>Preparatory/ Preliminary works</b> Can the Applicant explain how the preparatory/ preliminary works have been assessed in terms of noise and vibration?</p> <p><b>Response:</b></p>

<sup>11</sup> Department of Transport and Welsh Office (1988). Calculation of Road Traffic Noise (CRTN).

<sup>12</sup> Department for Transport (2014). National Policy Statement for National Networks.

<sup>13</sup> Highways England (2020). Design Manual for Roads and Bridges (DMRB), LA 111 Noise and Vibration. Revision 2. Accessed August 2023.

<https://www.standardsforhighways.co.uk/search/cc8cfcf7-c235-4052-8d32-d5398796b364>

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		<p>The assessment of construction noise and vibration that is detailed in Environmental Statement (ES) Chapter 12: Noise and Vibration [APP-150] includes the preparatory/preliminary works. These have been assessed using the same methodologies as the main works, i.e. in accordance with DMRB LA111.</p> <p>The term 'preliminary works', as defined in paragraph 3.1.1 of ES Appendix 2.2: Code of Construction Practice (CoCP) [REP3-104], includes a specific scope of defined activities. The scope of the assessment is detailed in paragraph 12.3.3a of ES Chapter 12: Noise and Vibration [APP-150], where the assessment scope comprehensively addresses the temporary construction impacts of the entire Project as detailed within the construction assumptions, including both the preliminary works and subsequent phases.</p> <p>Within ES Chapter 12: Noise and Vibration [APP-150] the assessment includes the main preparatory/preliminary works which use large scale noisy equipment that present the potential to result in significant effects has been assessed; such as site clearance (including vegetation strip), advanced compound works and site establishment. These have been assumed to occur at the commencement of the 5 year construction period considered within Chapter 12 and have been assessed using the same methodologies as the main works, i.e. in accordance with DMRB LA 111. The preparatory/preliminary works would be subject to the same REAC commitments as the main works, as set out in ES Appendix 2.2: CoCP [REP3-104].</p>
ExQ1_Q9.3.2	N/A	<p><b>Timing</b></p> <p>For some of the assessments, the effects are subdivided by year during the construction period. - Please provide a justification for this approach? - Please explain how any delay in the construction period could affect this assessment?</p> <p><b>Response:</b></p> <p>Within the scope of Environmental Statement (ES) Chapter 12: Noise and Vibration [APP-150] the construction traffic assessment is subdivided by year in order to provide a more accurate indication of the duration of potential effects. This also assists with demonstrating that any identified effects are unlikely to be present for the full construction period. An assessment period shorter than one year was considered to be too short given the level of detail provided at this stage of the assessment.</p> <p>Should the construction year change then the existing traffic flows on the network are likely to increase to a limited extent as a result of year on year traffic growth. However, the construction-generated traffic would remain consistent with the levels used for the assessment of impacts from construction traffic. The noise from construction activities would also remain consistent with that assessed within ES Chapter 12: Noise</p>

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		and Vibration [APP-150]. As such, the Applicant considers that a delay in the construction period would not affect the conclusions relating to the assessment of construction traffic noise within ES Chapter 12: Noise and Vibration.
ExQ1_Q9.3.3	N/A	<p><b>Mitigation</b> ES Chapter 12 – Noise and Vibration (paragraph 12.6.114) [APP-150] sets out that dwellings on Henhurst Road and Jeskyns Road are predicted to experience significant effects but also notes that further interrogation of the results was undertaken and sets this out. From this, it then goes on to set out a number of mitigation measures which are concluded as not possible to implement and one measure as being under investigation. Noting this, can the Applicant clarify its conclusion in terms of the significance of effects on these dwellings and provide an update on the mitigation proposed?</p> <p><b>Response:</b> The conclusion of the Applicant remains as reported in paragraphs 12.6.113 to 12.6.115 of Environmental Statement (ES) Chapter 12: Noise and Vibration [APP-150], which is to identify modelled indirect significant effects at these properties due to changes in local traffic flows and increase in proportion of heavy vehicles. In terms of the latest position on potential mitigation, the Applicant has considered and discounted as not feasible three options as presented in paragraph 12.6.115, whilst the remaining option of limiting heavy vehicle use of these routes remains under consideration and has yet to be concluded.</p>
ExQ1_Q9.3.4	N/A	<p><b>Duration</b> ES Chapter 12 – Noise and Vibration [APP-150] indicates that Receptor CN 77 would be unlikely to constitute a significant effect on the basis of duration. Can the Applicant indicate why a more robust conclusion can not be reached for this receptor?</p> <p><b>Response:</b> Review of the information in Table 12.33 of Environmental Statement (ES) Chapter 12: Noise and Vibration [APP-150] relative to construction noise receptor CN 77 concludes that, during the daytime and evening, construction noise is '<i>unlikely to constitute a significant effect on the basis of duration</i>'. The Applicant's response to ExQ1_Q9.2.5 details the confidence of the Applicant relating to the duration of construction activities. Given that confidence, the Applicant agrees that the table is worded too cautiously.</p>

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		The text should read ' <i>would not constitute a significant effect on the basis of duration</i> ' and will be updated in the ES Addendum for Deadline 4.
ExQ1_Q9.3.5	N/A	<p><b>Tunnel Boring Method</b></p> <p>The Applicant has notified the ExA of proposed changes to the development [AS 083]. This includes reference to the use of a single Tunnel Boring Machine (TBM) rather than 2 TBMs. In respect of both noise and vibration, can the applicant set out what different effects could occur using a single compared to 2 TBMs.</p> <p><b>Response:</b></p> <p>The Applicant has set out the possible effects from the use of a single TBM within Table C.5 of Appendix C of the Environmental Statement Addendum [REP3-124]. This has concluded that no new or different significant effects on noise and vibration receptors beyond those already assessed in Environmental Statement Chapter 12: Noise and Vibration [APP-150] are anticipated. The construction noise and vibration assessment presented in Chapter 12 is therefore considered to provide a robust assessment based on a worst-case scenario where two TBMs are used.</p>
ExQ1_Q9.3.6	N/A	<p><b>Tunnel Boring Method</b></p> <p>There are a variety of types of TBMs available. Can the Applicant explain how this potential variety in technology has been considered in the assessment?</p> <p><b>Response:</b></p> <p>Tunnel Boring Machine (TBM) selection considered the technical capabilities needed for the prevalent geology (flint bands in Chalk) and high water pressure (due to tunnel depth below River Thames). The Applicant considers a closed-face TBM would be best suited to tunnelling in Chalk. A slurry-type machine has been selected to provide the basis of the assessments.</p> <p>The infrastructure required for a slurry-type machine, i.e. the slurry treatment plant, is a larger piece of infrastructure than might be required for the management of excavated arisings coming out of the tunnel from the other closed-face TBM-types, such as an Earth Pressure Balance Machine. So, in terms of a reasonable worst case, the Applicant has therefore assessed the TBM technology which has the most infrastructure at the tunnel portal compound.</p>



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		<p>The Applicant has further considered whether slurry technology represents a reasonable worst case for the Environmental Impacts Assessment and is satisfied that it does. Any alternative technology would fall within the assessed envelope, as no surface-sited slurry treatment plant would be required.</p> <p>In terms of the impacts around de-watering or ground-borne noise, the Applicant considers those to be within the same bounds for both machine types, and the Project's assessment is considered to be appropriate.</p> <p>Following the discussions at ISH5, the Applicant is proposing to commit to using closed-face tunnelling techniques for the highway bored tunnels within the Register of Environmental Actions and Commitments (REAC). This will be included in the next update of Environmental Statement Appendix 2.2: Code of Construction Practice [REP3-104], targeted for Deadline 5.</p>
ExQ1_Q9.4.1	N/A	<p><b>Mitigation</b></p> <p>Can the Applicant explain how the commitments in the Register of Environmental Actions and Commitments (REAC) contained within the Code of Construction Practice [REP1-157] would be delivered during the operational phase?</p> <p><b>Response:</b></p> <p>The draft Development Consent Order [REP3-077], Schedule 2, Part 1, Requirement 4 secures the requirement for approval of an Environmental Management Plan (referred to as the third iteration of the EMP or EMP3) and for the authorised development to be operated and maintained in accordance with that plan, which would be developed and completed by the end of the construction, commissioning and handover stage of any part of the authorised development, in accordance with the process set out in the Code of Construction Practice (CoCP).</p> <p>The CoCP, as updated at Examination Deadline 3 [REP3-104], sets out the following:</p> <ul style="list-style-type: none"> <li>Paragraph 2.3.6 explains that the Contractors will prepare an EMP3. It states that '<i>The EMP3 will build on the EMP2 and Landscape and Ecology Management Plan (LEMP) and will provide the information on relevant environmental commitments and objectives that will need to be honoured and ongoing actions and risks that will need to be managed for that part of the Project. It will include as-built information and other details in a form that can be used by the organisation responsible for long-term operational management.</i></li> </ul>

PINS ID	External Stakeholder (where applicable)	Question / Response
		<ul style="list-style-type: none"> <li>Paragraph 6.13.2 of the CoCP states that '<i>the EMP3 will detail maintenance and monitoring activities throughout the operation phase having regard for the specific mitigation measures identified within the REAC as well as operating procedures of National Highways, the local authority and local highway authority</i>'.</li> </ul> <p>The delivery of many of the commitments would be contractor-led because they relate to the design of measures which will endure into the operational phase. Other commitments would be ongoing during operation and would therefore be the responsibility of the Applicant, however contractual arrangements may be put in place to ensure their delivery by appropriate contractors.</p> <p>Paragraph 2.7.2 of the CoCP states that '<i>National Highways and Contractors involved with the operation of the Project will be required to comply with the provisions of the EMP3. These requirements would be subject to the enforcement provisions in Part 8 of the Planning Act 2008</i>'.</p> <p>With specific reference to noise and vibration, commitments are included within the Register of Environmental Actions and Commitments (REAC) contained within the Code of Construction Practice, and as updated at Examination Deadline 3 [REP3-104], relating to measures to mitigate noise from the road when operational (i.e. REAC commitments NV011, NV013 and NV014). Action will be undertaken by the Contractors to ensure the mitigation measures installed during construction meet the required standard. As an example, before any noise barriers are installed, the manufacturer's specification will be checked to ensure compliance with REAC commitment NV011. The procedures for the implementation of actions such as this will be set out in an EMP2 submitted for approval in accordance with Requirement 4 of the draft DCO.</p>
ExQ1_Q9.4.2	N/A	<p><b>Maintenance</b></p> <p>Can the Applicant explain the scale of maintenance work used to inform the operational assessment? In doing so, please set out the type, location and duration of maintenance works likely to take place and any likely significant effects that could result.</p> <p><b>Response:</b></p> <p>There is no assumed maintenance work used to inform the operational noise assessment. The assessment of operational noise considers the Project directly after construction before any maintenance has been undertaken.</p>

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		<p>The definition of ‘maintain’ in article 2 of the draft Development Consent Order (DCO) [REP3-077] is expressly limited only to activities which do not give rise to any materially new or materially different environmental effects compared to those identified in the Environmental Statement. Accordingly, the maintenance powers in the DCO fall within the scope of the ‘Rochdale Envelope’ within which the assessments are based. Therefore, no specific maintenance activities have been incorporated into the assessment of noise effects.</p> <p>Any future maintenance which relies upon National Highways' powers under the Highways Act 1980 will, in common with the rest of the strategic road network, be undertaken having regard to the activities permitted by that statutory regime.</p>
ExQ1_Q9.4.3	N/A	<p><b>Mitigation</b> Please clarify if any mitigation is relied upon to avoid likely significant effects that could arise from maintenance works; if so, please clarify/identify these?</p> <p><b>Response:</b> There is no noise mitigation included within the DCO design that is relied upon to avoid likely significant effects from the undertaking of maintenance works.</p>
ExQ1_Q9.4.4	N/A	<p><b>Mitigation</b> At paragraph 12.6.201 of ES Chapter 12 – Noise and Vibration [APP-150], it is concluded that no dwellings would qualify under the Noise Insulation Regulations assessment scheme. Can the applicant please explain: - Whether this conclusion is contingent upon any design features/ mitigation? - How the final assessment and verification as to eligibility under the Regulations (to be undertaken within the first year of the Project opening) is secured through the dDCO? - If any noise insulation works are found to be required through the final assessment, what timescales would be likely for the mitigation/measures to be implemented?</p> <p><b>Response:</b> The conclusion of “no dwellings being eligible for noise insulation” is contingent upon the mitigation described within Section 12.5 of Environmental Statement (ES) Chapter 12: Noise and Vibration [APP-150] being delivered.</p>

PINS ID	External Stakeholder (where applicable)	Question / Response
		<p>The final assessment and verification will be secured via a new REAC commitment within ES Appendix 2.2: Code of Construction Practice [REP3-104] submitted at Deadline 5. The new REAC commitment will state 'A final assessment and verification of possible eligibility under the Regulations will be undertaken within the first year of the Project opening', which will be secured by Requirement 4 of the draft DCO [REP3-077].</p> <p>With reference to the request for details of timeframes for implementation, the works would be undertaken under the provisions of the Noise Insulation Regulations 1975. The specifics of Provision 10 of the Noise Insulation Regulations relate to timescales are presented below.</p> <p><i>Conditions for carrying out of insulation work or making of grants</i></p> <p>10.— (1) <i>The carrying out of insulation work and the making of grants shall be dependent upon compliance with the following conditions—</i></p> <p>(a) <i>the claimant shall have complied with paragraphs (4) to (7) of Regulation 8;</i></p> <p>(b) <i>a claimant who accepts an offer to carry out insulation work shall—</i></p> <p>(i) <i>if he is the occupier of or entitled to occupy the building, afford to the appropriate highway authority or their agent such access to the building as they may reasonably require for the purpose of carrying out and of inspecting the work to ascertain whether it complies with the relevant specifications, or</i></p> <p>(ii) <i>if he is not the occupier of nor entitled to occupy the building, procure the occupier or person entitled to occupy the building to afford them such access;</i></p> <p>(c) <i>a claimant who accepts an offer to make a grant in respect of the cost of insulation work shall carry out the work in accordance with the relevant specifications and <u>complete it before the expiration of twelve months from the date of acceptance and—</u></i></p> <p>(i) <i>if he is the occupier of or entitled to occupy the building, afford to the appropriate highway authority or their agent such access to the building as they may reasonably require for the purpose of inspecting the work to ascertain whether it complies with the relevant specifications, or</i></p> <p>(ii) <i>if he is not the occupier of nor entitled to occupy the building, procure the occupier or person entitled to occupy the building to afford them such access.</i></p> <p>Due to the variation in the types of properties that may be eligible for noise insulation, timescales for implementation will vary. It is not possible to determine the times involved until on-site assessments have been completed.</p>

PINS ID	External Stakeholder (where applicable)	Question / Response
ExQ1_Q9.4.6	N/A	<p><b>Night-time Effects</b></p> <p>ES Chapter 12 – Noise and Vibration (Paragraph 12.6.127 (b)) [APP-150] notes that “<i>Nine dwellings: one dwelling (No. 2 Potash Cottages, Orsett) which reports a Minor beneficial change above a SOAEL during the daytime and night-time periods, with a further nine dwellings reporting a significant effect during the night-time only</i>”. These night-time significant effects do not appear to be listed in the summary. Can the Applicant confirm whether these are adverse significant effects and explain any potential mitigation considered in the assessment for these receptors?</p> <p><b>Response:</b></p> <p>The significant effects described within paragraph 12.6.127 of Environmental Statement (ES) Chapter 12: Noise and Vibration [APP-150] are beneficial effects and no mitigation is therefore considered for them. Whilst the 10 beneficial effects above a SOAEL in total stated in paragraph 12.6.127 are correct, the reference to ‘further nine’ in paragraph 12.6.127b is incorrect and should read ‘remaining eight’. This correction will be addressed in the ES Addendum for Deadline 5, but it does not change the total number of effects quoted in paragraphs 12.6.127 and 12.6.128.</p> <p>Table 12.50 contains a summary of both the adverse and beneficial effects between the north shore of the River Thames and the A13/A1089 junction. The paragraphs following this table identify any of these significant effects, adverse or beneficial, <b>where the absolute noise level is above a SOAEL</b>. The nine dwellings demonstrating significant beneficial effects above a SOAEL during the night-time identified in paragraph 12.6.127b are therefore a subset of those listed in Table 12.50 within:</p> <ul style="list-style-type: none"> <li>• 4 No. on Stanford Road under ‘<i>Four dwellings located in Stanford Road</i>’ where it is reported a ‘<i>Moderate or greater change in road traffic noise during daytime period and <b>minor change above an SOAEL during the night-time period</b></i>’</li> <li>• 1 No. on Stanford Road (No. 2 Potash Cottages, Orsett) under ‘<i>31 dwellings located in Stanford Road, River View</i>’ where it is reported a ‘<i>Minor change above a SOAEL during the daytime and night-time period</i>’</li> <li>• 4 No. on Heath Road under ‘<i>Seven dwellings located in River View, Heath Road</i>’ where it is reported a ‘<i>Minor change above a SOAEL during the Night-time period</i>’. The remaining three are on River View and are reported as indirect beneficial effects.</li> </ul>

PINS ID	External Stakeholder (where applicable)	Question / Response
ExQ1_Q9.4.7	N/A	<p><b>Indirect Beneficial Effects</b></p> <p>ES Chapter 12 – Noise and Vibration [APP-150] indicates there would be a number of indirect significant beneficial effects. Please could each of these effects be listed and explained individually?</p> <p><b>Response:</b></p> <p>ES Chapter 12: Noise and Vibration [<a href="#">APP-150</a>] reports a total of 1,367 significant beneficial effects of the Project, of which 859 are indirect effects, i.e. not resulting from noise generated by any new or altered highways. These significant beneficial effects relate to either moderate or greater reductions in road traffic noise, or minor or greater reductions in road traffic noise above a Significant Observed Adverse Effect Level (SOAEL).</p> <p>These occur in the following areas:</p> <ul style="list-style-type: none"> <li>• 12 receptors located on Dene Holm Road, Gainsborough Drive and Painters Ash Lane south of the River Thames in Gravesend. <ul style="list-style-type: none"> <li>– 12 receptors present a minor beneficial change in road traffic noise above a SOAEL during the night-time.</li> <li>– This is as a direct result of a 30% reduction in total flow along Dene Holm Road as a result of the Project.</li> </ul> </li> <li>• 28 receptors located on Stifford Clays Road and Silverwood Close between the River Thames and the A13 in Grays. <ul style="list-style-type: none"> <li>– 2 receptors present a minor beneficial change in road traffic noise above a SOAEL during the daytime period only.</li> <li>– 6 receptors present a minor beneficial change in road traffic noise above a SOAEL during both the daytime and night-time periods.</li> <li>– 20 receptors present a minor beneficial change in road traffic noise above a SOAEL during the night-time period only.</li> <li>– This is as a direct result of a 15% reduction in total flow and a 3% reduction in the percentage Heavy Goods Vehicle (HGV) content along Stifford Clays Road as a result of the Project.</li> </ul> </li> <li>• 16 receptors located on High Road and Shelford Close between the A13 and the M25 in Orsett.</li> </ul>

PINS ID	External Stakeholder (where applicable)	Question / Response
		<ul style="list-style-type: none"> <li>– 2 receptors present a moderate beneficial change in road traffic noise during the daytime period.</li> <li>– 14 receptors present a moderate beneficial change in road traffic noise during both the daytime and night-time periods.</li> <li>– This is as a direct result of a 20% reduction in total flow and a 5% reduction in the percentage HGV content along High Road as a result of the Project.</li> <li>• 8 receptors located on London Road adjacent to the M20 in West Kingsdown. <ul style="list-style-type: none"> <li>– 8 receptors present a minor beneficial change in road traffic noise above a SOAEL during the daytime period only.</li> <li>– This is as a direct result of a 20% reduction in total flow and a 3% reduction in the percentage HGV content on the eastbound M20 as a result of the Project.</li> </ul> </li> <li>• 11 receptors located on London Road, Nepicar Lane, Wrotham Water Road, Old London Road, Pilgrims Way and Gravesend Road adjacent to the M20 in Wrotham and Wrotham Heath. <ul style="list-style-type: none"> <li>– 5 receptors present a minor beneficial change in road traffic noise above a SOAEL during the daytime period only.</li> <li>– 2 receptors present a minor beneficial change in road traffic noise above a SOAEL during both the daytime and night-time periods.</li> <li>– 4 receptors present a minor beneficial change in road traffic noise above a SOAEL during the night-time period only.</li> <li>– This is as a direct result of a 24% reduction in total flow and a 4% reduction in the percentage HGV content along the eastbound M20 as a result of the Project.</li> </ul> </li> <li>• 11 receptors located on Tilbury Road, Brentwood Road and Church Road north of the A13 in West Horndon, Orsett and Bulphan. <ul style="list-style-type: none"> <li>– 4 receptors present a minor beneficial change in road traffic noise above a SOAEL during the daytime period only.</li> <li>– 7 receptors present a minor beneficial change in road traffic noise above a SOAEL during both the daytime and night-time periods.</li> </ul> </li> </ul>

PINS ID	External Stakeholder (where applicable)	Question / Response
		<ul style="list-style-type: none"> <li>– This is as a direct result of a 25% reduction in total flow and a 3% reduction in the percentage HGV content along Brentwood Road (A128) as a result of the Project.</li> <li>• 25 receptors located on London Road, Button Street and Farningham Hill Road adjacent to the M20 in Swanley and Farningham. <ul style="list-style-type: none"> <li>– 15 receptors present a minor beneficial change in road traffic noise above a SOAEL during the daytime period only.</li> <li>– 5 receptors present a minor beneficial change in road traffic noise above a SOAEL during both the daytime and night-time periods.</li> <li>– 5 receptors present a minor beneficial change in road traffic noise above a SOAEL during the night-time period only.</li> </ul> </li> <li>– This is as a direct result of a 27% reduction in total flow and a 4% reduction in the percentage HGV content at the M20/M25 junction as a result of the Project.</li> <li>• 33 receptors located on River View north of the River Thames in Chadwell St Mary. <ul style="list-style-type: none"> <li>– 30 receptors present a minor beneficial change in road traffic noise above a SOAEL during both the daytime and night-time periods.</li> <li>– 3 receptors present a minor beneficial change in road traffic noise above a SOAEL during the night-time period only.</li> <li>– This is as a direct result of a 27% reduction in total flow along River View as a result of the Project.</li> </ul> </li> <li>• 7 receptors located on Main Road, Longfield Road and Ryecroft in Meopham and Longfield in Kent. <ul style="list-style-type: none"> <li>– 3 receptors present a minor beneficial change in road traffic noise above a SOAEL during both the daytime and night-time periods.</li> <li>– 4 receptors present a minor beneficial change in road traffic noise above a SOAEL during the night-time period only.</li> <li>– This is as a direct result of a 27% reduction in total flow on the B260 as a result of the Project.</li> </ul> </li> <li>• 143 receptors located adjacent to Lower Dutton Road north of the A13. <ul style="list-style-type: none"> <li>– 3 receptors present a minor beneficial change in road traffic noise above a SOAEL during both the daytime and night-time periods.</li> </ul> </li> </ul>



PINS ID	External Stakeholder (where applicable)	Question / Response
		<ul style="list-style-type: none"> <li>– 30 receptors present a moderate beneficial change in road traffic noise above a SOAEL during the daytime and a minor beneficial change in road traffic noise above a SOAEL during the night-time.</li> <li>– 107 receptors present a moderate beneficial change in road traffic noise during the daytime only.</li> <li>– 3 receptors present a moderate beneficial change in road traffic noise during the daytime and a minor beneficial change in road traffic noise above a SOAEL during the night-time.</li> <li>– This is as a direct result of a 30% reduction in total flow and a 5% reduction in the percentage HGV content on Lower Dutton Road as a result of the Project.</li> <li>• 27 receptors located on Green Street, Green Road and Gore Road adjacent to the A282 at Darenth in Kent. <ul style="list-style-type: none"> <li>– 4 receptors present a minor beneficial change in road traffic noise above a SOAEL during the daytime period only.</li> <li>– 18 receptors present a minor beneficial change in road traffic noise above a SOAEL during both the daytime and night-time periods.</li> <li>– 5 receptors present a minor beneficial change in road traffic noise above a SOAEL during the night-time period only.</li> <li>– This is as a direct result of a 50% reduction in total flow along the A282 and the A2 slip roads as a result of the Project.</li> </ul> </li> <li>• 370 receptors located adjacent to Galleon Road, Mayflower Road and Lancaster Road in Chafford Hundred. <ul style="list-style-type: none"> <li>– 366 receptors present a moderate or greater beneficial change in road traffic noise during both the daytime and night-time periods.</li> <li>– 4 receptors present a moderate or greater beneficial change in road traffic noise during the daytime period only.</li> <li>– This is as a direct result of a 50% reduction in total flow along Lancaster Road, Mayflower Road and Galleon Road as a result of the Project.</li> </ul> </li> <li>• 109 receptors located adjacent to Lodge Lane in Stifford Clays and Grays.</li> </ul>

PINS ID	External Stakeholder (where applicable)	Question / Response
		<ul style="list-style-type: none"> <li>– 17 receptors present a minor beneficial change in road traffic noise above a SOAEL during the daytime period only.</li> <li>– 86 receptors present a minor beneficial change in road traffic noise above a SOAEL during both the daytime and night-time periods.</li> <li>– 6 receptors present a minor beneficial change in road traffic noise above a SOAEL during the night-time period only.</li> <li>– This is as a direct result of a 9% reduction in total flow and a 3% reduction in the percentage HGV content along Lodge Lane as a result of the Project.</li> <li>• 59 receptors located on Belhus Park Lane, Hamble Lane, Irvine Gardens, Humber Avenue, Gatehope Drive and Erriff Drive in South Ockendon. <ul style="list-style-type: none"> <li>– 1 receptor presents a minor beneficial change in road traffic noise above a SOAEL during both the daytime and night-time periods.</li> <li>– 58 receptors present a minor beneficial change in road traffic noise above a SOAEL during the night-time period only.</li> <li>– This is as a direct result of a 20% reduction in total flow and a 5% reduction in the percentage HGV content along the northbound M25, and a 16% reduction in total flow and a 4% reduction in the percentage HGV content along the southbound M25, as a result of the Project.</li> </ul> </li> </ul>
ExQ1_Q9.4.8	N/A	<p><b>Road Surfacing</b></p> <p>Can the Applicant explain how the maintenance / replacement of low road noise surfacing throughout the operating phase of the project will be secured in the DCO. Over time the highway will experience surface decays resulting in the need to maintain or replace the surface. What assurance is provided in the DCO that any resurfacing will meet the ES noise assessment?</p> <p><b>Response:</b></p> <p>Maintenance/renewals would be undertaken in accordance with Design Manual for Roads and Bridges (DMRB) GM 701 Asset delivery asset maintenance requirements<sup>14</sup> and CD 227 Design for pavement</p>

<sup>14</sup> Highways England (2020). Design Manual for Roads and Bridges, GM 701 Asset delivery asset maintenance requirements. <https://www.standardsforhighways.co.uk/search/e0a134c8-f5e2-4f30-9cda-9e43d047f46e>

PINS ID	External Stakeholder (where applicable)	Question / Response
		<p>maintenance<sup>15</sup>, coupled with the consideration of other DMRB standards for pavement treatments and investigation, and asset management plans. Pavement surfacing will undergo like-for-like replacement, based on measured wear and usage, with current best practice being a typical 11 to 12 year renewal period. The performance requirements for any replacement surfaces will be secured via a variation to commitment NV013 in the Register of Environmental Actions and Commitments (REAC) within Environmental Statement Appendix 2.2: Code of Construction Practice (CoCP) [REP3-104]. The updates to the commitment will be added to the updated REAC targeted for Deadline 5 and is intended to secure the replacement of road surfaces on the strategic network so that the noise emission performance is no worse than that laid for scheme opening. The REAC is secured as part of the CoCP by Requirement 4 of the draft DCO [REP3-077].</p> <p>The commitment discussed above will be included in the Handover Environmental Management Plan (EMP) i.e. the third iteration of the EMP (EMP3). By the end of the construction, commissioning and handover stage of any part of the Project, the Contractors will have developed the EMP3. EMP3 will detail maintenance and monitoring activities throughout the operational phase having regard for the specific mitigation measures identified within the REAC as well as operating procedures of National Highways, the local authority and local highway authority including commitments outlined above. This is set out in Section 6.13 of the CoCP.</p>
ExQ1_Q9.5.1	N/A	<p><b>Monitoring baseline</b></p> <p>Within ES Chapter 12 – Noise and Vibration [APP-150], it is indicated that there are some limitations to monitoring of the operational effectiveness due to the baseline understanding and existing noise emitters in the area. Can the Applicant provide further clarity as to the baseline information and how this will inform the monitoring strategy?</p> <p><b>Response:</b></p> <p>The Applicant is assuming that this question relates to the text within paragraph 12.8.6 of Environmental Statement Chapter 12: Noise and Vibration [APP-150].</p> <p>If present in the environment, the example noise sources listed within paragraph 12.8.6 would be contained within the baseline noise monitoring information presented within Environmental Statement Appendix 12.5:</p>

<sup>15</sup> Highways England (2020). Design Manual for Roads and Bridges, CD 227 Design for pavement maintenance. <https://www.standardsforhighways.co.uk/tses/attachments/0ff37fc4-9db6-495a-9460-843a55c0fc0c?inline=true>

PINS ID	External Stakeholder (where applicable)	Question / Response
		<p>Baseline Noise Survey Information [<a href="#">APP-445</a>]. The reports for each survey location presented within Appendix 12.5 provide information of the noise climate, including whether there were any dominant noise sources present. This information was gained from site visits by the team undertaking the noise monitoring exercise.</p> <p>The baseline information presented in Appendix 12.5 will not be used to inform the monitoring strategy. This is because the monitoring strategy will be evolved around ensuring that the products used for noise mitigation are correctly selected and installed, and the baseline information does not influence this process.</p>
ExQ1_Q9.5.2	N/A	<p><b>Monitoring Approval/ Timescales</b></p> <p>Within paragraph 12.8.7 of ES Chapter 12 – Noise and Vibration [APP-150], it is stated that physical monitoring of noise levels as a means of verification will not be undertaken as part of the Project. Rather these would be confirmed ‘pre-opening’. Can the Applicant confirm: - How this would be secured? - To what extent the relevant local authorities would be consulted? - What protocols would be put in place to ensure any breaches are remedied? - Subsequently, how would any remedial works be monitored/ verified to ensure they are effective?</p> <p><b>Response:</b></p> <p>The approval of performance specifications of specific operational mitigation measures as detailed in paragraph 12.8.7, Section 12.8 of Environmental Statement (ES) Chapter 12: Noise and Vibration [<a href="#">APP-150</a>], will be secured via a new REAC commitment within ES Appendix 2.2: Code of Construction Practice [<a href="#">REP3-104</a>] that will be submitted at Deadline 5. This proposed new REAC commitment would require these measures to be validated during construction, prior to opening, and would cover issues such as how local authorities would be consulted; and protocols for non-compliance with the recommendations of NV011 (Acoustic Barriers) and NV013 (Road Surfacing).</p> <p>The REAC is secured as part of the CoCP by Requirement 4 of the draft Development Consent Order [<a href="#">REP3-077</a>].</p>

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