Grand Union Canal Transfer

Chapter 19: Noise and Vibration

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19. Noise and Vibration

19.1 Introduction

19.1.1 This Preliminary Environmental Information (PEI) Report chapter presents the preliminary assessment of likely significant environmental effects arising from the Proposed Development in relation to noise and vibration.

19.1.2 This preliminary assessment follows the methodology outlined within the Environmental Impact Assessment (EIA) Scoping Report and EIA Scoping Opinion (provided in **Appendices 5-PD-1 and 5-PD-2** in PEI Report **Volume 4**) and is based on the environmental information obtained to date and the description of the Proposed Development (provided in **Chapter 3: The Proposed Development** in PEI Report **Volume 2**). Further review of the potential for significant noise and vibration effects will be undertaken at the ES stage and assessed if required.

19.1.3 The noise and vibration assessment presented in this PEI Report chapter covers the potential noise and vibration emissions which may adversely impact Noise and Vibration Sensitive Receptors (NVSR) in the vicinity of the Proposed Development. An NVSR is any location that may be affected adversely by noise and/or a vibration (e.g. residential properties, commercial facilities, schools).

19.1.4 The potential impacts are discussed in relation to the following aspects:

a. Potential noise and vibration impacts arising during the construction phase, including:
    i. Noise impacts arising from construction activities;
    ii. Vibration impacts arising from construction activities; and
    iii. Noise impacts arising from changes in traffic flows on existing roads due to construction traffic.
b. Potential noise and vibration impacts arising during the operational phase, including:
    i. Noise impacts arising from site activities;
    ii. Vibration impacts arising from site activities; and
    iii. Noise impacts arising from changes in traffic flows on existing roads due to operational traffic.

19.1.5 Appropriate mitigation measures are identified to alleviate the resulting potential significant adverse effects where necessary.

19.1.6 Supporting documentation, including figures and appendices, is listed in **Table 19-1**.

Table 19-1: Supporting documentation

Reference	Title
Figures (provided in PEI Report Volume 3)	
Figure 19-PD-1	Receptor and Sound Monitoring Locations
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Appendices (provided in PEI Report Volume 4)	
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19.1.7 **Appendix 3-PD-1** in PEI Report **Volume 4** presents indicative information regarding the Proposed Development

19.1.8 There are interrelationships between the potential effects of noise and vibration and other environmental topics. Therefore, the following should be read in conjunction with this chapter:

a. **Chapter 11: Cultural Heritage** in PEI Report **Volume 2** considers the likely significant environmental effects arising from the Proposed Development in relation to cultural heritage receptors;

b. **Chapter 12: Ecology – Aquatic** and **Chapter 13: Ecology – Terrestrial** in PEI Report **Volume 2** considers the likely significant environmental effects arising from the Proposed Development in relation to sensitive ecological receptors;

c. **Chapter 14: Ground Conditions** in PEI Report **Volume 2** considers likely significant environmental effects arising from the Proposed Development in relation to ground stability;

d. **Chapter 20: Socio-economics** in PEI Report **Volume 2** considers the likely socio-economic impacts of changes in traffic flow on road

links and canals utilised by traffic generated by the Proposed Development, particularly during the construction phase; and

e. **Chapter 21: Traffic and Transport** in PEI Report **Volume 2** considers changes in current vehicle traffic and transport on the affected road network and its effect on human receptors.

19.1.9 This chapter assesses noise and vibration impacts on human receptors only. Potential effects on other receptor types (e.g. ecological or heritage receptors) are addressed, where relevant, in the chapters dedicated to those receptors (as identified above).

19.2 Legislation, Policy and Guidance

19.2.1 Legislation, policy[1], and standards and guidance relating to noise and vibration pertinent to the Proposed Development comprises of the documents listed below.

Legislative Framework

19.2.2 Relevant legislation comprises the Control of Pollution Act 1974 (CoPA) (Ref. 1).

National Policy

19.2.3 National policy considered includes:

a. National Policy Statement for Water Resources Infrastructure (NPSWRI) (Ref. 2);

b. National Planning Policy Framework (NPPF) (Ref. 3); and

c. The Noise Policy Statement for England (NSPE) (Ref. 4).

Local Policy

19.2.4 Local policy to be considered includes relevant Local Plans (both adopted and emerging) and other adopted policy documents produced by the ten local authorities that the Proposed Development is situated within. More

[1] For the purposes of this PEI Report an overview of relevant policy is provided to show how relevant policy has informed scope, method and in some cases mitigation. It is not the purpose of the PEI Report (or the Environmental Statement [ES]) to present a review of the compliance of the Proposed Development with the requirements of policy. The Planning Statement, to be submitted with the DCO application, will present an assessment of the extent to which the Proposed Development accords with policy.

detail is provided in Table 1-4 in **Chapter 1: Introduction** in PEI Report **Volume 2**.

National Guidance

19.2.5 National guidance considered comprises the national Planning Practice Guidance (PPG) – Noise (Ref. 5).

Other Guidance

19.2.6 Other guidance considered includes:

a. British Standards (BS):
    i. BS 7445-1:2003 Description and measurement of environmental noise. Guide to quantities and procedures (Ref. 6);
    ii. BS 7445-2:1991 Description and measurement of environmental noise. Guide to the acquisition of data pertinent to land use (Ref. 7);
    iii. BS 5228-1:2009+A1:2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 1: Noise (Ref. 8);
    iv. BS 5228-2:2009+A1:2014 Code of Practice for Noise and Vibration Control of Construction and Open Sites - Part 2: Vibration (Ref. 9);
    v. BS 6472-1:2008 Guide to Evaluation of Human Exposure to Vibration in Buildings (Ref. 10);
    vi. BS 7385-2:1993 Evaluation and measurement for vibration in buildings – Guide to damage levels from ground borne vibration (Ref. 11);
    vii. BS 4142:2014+A1:2019 Method for Rating and Assessing Industrial and Commercial Sound (Ref. 12); and
    viii. BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings (Ref. 13).
b. Calculation of Road Traffic Noise (CRTN) (Ref. 14);
c. Design Manual for Roads and Bridges (DMRB) LA111 Revision 2 Noise and Vibration (LA111) (Ref. 15);
d. World Health Organization (WHO) (1999) Guidelines for Community Noise (Ref. 16);
e. WHO (2009) Night Noise Guidelines for Europe (Ref. 17);
f. WHO (2018) Environmental Noise Guidelines for the European Region (Ref. 18);

g. Institute of Sustainability and Environmental Professionals'[2] (ISEP) Guidelines for Environmental Noise Impact Assessment – (Ref. 19); and

h. International Organization for Standardization (ISO) 9613-2:2024 Acoustic – Attenuation of sound during propagation outdoors Part 2: Engineering method for the prediction of sound pressure levels outdoors (Ref. 20).

19.3 Consultation

19.3.1 This section provides an overview of consultation undertaken to date in relation to noise and vibration.

Phase One Public Consultation

19.3.2 A summary of key topics raised from Phase One Public Consultation undertaken between 11 September to 25 October 2024 with regards to noise and vibration is provided below:

a. Impact on local residents (including boaters) during construction; and

b. Potential benefits of using the canal network for transporting construction materials to reduce vehicles (including Heavy Goods Vehicles [HGV]) movements on roads.

19.3.3 These topics have been taken into consideration during the ongoing design of the Proposed Development and the environmental assessments undertaken[3].

EIA Scoping

19.3.4 **Appendix 19-PD-1** in PEI Report **Volume 4** provides a summary of the key comments raised in the EIA Scoping Opinion (provided in **Appendix 5-PD-2** of PEI Report **Volume 4**), such as amending the original scope or request for further justification/evidence to agree the EIA scope. It also and outlines how and where these issues have been addressed within the PEI Report or will be later addressed within the Environmental Statement (ES) to ensure they are taken account of as part of the ongoing noise and vibration assessment.

[2] Formerly the Institute of Environmental Management and Assessment (IEMA).

[3] A Phase One Public Consultation Report has been made available at Phase Two Public Consultation, which sets out activities undertaken to deliver the consultation and provides a summary of the key themes and issues raised, and how the project has considered these.

19.3.5 Where the EIA Scoping Opinion has resulted in amendment to the scope of the noise and vibration assessment (or where further justification or evidence is required to confirm an effect can remain scoped out), this has been presented in section 19.4.

19.3.6 The scope of the noise and vibration assessment is presented in **Table 19-3**.

Other consultation

19.3.7 **Table 19-2** provides a summary of further consultation that has taken place outside the EIA Scoping process.

Table 19-2: Summary of further consultation

Organisation	Date and form of consultation	Summary
Coventry Borough Council	22/07/2025; email	Email sent to provide details on the proposed baseline survey and assessment methodologies. No feedback received.
West Northamptonshire Borough Council	22/07/2025; email	Email sent to provide details on the proposed baseline survey and assessment methodologies. Environmental protection responded regarding the requirement for night-time measurements if works are scheduled to take place during night hours.
Milton Keynes Borough Council	22/07/2025; email	Email sent to provide details on the proposed baseline survey and assessment methodologies. No feedback received.
Rugby Borough Council	22/07/2025; email	Email sent to provide details on the proposed baseline survey and assessment methodologies. No feedback received.
Nuneaton & Bedworth Borough Council	22/07/2025; email	Email sent to provide details on the proposed baseline survey and assessment methodologies. No feedback received.
North Warwickshire Borough Council	22/07/2025; email	Email sent to provide details on the proposed baseline survey and assessment methodologies. No feedback received.
Birmingham City Council	To be completed	These councils will be contacted in due course prior to the ES once details of

Organisation	Date and form of consultation	Summary
Buckinghamshire Council	To be completed	the survey positions relevant to each council are confirmed.
Central Bedfordshire Council	To be completed	
Luton Council	To be completed	

19.4 Scope of Assessment

19.4.1 This section identifies the scope of the noise and vibration assessment following EIA Scoping and subsequent consultation, design refinement, surveys / studies and assessment.

Amendments to Scope Following EIA Scoping

Matters Scoped In

Vibration effects on sensitive receptors (including canal infrastructure) during the operational phase (all Parts)

19.4.2 Following the EIA Scoping process, direct permanent vibration impacts on sensitive receptors in proximity to the proposed development has been requested through the EIA Scoping Opinion (provided in **Appendix 5-PD-2** in PEI Report **Volume 4**) to be scoped back into the assessment by PINS.

19.4.3 At the time of preparing this PEI Report, sufficient information to assess vibration emissions during the operational phase was not available. This matter will be addressed in ES once the necessary information becomes available.

Matters Scoped Out

Direct temporary noise effects on sensitive receptors arising from changes in traffic flows during the construction phase (all Parts)

19.4.4 The EIA Scoping process scoped in the assessment of direct temporary noise effects on sensitive receptors arising from changes in traffic flows on the existing road network during the construction phase for all Parts.

19.4.5 However, this is now proposed to be scoped out. Justification is provided in the assessment approach section below.

Direct permanent noise effects on sensitive receptors arising from changes in traffic flows during the operational phase (all Parts)

19.4.6 The EIA Scoping Opinion (provided in **Appendix 5-PD-2** in PEI Report **Volume 4**) stated that noise impacts on sensitive receptors due to an increase in road traffic is scoped back in and assessed, or for the Applicants to provide justification as to why this matter is not expected to result in significant impacts.

19.4.7 At this stage, it is proposed that this area of assessment remains scoped out. Further justification is provided in the assessment approach section below.

Assessment approach (Both Operational and Construction Phases)

19.4.8 As stated in the EIA Scoping Report (**Appendix 5-PD-1** in PEI Report **Volume 4**), when considering noise effects arising from increased traffic on the existing road network, the short-term criteria given in LA111 (Ref. 15) are used. These 'short term' changes in noise level are also derived by calculating the difference between the traffic flows in the opening year of the Proposed Development without the scheme in place (termed the 'Do-Minimum Opening Year' (DMOY) in LA111) and with the scheme in place (termed the 'Do-Something Opening Year' (DSOY) in LA111).

19.4.9 As part of the scoping assessment for road traffic noise, paragraph 3.41 of LA111 states that effects can be scoped out if the answer to the following question is no *"…is the project likely to cause a change in the BNL of 1dB [decibels] LA10,18hr in the do-minimum opening year (DMOY) compared to the do-something opening year (DSOY)?"*[4]*.* A 1 dB change corresponds to a 25% increase in road traffic flows, assuming the speed and percentage HDV of the given road remain unchanged. Given the low construction traffic flows anticipated, it is considered unlikely that the total traffic flows on the existing road network will increase by more than 25%.

19.4.10 To assess the potential noise changes arising from the traffic during either the construction or operational phases, baseline flows and the predicted flows in the form of Annual Average Weekday Traffic (AAWT) in 18hr, % Heavy Duty Vehicles (HDV) and speeds are required. This information is not available at the time of writing the PEI Report and therefore a quantitative assessment has not been possible; however, indicative traffic estimates (based on indicative work durations) are provided in **Appendix 3-PD-1** in PEI Report **Volume 4**.

[4] It is noted that other scoping criteria are presented, however these criteria are not relevant in the context of a non-road project.

19.4.11 These indicative flows are not in the format required for noise assessment (i.e. AAWT,18hr) so cannot be used directly. However, inference can be drawn.

19.4.12 As further described in **Chapter 21: Traffic and Transport** in PEI Report **Volume 2**, the initial traffic flows for both construction and operation are considered to be minimal in terms of increased traffic generation arising from the Proposed Development; with operational flows being significantly lower than those during construction. In view of such low levels of operational traffic, it is considered that the traffic noise impacts during both the construction and operational phases will be negligible compared with the baseline traffic flows on the existing road network.

Mitigation measures

19.4.13 For construction, an Outline Construction Environmental Management Plan (CEMP) and Outline Operational Environmental Management Plan (OEMP) will also be prepared, which will embed noise and vibration reduction measures; serving as a mechanism for addressing related noise and vibration emissions (including from vehicles). It will describe appropriate mitigation measures to be followed.

19.4.14 The Outline CEMP and Outline OEMP will both be submitted with the DCO application, which, if consent is granted, a Detailed CEMP(s) and Detailed OEMP(s) will be prepared and agreed with the relevant authority before the proposed works start. At this stage, a Preliminary Outline CEMP is included in **Appendix 24-PD-2** in PEI Report **Volume 4** for information purposes.

19.4.15 Furthermore, an Outline Construction Traffic Management Plan (Outline CTMP) will be prepared for the DCO application which will give consideration to traffic flows, timing of deliveries and access points in order to reduce potential noise impacts to sensitive receptors.

19.4.16 Therefore, at this stage, it is considered that the Proposed Development would not result in significant traffic noise due to the minimal increase, geographic spread of vehicle flows across and appropriate management plans.

Conclusion

19.4.17 Although traffic related noise impacts are to remain scoped out of the EIA at this stage, the ES will re-review the estimated traffic flow data for the final design of the Proposed Development. This will confirm whether the traffic flows exceed relevant assessment threshold / criteria to determine if likely significant adverse effects will arise from the Proposed Development and thus the need further assessment. If traffic flows identify the requirement for further assessment at ES stage, then road traffic noise effects will be

assessed in accordance with guidance presented in LA111 (Ref. 15) and will cover all affected road links identified in the traffic and transport assessment.

Scope of Assessment

19.4.18 **Table 19-3** provides a summary of all matters scoped in and out of the noise and vibration assessment based on whether they were considered to have the potential to result in significant effects during the EIA Scoping process. The table uses the following coding:

a. In = refers to likely effects that are considered potentially significant and therefore do require further assessment in the EIA;

b. Out = refers to likely effects that are not considered potentially significant and therefore do not require further assessment in the EIA; and

c. n/a = refers to where there is no prospect of an effect from a particular Proposed Development Part(s), either due to the particular nature or location of the Proposed Development Part and/or the absence of a receptor within the study area for that particular Proposed Development Part.

Table 19-3: Summary of noise and vibration assessment scope

Likely significant effect	Receptor(s)	Parts of the Proposed Development					
		1a	1b	2	3	4a	4b
Construction Phase							
Direct temporary noise effects on sensitive receptors	Existing sensitive receptors within the locality and the surrounding area, including long-term receptors such as residents, and short-term receptors such as users of public spaces.	In	In	In	In	In	In
Direct temporary vibration effects on sensitive receptors (including canal infrastructure)	Existing sensitive receptors within the locality and the surrounding area, including long-term receptors such as residents.	In	In	In	In	In	In
Direct temporary noise effects on sensitive receptors due to increased road traffic	Existing sensitive receptors within the locality and the surrounding area, including long-term receptors such as residents.	Out	Out	Out	Out	Out	Out
Operational Phase							
Direct permanent noise effects on sensitive receptors	Existing sensitive receptors within the locality and the surrounding area, including long-term receptors such as residents, and short-term receptors such as users of public spaces.	In	In (Break Pressure Tank only)	In	Out	In	Out
Direct permanent vibration effects on sensitive receptors	Existing sensitive receptors within the locality and the surrounding area, including long-term receptors such as residents, and short-term receptors such as users of public spaces.	In	In	In	In	In	In

Likely significant effect	Receptor(s)	Parts of the Proposed Development					
		1a	1b	2	3	4a	4b
Direct permanent noise effects on sensitive receptors due to increased road traffic	Existing sensitive receptors within the locality and the surrounding area, including long-term receptors such as residents, and short-term receptors such as users of public spaces.	Out	Out	Out	Out	Out	Out

19.5 Assessment Methodology

19.5.1 This section presents the methodology used to assess the potential noise and vibration effects during the construction and operational phases of the Proposed Development.

Defining the Study Area

19.5.2 This section sets out the study areas adopted for the Proposed Development.

Construction Phase

19.5.3 For the construction phase, the study area is defined as 300 metres (m) from the Preliminary Order Limits for noise and 100 m for vibration.

19.5.4 The rationale for the noise study area is based on BS 5228-1 (Ref. 8) which states "*At distances over 300 m noise predictions have to be treated with caution, especially where a soft ground correction factor has been applied, because of the increasing importance of meteorological effects"*.

19.5.5 It is noted that although predictions may not be accurate over 300 m, the possibility of effects remain. Therefore, all predictions have been reviewed post calculation and extended wherever the results indicate that effects may occur at greater distance.

19.5.6 The vibration scoping distance is based on the parameter ranges given for the relevant prediction calculations (detailed in BS 5228-2 (Ref. 9), guidance for construction vibration presented in LA111 (Ref. 15) and cross referenced with previous UK infrastructure projects (e.g. High Speed 2 [HS2]).

Operational Phase

19.5.7 The study areas for operational phase noise and vibration assessment have been informed by the results of the assessment and will extend from the Preliminary Order Limits as far as required to capture all significant potential effects.

19.5.8 This is because the study area for different sections of the Proposed Development will vary depending on the specifics of the location; a built up area with structures that provide high levels of acoustic screening will require a smaller study area to capture all effects given that emissions will attenuate sharply, whereas a more rural location may require a much larger study area.

19.5.9 Due to the Proposed Development being at a relatively early design stage, source data for elements of the Proposed Development expected to give rise to noise and/or vibration emissions was not available at the time of writing this PEI Report.

19.5.10 Therefore, the iterative process required to define the appropriate study area for each relevant section of the Proposed Development has not taken place. This will be completed for the ES.

Summary

19.5.11 **Table 19-4** provides a summary of the study areas by Proposed Development Part.

Table 19-4: Summary of study areas for the noise and vibration assessment

Proposed Development Part	Study area
1a: Minworth Advanced Water Treatment Plant (AWTP)	Construction Phase: • 300 m from Preliminary Order Limits for construction noise; and • 100 m from Preliminary Order Limits for construction vibration. Operational Phase: • Up to and including all receptor positions with the potential to experience significant adverse effects in all directions from the Preliminary Order Limits for both operational noise and vibration. This will be determined by the results of the assessment.
1b: Minworth to Atherstone Pipeline	Construction Phase: • 300 m from Preliminary Order Limits for construction noise; and • 100 m from Preliminary Order Limits for construction vibration. Operational Phase: • Up to and including all receptor positions with the potential to experience significant adverse effects in all directions from the Preliminary Order Limits for both operational noise and vibration. This will be determined by the results of the assessment.
2: Works to the Coventry, Oxford and Grand Union canals	Construction Phase: • 300 m from Preliminary Order Limits for construction noise; and • 100 m from Preliminary Order Limits for construction vibration. Operational Phase: • Up to and including all receptor positions with the potential to experience significant adverse effects in all directions from the Preliminary Order Limits for both operational noise and vibration. This will be determined by the results of the assessment.

Proposed Development Part	Study area
3: Works to Daventry and Drayton Reservoirs	Construction Phase: • 300 m from Preliminary Order Limits for construction noise; and • 100 m from Preliminary Order Limits for construction vibration. Operational Phase: • Up to and including all receptor positions with the potential to experience significant adverse effects in all directions from the Preliminary Order Limits for both operational noise and vibration. This will be determined by the results of the assessment.
4a: Abstraction, Storage and Treatment	Construction Phase: • 300 m from Preliminary Order Limits for construction noise; and • 100 m from Preliminary Order Limits for construction vibration. Operational Phase: • Up to and including all receptor positions with the potential to experience significant adverse effects in all directions from the Preliminary Order Limits for both operational noise and vibration. This will be determined by the results of the assessment.
4b: Pipeline to an Existing Underground Reservoir near Luton	Construction Phase: • 300 m from the Preliminary Order Limits for construction noise; and • 100 m from the Preliminary Order Limits for construction vibration. Operational Phase: • Up to and including all receptor positions with the potential to experience significant adverse effects in all directions from the Preliminary Order Limits for both operational noise and vibration. This will be determined by the results of the assessment.

Determining Baseline Conditions

Noise

19.5.12 A desktop assessment was undertaken using available project data and mapping resources (OS Mastermap) to establish the site context and surrounding environment. This included reviewing nearby land uses to identify relevant noise-sensitive receptors and areas where impacts may be most likely.

19.5.13 Based on this assessment, appropriate survey locations were selected to ensure that measurements would capture representative existing sound conditions across the study area.

19.5.14 A suite of attended and unattended baseline sound surveys in accordance with BS 7445-2:1991 (Ref. 7) were conducted at relevant locations along the corridor of the Proposed Development. These measurements were conducted to inform the assessment criteria adopted when determining potential effects.

19.5.15 The approximate location of these survey locations were communicated to relevant the Local Authorities during the survey planning process. The exact location was not communicated as this was subject to land access considerations and local site conditions encountered when setting up the equipment.

19.5.16 Given the spatial extent of the Proposed Development, long-term baseline surveys along the entirety of the Proposed Development is not practical.

19.5.17 The following approach has, therefore, been adopted:

a. Short-term (1 hour) attended measurements were conducted during the daytime in areas where noise impacts are only possible during the construction phase (e.g. along the corridor of Part 1b); and

b. Long-term (>24 hours) unattended measurements were conducted in areas where noise impacts are possible in both the construction and operational phase (e.g. Part 1a, permanent assets within Part 2).

19.5.18 This methodology and the proposed survey locations were communicated to the relevant local authorities as detailed in **Table 19-2** above.

19.5.19 In some areas where construction works are relatively minimal and of short duration (e.g. areas within Part 2 where only bank raising is to occur) a baseline noise survey was not undertaken.

19.5.20 In these instances, the assessment has been carried out using conservative assumptions with regards to baseline sound levels (e.g. adopting the most stringent assessment criterion possible – refer to relevant sections of Parts 1b, 2, 3, 4a and 4b) or with reference to duration (i.e. where construction noise levels are predicted to be elevated only for a short period).

19.5.21 In practice, this means adopting Category A noise criteria for the construction noise where baseline is unavailable and considering the possibility of low background sound levels in the BS 4142 (Ref. 12) operational noise assessment. Further details on these technical points are provided in the Assessment of Effects section below.

19.5.22 Some planned surveys have not yet been completed. In these instances, the surveys will be completed prior to the ES.

19.5.23 In these instances, similar to where short duration works are proposed, the assessment has been carried out using conservative assumptions with regards to baseline sound levels. The conservative assumptions are the same as described in section 19.5.21

Vibration surveys

19.5.24 Vibration emissions are assessed against absolute effect criteria which are not affected by baseline conditions. Therefore, no baseline vibration surveys have been conducted.

Overview of surveys

19.5.25 **Table 19-5** provides an overview of the baseline studies and surveys undertaken to inform the noise and vibration assessment. The table uses the following coding:

a. ✓ = Completed;
b. O = To be completed for the ES;
c. ✓O = partially complete, to be fully competed for the ES; and
d. n/a = Baseline study / survey is not applicable for that Part of the Proposed Development.

Table 19-5: Summary of baseline noise and vibration studies and surveys

Study / survey	Overview	Date completed	Parts of the Proposed Development					
			1a	1b	2	3	4a	4b
Desktop review*	A desktop review was undertaken to identify potential existing noise and vibration sensitive receptors and potential existing noise and vibration producing activities to inform the Study Areas and extent of the environmental noise survey.	January 2025	✓	✓	✓	✓	✓	✓
Baseline noise surveys	Noise surveys in accordance with the procedure described above.	July 2025	✓	✓O	✓O	✓O	O	O
Baseline vibration surveys	Vibration surveys have been identified to not be required as vibration emissions are assessed against absolute effect criteria which are not affected by baseline conditions.	n/a	n/a	n/a	n/a	n/a	n/a	n/a

** To be refreshed for the ES stage.*

Assessment of Effects

19.5.26 This section sets out how the scoped in effects have been assessed.

19.5.27 The assessment has considered the potential noise and vibration effects of the Proposed Development on sensitive receptors, generated by on-site activities during both the construction and operational phases.

19.5.27 The methodology for calculating noise and vibration, definitions of magnitude of impact, sensitivity or importance of the receptor and significance of effect that will be used as part of the assessment are reported in the following sections.

19.5.28 Further technical details of the calculation processes employed is provided in **Appendix 19-PD-3** in PEI Report **Volume 4.**

Sensitivity of Receptors

19.5.28 The sensitivity of receptors for noise and vibration is defined in **Table 19-6**.

Table 19-6: Sensitivity of noise and vibration receptors

Sensitivity	Description	Examples of receptor usage
High	Receptors where noise will significantly affect the function of a receptor.	Auditoria / studios, specialist medical / teaching centres, and libraries.
Medium	Receptors where people or operations are particularly susceptible to noise.	Residential and student accommodation, moorings[5], hotels, places of worship, conference facilities, schools, and hospitals / residential care homes.
Low	Receptors of low sensitivity to noise, where it may cause some distraction or disturbance.	Offices, restaurants, public houses, and sports grounds or facilities where noise is not a normal part of the event and where quiet conditions are necessary (e.g. tennis, golf). Canal users. Public right of way and other recreational areas associated with the canal.
Very Low	Receptors where distraction or disturbance from noise is minimal.	Residences and other buildings not occupied during hours that an impact is experienced.

[5] The Glossary defines various types of moorings provided along the Trust's network. The types of moorings to be assessed as sensitive receptors for noise and vibration will be further considered and addressed in the ES.

Sensitivity	Description	Examples of receptor usage
		Factories and industrial working environments with existing high noise levels. Sports grounds or facilities where noise is a normal part of the event.

19.5.29 At the time of preparing this PEI Report, the data necessary to systematically review all receptors within the scoping distance and assess their sensitivity was not available. However, based on currently available information, there have been no high sensitivity receptors identified within the scoping distance. Therefore, for the purpose of the assessment presented below, all receptors are initially classified as having 'medium' sensitivity on a precautionary basis. This assumption will be revisited for the ES.

19.5.30 The classification of receptor sensitivity will be revisited and refined for the ES as further information becomes available.

19.5.31 Potential noise and/or vibration effects on ecological and heritage receptors are discussed in **Chapter 11: Cultural Heritage**, **Chapter 12: Ecology – Aquatic**, **Chapter 13: Ecology – Terrestrial**, and **Chapter 16: Landscape and Visual** in PEI Report **Volume 2**.

Magnitude of Impacts

19.5.32 The magnitude of impacts arising from the Proposed Development has been defined in accordance with EIA terminology and assigned by reference to thresholds expressed in relevant physical parameters.

19.5.33 These include, for example, noise levels expressed in decibels (dB) and vibration levels expressed as Peak Particle Velocity (PPV), as set out in relevant guidance and British Standards. The specific thresholds are discussed in detail below.

Noise Policy Statement for England

19.5.34 Separate to EIA terminology, potential impacts / effects are considered in relation to the thresholds identified in the NPSE (Ref. 4).

19.5.35 The 'Explanatory Note' within the NPSE introduces the following concepts to aid in the establishment of significant noise effects:

a. No Observed Effect Level (NOEL): the level below which no effect can be detected. Below this level no detectable effect on health and quality of life due to noise can be established;

b. Lowest Observed Adverse Effect Level (LOAEL): the level above which adverse effects on health and quality of life can be detected; and

c. Significant Observed Adverse Effect Level (SOAEL): the level above which significant adverse effects on health and quality of life occur.

19.5.36 This terminology is also adopted for the assessment.

Construction Noise

19.5.37 Noise due to construction works are calculated and assessed in accordance with BS 5228-1 (Ref. 8).

19.5.38 The ABC method set out in BS 5228-1 is used as the basis for defining criteria that assist in the assessment of potential significant effects at residential NVSRs.

19.5.39 At the time of writing this PEI Report, the data necessary to systematically review non-residential receptors within the scoping distance and assess their sensitivity was not available.

19.5.40 Therefore, on a precautionary basis, the above thresholds are also used to assess non-residential receptors given that no 'High' sensitivity non-residential receptors exist within the scoping distance.

19.5.41 Assuming equivalence between non-residential and residential receptors in terms of noise sensitivity is considered robust, as residential receptors are of medium sensitivity and non-residential receptors may range from medium to low or very low sensitivity depending on their specific use

19.5.42 The ABC thresholds and notes regarding the definition of potential significant effects are reproduced in **Table 19-7**.

Table 19-7: BS 5228-1 ABC thresholds

Assessment Category and Threshold Value Period	**Threshold Value $L_{Aeq,T}$ dB – Façade**		
	Category A (a)	**Category B (b)**	**Category C (c)**
Night-time (23:00-07:00)	45	50	55
Evenings and Weekends (d)	55	60	65
Daytime (07:00-19:00) and Saturdays (07:00-13:00)	65	70	75
NOTE 1: A potential significant effect is indicated if the $L_{Aeq,T}$ noise level arising from the Proposed Development Site exceeds the threshold level for the category appropriate to the ambient noise level. NOTE 2 If the ambient noise level exceeds the Category C threshold values given in the table (i.e. the ambient noise level is higher than the above values), then a potential significant effect is indicated if the total $L_{Aeq,T}$ noise level for the period increases by more than 3 dB due to site noise. NOTE 3: Applies to residential receptors only.			
(a) Category A: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are less than these values.			

Assessment Category and Threshold Value Period	Threshold Value $L_{Aeq, T}$ dB – Façade		
	Category A (a)	Category B (b)	Category C (c)
(b) Category B: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are the same as Category A values. (c) Category C: Threshold values to use when ambient noise levels (when rounded to the nearest 5 dB) are higher than Category A values. (d) 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays, 07:00 – 23:00 Sundays.			

19.5.43 Based on the above, the magnitude of construction noise impacts on residential receptors is classified in accordance with the criteria in **Table 19-8**.

Table 19-8: Magnitude of Construction Noise Impacts for Residential NVSRs

Construction and Demolition Sound Level Above Threshold Level (dB)	Magnitude of Impact	NPSE Effect Levels
Exceedance of ABC Threshold Value by > +5 dB	Major	-
Exceedance of ABC Threshold Value by up to +5 dB	Moderate	SOAEL
Equal to or below the ABC Threshold Value by up to -5dB	Minor	LOAEL
Below the ABC Threshold Value by > -5dB	Negligible	NOEL

19.5.44 One potential exception to the above criteria and thresholds above are houseboats / moorings along the canal. These receptors are distinct from typical residential receptors which are often of a masonry construction and therefore provide higher levels of sound insulation than houseboats. The approach to houseboats (with regards construction noise criteria) has not been confirmed at the time of writing this PEI Report and will be revisited for the ES.

19.5.45 LA111 (Ref. 15) also provides guidance on construction noise impacts, albeit with reference to highway construction. It states:

"Construction noise and construction traffic noise shall constitute a significant effect where it is determined that a major or moderate magnitude of impact will occur for a duration exceeding:

1) 10 or more days or nights in any 15 consecutive days or nights;

2) a total number of days exceeding 40 in any 6 consecutive months."

19.5.46 Construction noise from highways projects is of a similar nature to the construction noise expected from the Proposed Development. Therefore, the above temporal thresholds are considered relevant. It is inferred that for

any exceedance of the above thresholds to result in an adverse impact, the duration of the elevated noise level would also need to meet the LA111 temporal criteria.

19.5.47 This approach will be revisited and revised, where appropriate, for the ES as more information becomes available.

Construction Vibration – General

19.5.48 Construction vibration impacts will be assessed using the calculation methodologies presented in BS 5228-2 (Ref. 9).

19.5.49 **Table 19-9** details PPV vibration levels and provides a semantic scale for the description of construction vibration effects on human receptors, based on guidance contained in BS 5228-2.

Table 19-9: Construction Vibration Criteria for human receptors (annoyance)

PPV level	Description	Magnitude of Impact	NPSE Effect Levels
>10 mms^{-1}	Vibration is likely to be intolerable for any more than a very brief exposure to this level.	Major	-
>1.0 mms^{-1}	It is likely that vibration of this level in residential environments will cause complaint but can be tolerated if prior warning and explanation has been given to residents.	Moderate	SOAEL
>0.3 mms^{-1}	Vibration might be just perceptible in residential environments.	Minor	LOAEL
<0.14 mms^{-1}	Vibration might be just perceptible in the most sensitive situations for most vibration frequencies associated with construction. At lower frequencies, people are less sensitive to vibration.	Negligible	NOEL

19.5.50 In addition to human annoyance, building structures (excluding canal infrastructure, which is discussed separately below) may be damaged by high levels of vibration. The levels of vibration that may cause building damage are far in excess of those that may cause human annoyance. Consequently, if vibration levels within buildings are controlled to those relating to annoyance, then it is highly unlikely that buildings will be damaged by construction vibration.

19.5.51 For the same reasons as given for construction noise, the above thresholds are also used to assess non-residential receptors on a precautionary basis.

This approach will be revisited and revised, where appropriate, for the ES as more information becomes available.

Construction Vibration – Canal Infrastructure

19.5.52 Vibration generated by the construction of the Proposed Development also has the potential to impact structural elements of the canal network.

19.5.53 There is no specific guidance on vibration damage to the structure components of a canal, the following recommendation from section B.2.4 of BS 5228-2 (Ref. 9) for a retaining wall have been used instead. This states:

"Unlike conventional buildings, which are tied together by crosswalls, intermediate floors and roofs, retaining walls might have little lateral restraint near their tops. This can result in substantial amplification of vibrations particularly in the horizontal mode normal to the plane of the wall. Amplification factors of between 3 and 5 are typical. For slender and potentially sensitive masonry walls, it is recommended that threshold limits for PPV of 10 mm·s^{-1} at the toe and 40 mm·s^{-1} at the crest should generally be adopted. Propped or tied walls or mass gravity walls can be subject to values 50% to 100% greater than these limits. Similar values could be applied to well-supported steel pile and reinforced concrete retaining walls. Where walls are in poor condition, the allowable values should be diminished and at the same time additional propping or other methods of support should be devised. For continuous vibrations, all the above levels should be reduced by a factor of 1.5 to 2.5 according to individual circumstances."

19.5.54 This assessment initially takes a conservative approach by reducing the above PPV threshold limits described in the paragraph above (at the crest) by 50% (i.e. 20 mm·s^{-1}). These values may be increased following structural surveys of the locks, bridges, tunnels and other structures and / or once monitoring data has been analysed.

Operational Noise

19.5.55 The impacts from operation noise due to fixed plant will be assessed in accordance with BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound (Ref. 12). Full details of the BS 4142 methodology are provided in **Appendix 19-PD-3** in PEI Report **Volume 4**.

19.5.56 Based on this guidance, and subject to context, a difference of around +10 dB between the rating level and the background sound level is considered to be the SOAEL and a difference of around +5 dB is considered to be the LOAEL.

19.5.57 Hence, the magnitude of impact will be determined based on the difference between the rating level and the background sound level as described in **Table 19-10**.

Table 19-10: Magnitude of Operational Noise Impacts for Residential NVSRs

Difference between Rating Level and Background Level (subject to context)	Magnitude of Impact	NPSE Effect Level
Around or above +15 dB	Major	-
Around +10 dB	Moderate	SOAEL
Around +5 dB	Minor	LOAEL
Around or below 0 dB	Negligible	NOEL

Operational Vibration

19.5.58 A method for assessing operational phase vibration is provided in BS 6472-1 (Ref. 10).

19.5.59 This standard advises that vibration should be assessed in terms of the Vibration Dose Value (VDV).

19.5.60 **Table 19-11** provides the vibration dose thresholds from low to high probability, which might result in adverse comment by the occupants who experience these excessive vibration levels. These values represent the best judgement currently available and may be used for both vertical and horizontal vibration, provided they are correctly weighted.

Table 19-11: BS 6472-1 Guidance on Human Disturbance from Vibration

Place and time	Range of vibration dose values ($ms^{-1.75}$) which might result in various probabilities of adverse comment		
	Low probability of adverse comment	Adverse comment possible	Adverse comment probable
Residential buildings 16-hour day	0.2 to 0.4	0.4 to 0.8	0.8 to 1.6
Residential buildings 8-hour night	0.1 to 0.2	0.2 to 0.4	0.4 to 0.8

19.5.61 For offices and workshops, multiplying factors of x2 and x4 respectively should be applied to the above vibration dose value ranges for a 16-hour day.

19.5.62 The BS 6472-1 methodology assumes the most dominant axis of vibration is considered and relates to vibration measured / predicted at the point of entry into the human body, which is usually taken to mean a point mid-span of an internal floor.

19.5.63 Based on the above, the magnitude of impact will be determined using the thresholds presented in **Table 19-12**. In the case of non-residential

receptors, the effect may be modified on a receptor by receptor basis, taking into account factors such as the use, design and sensitivity of the receptor.

Table 19-12: Magnitude of Operational Vibration Impacts

Place and time	Vibration Dose Values ($ms^{-1.75}$)			
	Negligible (NOEL)	Minor (LOAEL)	Moderate (SOAEL)	Major
Residential buildings 16-hour day	<0.2	0.2 to 0.4	0.4 to 0.8	>0.8
Residential buildings 8-hour night	<0.1	0.1 to 0.2	0.2 to 0.4	>0.4
Commercial buildings 16-hour day	<0.4	0.4 to 0.8	0.8 to 1.6	>1.6
Commercial buildings 8-hour night (if applicable)	<0.2	0.2 to 0.4	0.4 to 0.8	>0.8

Significance of Effects

19.5.64 The following terminology will be used to define noise and vibration effects:

a. Adverse: detrimental or negative effects to an environmental resource or receptor;

b. Negligible: imperceptible effects to an environmental resource or receptor; and

c. Beneficial: advantageous or positive effects to an environmental resource or receptor.

19.5.65 Where adverse or beneficial noise and vibration effects are identified, these are described using the following scale:

a. Minor: slight, very short or highly localised effect;

b. Moderate: limited effect (by extent, duration, or magnitude), which may be important at a local scale; and

c. Major: considerable effect (by extent, duration, or magnitude) of more than local significance or in breach of recognised acceptability, legislation, policy or standards.

19.5.66 The duration of noise and vibration effects is defined as follows:

a. Temporary: noise and vibration effects during the construction phase; and

b. Permanent: noise effects during the operational phase.

19.5.67 **Table 19-13** provides a matrix showing the significance of effects depending on the sensitivity of receptors and magnitude of impact. The

assignment of magnitude of impacts is discussed further in the following sections for the different types of potential impact from the Proposed Development.

Table 19-13: Significance Criteria – Noise and Vibration

Sensitivity or value of resource / receptor	Magnitude of impact			
	Major	**Moderate**	**Minor**	**Negligible**
High	Major	Major	Moderate	Minor
Medium	Major	Moderate	Minor	Negligible
Low	Moderate	Minor	Negligible	Negligible
Very Low	Minor	Negligible	Negligible	Negligible

19.5.68 Generally, effects classed from negligible to minor are ‘not significant’, whereas effects classed from moderate to major adverse are ‘significant’.

19.5.69 However, final determination of whether effects are likely to be significant has been made following the classification of effects and using professional judgment. These include consideration of the duration, frequency and likelihood of noise and vibration effects and whether they are temporary or permanent and the area and number of receptors affected.

19.5.70 This terminology is adopted for the assessment.

Assumptions, Limitations and Uncertainties

Construction Phase

19.5.71 Assumptions, limitations and uncertainties relating to the construction phase are as follows:

a. Predictions have been undertaken using BS 5228-1 (Ref. 8) and BS 5228-2 (Ref. 9) for construction noise and vibration respectively. These prediction methodologies carry an inherent level of uncertainty; however, this has been minimised via conservative assumptions;

b. Where baseline information is not available, conservative assumptions have been made (i.e. adoption of Category A criteria for construction noise and consideration of potentially low background levels for the operational noise assessment). This introduces the potential for impacts to be overestimated at this stage due to uncertainty / lack of detailed information;

c. Due to limitations within the prediction methodologies presented in BS 5228-2, the risk of potential vibration impacts on canal infrastructure have been addressed through a commitment to

various monitoring and/or mitigation controls, as opposed to quantitative prediction;

d. As stated previously, no ‘high’ sensitivity receptors have been identified (at the time of writing) within the scoping distance. Therefore, for the purpose of the assessment presented below, all receptors are initially classified as having ‘medium’ sensitivity on a precautionary basis;

e. The assessment methodology and significance criteria for noise impacts affecting narrowboats have not yet been finalised. For the purposes of the PEI Report, the assessment has applied BS 5228 criteria to mooring locations. This methodology will be reviewed and, where necessary, refined for the ES;

f. Detailed construction programme information was not available at the time of writing this PEI Report. Therefore, assumptions have been made regarding the sequencing of works. The assumed sequencing of construction are detailed in the column headings of the results tables presented in **Appendices 19-P1A-1**, **19-P1B-1**, **19-P2-1**, **19-P3-1**, **19-P4A-1** and **19-P4B-1** (PEI Report **Volume 4**). These assumptions will be revisited and refined for the ES;

g. The approach to houseboats (with regard noise criteria) has not been confirmed at the time of writing this PEI Report and will be revisited for the ES; and

h. Service and short-term moorings are not included as NVSRs as they are not assumed to be permanent residences. Identification of the different types of moorings will be further reviewed at the ES stage.

Operational Phase

19.5.72 Assumptions, limitations and uncertainties relating to the operational phase are as follows:

a. At the time of writing, the input data required to assess operational noise and/or vibration emissions from the Proposed Development was not available. Therefore, no quantitative assessment has been conducted at this stage. However, the nature of the Proposed Development is such that any potential noise or vibration effects should be easily mitigated through design. This will be revisited in the ES when more detail is available; and

b. Initial traffic flow data for the operational phase was not available in the metric suitable for use in the noise assessment. However, due to the very low traffic flows and conclusions of **Chapter 21: Traffic and Transport** in PEI Report **Volume 2**, this effect has been scoped out the assessment.

19.6 Project-Wide Environmental Design, Standards and Management

19.6.1 This section outlines embedded environmental design, standards and/or management measures in relation to noise and vibration that are relevant for the whole Proposed Development. Where embedded environmental design, standards and/or management measures are specific to a Proposed Development Part(s), these have been identified in the upcoming sections.

Construction Phase

19.6.2 The indicative core working hours are defined in **Chapter 3: The Proposed Development** in PEI Report **Volume 2**. Construction noise emissions have been assessed using the daytime criteria, except for trenchless crossings which are assessed against evening and night-time criteria also (due to their 24-hour operation).

19.6.3 Other works may extend beyond the times quoted above, either due to engineering requirements (e.g. concrete pours) or in response to emergencies. In these instances, management measures will be put in place, where practicable, to suitably mitigate or minimise potential noise and/or vibration impacts. Such circumstances will be covered in the CEMP.

19.6.4 An Outline Construction Environmental Management Plan (Outline CEMP) will embed and monitor standard noise and vibration reduction measures during the construction phase, serving as a mechanism for implementing noise and vibration mitigation and control measures.

19.6.5 It will describe the mitigation measures identified in the ES to be followed. The Outline CEMP will be submitted with the DCO application, which, if consent is granted, a Detailed CEMP(s) will be prepared and agreed with the relevant authority before the proposed works start. At this stage, a Preliminary Outline CEMP is included in **Appendix 24-PD-2** in PEI Report **Volume 4** for information purposes.

19.6.6 Measures to control noise and vibration as defined in Annex B and in Section 8 of BS 5228-1 (Ref. 8) and BS 5228-2 (Ref. 9) will be adopted as far as practicable. These measures represent Best Practicable Means (BPM) (as defined by Section 72 of the CoPA; Ref. 1) to manage noise and vibration emissions from construction and activities.

19.6.7 Examples of BPM that may be implemented during construction works through the CEMP are presented below:

a. Avoiding unnecessary revving of engines and switching off equipment when not required;

b. Keeping internal haul corridors well maintained and avoiding steep gradients;

c. Using rubber linings in, for example, chutes and dumpers to reduce impact noise;

d. Minimising drop heights of materials;

e. Starting-up plant and vehicles sequentially rather than all together;

f. Locating plant as far from noise sensitive receptors as practicable;

g. Working within designated working hours;

h. Use of broadband audible reversing warnings which have minimal impact;

i. Selection of quieter equipment and other noise control measures well maintained; and

j. Use of enclosures or screening where practicable.

19.6.8 The CEMP will require the preparation of a Construction Noise and Vibration Management Plan.

19.6.9 The effect of noise and vibration on nearby sensitive receptors can be minimised through a good communication strategy. Prior to construction works being undertaken, occupiers of sensitive premises that may be adversely affected by construction noise and vibration will be contacted by the contractor. All communications would contain contact details of who to direct any questions or issues to.

Operational Phase

19.6.10 To address noise and/or vibration emissions arising from the Proposed Development during the Operational Phase, mitigation options include:

a. Appropriate plant specification (e.g. specification of low noise models);

b. Location of noisy plant away from NVSRs;

c. Acoustics enclosures, attenuators and/or silencers;

d. Anti-vibration mounts;

e. Inertia bases;

f. Acoustic barriers; and

g. Use of topography to provide acoustic screening (e.g. bunds).

19.6.11 Where and if the above measures are necessary and/or practicable will be determined in due course (prior to the ES) as information becomes available.

19.6.12 In addition to broadband noise emissions, low frequency noise will also be considered.

19.6.13 Low frequency noise can be difficult to predict with high certainty and equally hard to resolve when present. This is because it can be caused by unexpected interactions between the operational plant components and exacerbated by the geometry of the Proposed Development or receptor buildings. The issue of low frequency noise will be considered through design, or appropriately mitigated (e.g. through isolation and attenuation measures) as appropriate / practicable.

19.6.14 Any specific embedded mitigation measures identified for the final design of the Proposed Development will be set out in the ES.

19.6.15 An Outline Operational Environmental Management Plan (OEMP) will be prepared, which will embed and monitor standard noise and vibration reduction measures during the operational phase, serving as a mechanism for implementing related noise and vibration mitigation. It will describe appropriate mitigation measures to be followed. The Outline OEMP will be submitted with the DCO application, which, if consent is granted, a Detailed OEMP(s) will be prepared and agreed with the relevant authority before the proposed works start. A Preliminary Outline OEMP has not been produced for the PEI Report as the design of the Proposed Development is not detailed enough.

Part 1a: Minworth AWTP

19.7 Part 1a: Minworth AWTP

19.7.1 This section provides a focussed description of the environmental baseline, embedded environmental design, standards and management measures (if in addition to the aforementioned) and presents the preliminary assessment of likely significant effects in relation to noise and vibration for Part 1a (Minworth AWTP) of the Proposed Development.

Baseline Conditions

19.7.2 This section describes the baseline environmental characteristics with specific reference to noise and vibration.

Noise and Vibration Sensitive Receptors

19.7.3 At the time of preparing this PEI Report, the data necessary to systematically review all receptors and assess their nature and sensitivity was not available. Consequently, receptor identification has been based principally on the locations of nearby structures. This approach will be revisited and refined for the ES.

19.7.4 Initial high-level review shows that nearby NVSRs comprise a mix of residential and commercial locations.

19.7.5 Nearby NVSR locations within the study area were identified via desktop assessment and are shown on **Figure 19-PD-1** in **PEI Report Volume 3**.

Existing Baseline

19.7.6 The existing acoustic environment is urban in nature and dominated by road traffic noise.

19.7.7 Existing noise sources in the vicinity of Part 1a are as follows:

a. Road traffic noise from the M6 Toll, M42 and the local road network (e.g. Kingsbury Road);

b. Commercial / industrial noise from the existing Minworth Wastewater Recycling Centre (WwRC) and other commercial operators (e.g. Prologis Park and Midpoint Park); and

c. Construction noise from nearby sections of HS2.

19.7.8 A long-term noise survey was carried out between 19-26 August 2025. This survey was conducted in accordance with BS 7445-1 (Ref. 6).

19.7.9 In some instances, land access and/or security constraints limited the locations at which baseline sound levels could be measured. Where this occurred, the most appropriate alternative monitoring locations were selected within these constraints

19.7.10 The locations of the measured baseline noise levels are provided in **Figure 19-PD-1** in PEI Report **Volume 3**, with results summarised in **Table 19-14**.

Table 19-14: Part 1a Measured Baseline Noise Levels

Location ID	Date	Period	dB $L_{Aeq, T}$	dB $L_{A90, T}$
1A-1 (Sheet C)	19/08/2025 – 26/08/2025	Day	54	49
		Night	51	49
1A-2 (Sheet C)	19/08/2025 – 26/08/2025	Day	60	56
		Night	57	52
1A-3 (Sheet A)	19/08/2025 – 26/08/2025	Day	63	47
		Night	59	46

[Note: A façade correction of +3 dB has been applied to the field-free $L_{Aeq,T}$ measurement data to align with the assessment criteria]

Future Baseline

19.7.11 In the absence of the Proposed Development, the acoustic environment is expected to remain largely stable, with only minimal increases in road traffic noise due to typical incremental traffic growth, and potential contributions from HS2 train movements once operational. HS2 is not anticipated to materially alter overall baseline conditions.

Environmental Design, Standards and Management

19.7.12 There are no further embedded environmental design, standards and/or management in relation to noise and vibration that are specific to Part 1a of the Proposed Development beyond those stated in section 19.6 for the Proposed Development as a whole.

Assessment of Effects and Significance

19.7.13 This section provides the preliminary assessment of likely significant effects, including determining the level of significance, for Part 1a (Minworth AWTP) of the Proposed Development.

19.7.14 Where applicable, the requirement for additional mitigation measures and/or monitoring is identified to avoid, prevent, reduce, or if possible offset, any identified significant adverse effects on the environment, and to mitigate and minimise other adverse effects as far as practicable.

Construction Phase

Direct temporary noise impacts on sensitive receptors

19.7.15 **Figure 3-P1A-1** in PEI Report **Volume 3** shows the area of land that could be used as a construction working area, and indicates possible locations for laydown areas and access points.

19.7.16 As stated in **Appendix 3-PD-1** in PEI Report **Volume 2**, construction of Part 1a will take approximately 20-25 months and comprises the following processes / phases:

a. Enabling works;

b. Site compound establishment;

c. General civil works;

d. Mechanical, electrical, instrumentation, control, and automation fit out; and

e. Dry and wet testing.

19.7.17 Indicative details of likely noise generating mechanical plant associated with the above processes (provided in **Appendix 3-PD-1** in PEI Report **Volume 4**) have been assigned sound power levels using the data library provided in BS 5228-1 (Ref. 8) and/or relevant manufacturer data.

19.7.18 Construction noise emissions have been assessed using the daytime criteria to reflect the core working hours.

19.7.19 Based on the existing baseline levels, NVSR locations within the study area have been assigned construction noise criteria as per the methodology presented in **Table 19-7**. These assignments are presented in **Table 19-15** below.

Table 19-15: Part 1a Construction Noise Criteria

Receptors	Associated Measurement Location	ABC Category	Daytime Criterion dB $L_{Aeq, T}$
AWTP_001 – AWTP_034	1A-3	B	70
AWTP_035 – AWTP_131	1A-2	A	65
AWTP_132 – AWTP_143	1A-1	A	65
AWTP_144 – AWTP_157	1A-3	B	70

19.7.20 To determine the magnitude of impact of construction noise on existing receptors in the area, a 3-dimensional (3D) noise model has been constructed using CadnaA (version 2025) acoustic modelling software.

19.7.21 Receptors where potential moderate or major adverse impacts are predicted are detailed in **Table 19-16**. A full table of results are provided in **Appendix 19-P1A-1** in PEI Report **Volume 4**.

Table 19-16: Part 1a Predicted Construction Noise Levels

Receptor	Applicable ABC Category	Threshold Criterion	Predicted Maximum Level ($L_{Aeq,10hr}$)	Magnitude of Impact	Loudest Activity
AWTP_130	A	65	70	Moderate	Piling
AWTP_131	A	65	70	Moderate	Piling

19.7.22 The two receptors (AWTP_130 and AWTP_131) are located on Coleshill Road to the south of Curdworth.

19.7.23 The identified effects are driven by the piling activities at Minworth AWTP. The predicted noise maps from these piling activities are shown in **Figure 19-PD-2** in PEI Report **Volume 3**.

19.7.24 Based on the above, there is likely to be a two direct, temporary, adverse effects which are significant.

19.7.25 For all other receptors, there is likely to be a direct, temporary, adverse effect which is either negligible or minor and not significant (i.e. lower than moderate).

19.7.26 In NPSE terminology, this equates to two SOAEL exceedances and five LOAEL exceedances.

19.7.27 To ensure a conservative assessment, the above predictions are based on indicative estimates of the likely construction activities and do not account for many of the mitigation measures outlined in section 19.6, as their precise effects cannot be quantified with the information available at the time of preparing this PEI Report. Therefore, construction noise levels are likely to be lower than presented above.

Additional Mitigation, Enhancement and Monitoring

19.7.28 Options for additional mitigation measures such as temporary noise barriers, sensitive site layouts (i.e. locating noisy activities away from receptors), monitoring and use of quieter mechanical plant / processes (where possible), will be identified as further detail becomes available for the final design of the Proposed Development.

19.7.29 These additional mitigation options will be investigated and incorporated wherever practicable prior to the ES assessment, to avoid significant adverse effects and minimise effects above the LOAEL as far as practicable.

Residual Effect

19.7.30 Although it is likely the identified effects can be reduced and/or removed as more detailed construction phase information becomes available, two direct, temporary, adverse effects which are significant are retained on a precautionary basis.

Direct temporary vibration impacts on sensitive receptors

19.7.31 Vibration-generating equipment associated with the construction phase of Part 1a include vibratory piling and impact piling.

19.7.32 The exact layout and location of the proposed piles is yet to be determined. However, it is understood that piling will take place within the footprint of the AWTP permanent structures as shown in **Figure 19-PD-3** in PEI Report **Volume 3**.

19.7.33 Vibration emissions from piling activities have been calculated using the prediction method given in BS 5228-2 (Ref. 9) to determine the distances from works at which different magnitudes of effects have the potential to occur.

19.7.34 The spatial extent over which minor impacts (LOAEL exceedance) and moderate or above impacts (SOAEL exceedance) may occur were calculated to be 100 m and 40 m respectively. Areas in which significant vibration effects could occur are shown on Sheet A and Sheet B in **Figure 19-PD-3** in PEI Report **Volume 3**.

19.7.35 Based on these figures, there are no direct, temporary, adverse effects which are significant and one direct, temporary, adverse effect which is minor and not significant.

19.7.36 In NPSE terminology, this equates to no SOAEL exceedances and one LOAEL exceedance.

19.7.37 Several factors suggest that predicted vibration effects are likely to be lower than indicated:

a. BS 5228-2 prediction methods are empirical with built-in safety margins, therefore measured levels are often lower in practice;

b. Ground conditions typically provide greater attenuation, as actual soil layers dissipate energy more effectively than assumed in the model;

c. In some cases, press-in piling methods may be feasible, avoiding vibration entirely; and

d. Operational factors may result in intermittent piling, reducing cumulative exposure.

Additional Mitigation, Enhancement and Monitoring

19.7.38 Additional mitigation measures will be investigated and implemented wherever required, following review of the final design of the Proposed Development in the ES. These will seek to avoid significant adverse effects above the SOAEL and minimise effects above the LOAEL as far as practicable, and could include:

a. Selection of piling method (e.g. using hydraulic jacking, where practicable);

b. Optimisation of cofferdam design through reduced pile lengths, lightweight pile sections, temporary anchors, and/or interlock lubrication where practicable;

c. Use of modern, well-maintained vibratory hammers with variable frequency and amplitude control;

d. Community and stakeholder engagement to provide advance notice and coordinate works around sensitive periods; and

e. Monitoring of actual emission levels to allow modification of working practices where possible and to enable reporting.

19.7.39 Consequently, the actual number and significance of effects are likely to be lower than identified above, with mitigation options available for particularly sensitive areas.

Residual Effect

19.7.40 Although it is likely the identified effects can be reduced and/or removed as more detailed construction phase information becomes available, one direct adverse effect which is not significant is retained on a precautionary basis.

Operational Phase

Direct permanent noise impacts on sensitive receptors

19.7.41 The main potential sources of operational noise and vibration at the Minworth AWTP are the pumping stations and the blowers for the nitrate removal Moving Bed Biofilm Reactor (MBBR) units.

19.7.42 At times there would also be some elevated noise levels from the standby generators. However, noise emissions would be minimised as far as practicable (via measures such as acoustic enclosures) and would only occur for short periods (e.g. during testing and/or maintenance) or under atypical circumstances, i.e. if the site lost power.

19.7.43 Therefore, noise from these generators are not considered part of normal site operations and will not be included in the quantitative assessment.

19.7.44 Operational phase sound emissions will be assessed in accordance with the BS 4142 (Ref. 12) methodology. Measured baseline sound levels have been used to determine background sound levels at nearby NVSR locations. These background sound levels are presented in **Table 19-17**.

Table 19-17: Part 1a Background Sound Levels

Receptor	Daytime Background Sound Level ($L_{A90,1hr}$, Modal Average)	Night-time Background Sound Level ($L_{A90,15min}$, Modal Average)
AWTP_001 – AWTP_034	44	43
AWTP_035 – AWTP_131	53	49
AWTP_132 – AWTP_143	46	46
AWTP_144 – AWTP_157	44	43

19.7.45 Due to the Proposed Development being at a relatively early design stage, noise level data for the above items of plant was not available at the time of writing this PEI Report. Therefore, no quantitative assessment is possible.

19.7.46 The proposed noise generating plant items are typical for AWTPs, therefore it is expected that noise emissions will also be typical.

19.7.47 It is not unusual for AWTPs to be located in mixed use areas, such as Minworth and Curdworth. Therefore, it is reasonable to assume that it will be possible to incorporate sufficient noise mitigation measures into the final design of the proposed Minworth AWTP such that adverse effects avoided.

19.7.48 Although this will be determined in the ES, based upon the information currently available, the effect is likely to be a direct, temporary adverse effect which is not significant.

Additional Mitigation, Enhancement and Monitoring

19.7.49 The types of additional mitigation options available include:

a. Appropriate plant specification;

b. Locating noisy plant away from NVSRs;

c. Acoustics enclosures, attenuators and/or silencers;

d. Acoustic barriers; and

e. Use of topography to provide acoustic screening (e.g. natural topography or engineered bunds).

19.7.50 This aspect of the Proposed Development will be addressed in further detail for the ES. However, a commitment is made to incorporate sufficient

design mitigation into noise generating elements of Part 1a such that no significant adverse effects arise.

Residual Effect

19.7.51 Although this will be determined in the ES, the residual effect is likely to be not significant.

Direct permanent vibration impacts on sensitive receptors

19.7.52 The main potential sources of operational vibration emissions are the same as listed for operational noise emissions (i.e. pumping stations and the blowers for the nitrate removal MBBR units).

19.7.53 These plant items typically do not generate high levels of vibration and, in the unlikely event that they do, it will be possible to mitigate emissions using appropriate mitigation measures such as anti-vibration mounts, inertia bases and/or careful plant specification at the detailed design stage.

19.7.54 A commitment is made to investigate and implement these measures, where required, for the final design of the Proposed Development.

19.7.55 Based on the above, the likely direct permanent effect is considered to be not significant.

Additional Mitigation, Enhancement and Monitoring

19.7.56 No additional mitigation, enhancement or monitoring has been identified as being required at this stage, other than those presented above.

Residual Effect

19.7.57 Although this will be determined in the ES, the residual effect is likely to be not significant.

Summary

19.7.58 **Table 19-17** summarises the residual noise and vibration effects of Part 1a of the Proposed Development, following the implementation of appropriate additional mitigation, enhancement and/or monitoring.

Table 19-18: Summary of residual effects – Part 1a

Description of impact	Sensitivity of receptor	Nature of effect / geographic scale	Magnitude of Impact	Initial classification of effect (with embedded control)	Additional mitigation, enhancement and/or monitoring	Residual effect significance
Construction Phase						
Direct temporary noise impacts on sensitive receptors: AWTP_130; and AWTP_131.	Medium	Adverse, Direct, Temporary	Moderate	Moderate Adverse (Significant)	To be confirmed at ES stage	To be confirmed in the ES (likely to be less extensive with fewer significant effects)
All other receptors	Medium	Adverse, Direct, Temporary	Minor or Negligible	Minor or Negligible Adverse	None	To be confirmed at ES stage (likely to be Minor or Negligible Adverse [Not Significant])
Direct temporary vibration impacts on sensitive receptors (including canal infrastructure): AWTP_131	Medium	Adverse, Direct, Temporary	Minor	Minor Adverse	None	To be confirmed at ES stage (likely to be less extensive
All other receptors	Medium	Adverse, Direct, Temporary	Negligible	Negligible Adverse	None	Negligible [Not Significant]

Description of impact	Sensitivity of receptor	Nature of effect / geographic scale	Magnitude of Impact	Initial classification of effect (with embedded control)	Additional mitigation, enhancement and/or monitoring	Residual effect significance
Operational Phase						
Direct permanent noise impacts on sensitive receptors	Medium	To be determined in the ES	To be determined in the ES	To be determined in the ES	To be confirmed at ES stage	To be determined in the ES (likely to be [Not Significant])
Direct permanent vibration impacts on sensitive receptors (including canal infrastructure)	Medium	To be determined in the ES	To be determined in the ES	To be determined in the ES	To be confirmed at ES stage	To be determined in the ES, (likely to be [Not Significant])

Part 1b: Minworth to Atherstone Pipeline

19.8 Part 1b: Minworth to Atherstone Pipeline

19.8.1 This section provides a focussed description of the environmental baseline, embedded environmental design, standards and management measures (if in addition to the aforementioned) and presents the preliminary assessment of likely significant effects in relation to noise and vibration for Part 1b (Minworth to Atherstone Pipeline) of the Proposed Development.

Baseline Conditions

19.8.2 This section describes the baseline environmental characteristics with specific reference to noise and vibration.

Noise and Vibration Sensitive Receptors

19.8.3 The route has been carefully selected to avoid, where possible, passing in close proximity to NVSRs. However, there are several points where the route will pass within 300 m of NVSRs, e.g. receptors in Lea Marston, Hurley, Baxterley and the outskirts of Atherstone.

19.8.4 At the time of preparing this PEI Report, the data necessary to systematically review all receptors and assess their nature and sensitivity was not available. Consequently, receptor identification has been based principally on the locations of nearby structures. This approach will be revisited and refined for the ES.

19.8.5 Initial high-level review shows that nearby NVSRs are predominantly residential, but with some non-residential receptors also present.

19.8.6 To assess noise levels at these NVSRs, a series of ‘clusters’ (i.e. a group of NVSRs in proximity to each other) have been defined. This has been done to provide clarity within the associated figures; predicted noise and/or vibration levels and associated assessment has been carried out at all NVSRs individually

19.8.7 The location of these receptors and clusters is shown in **Figure 19-PD-1** in PEI Report **Volume 3**.

Existing Baseline

19.8.8 Part 1b covers an area approximately 18 km in length and it is expected that baseline conditions will vary along the route.

19.8.9 The majority of the pipeline route passes through predominately rural areas where there are few significant noise sources and therefore it is expected that existing sound levels would be low in these areas.

19.8.10 The exception is where the route passes in the vicinity of the M6 Toll, M42 and where higher existing sound levels exist.

19.8.11 Noise from HS2 construction operations were considered. However, no HS2 construction noise was detected at any of the locations where attended baseline noise surveys were conducted for Part 1b.

19.8.12 The monitoring locations were chosen as being representative of baseline sound levels as they exist at nearby NVSR locations. In some instances, land access and/or security constraints limited the locations at which baseline sound levels could be measured. Where this occurred, the most appropriate alternative monitoring locations were selected within these constraints

19.8.13 Full details of the measured baseline sound levels are given in **Figure 19-PD-1** in PEI Report **Volume 3** and summarised below in **Table 19-19**.

Table 19-19: Part 1b Attended Short-term Measured Baseline Noise Levels

Location ID	Date	Period	Start Time	dB $L_{Aeq, T}$	dB $L_{A90, 15min}$ (Range)
1B-1 (Sheet D)	30/07/2025	1 hour	10:30	57	45 - 47
1B-2 (Sheet E)	30/07/2025	1 hour	12:20	73	44 - 51
1B-3 (Sheet F)	30/07/2025	1 hour	13:40	48	38 - 42
1B-4 (Sheet G)	06/08/2025	1 hour	10:05	55	33 - 47
1B-6 (Sheet I)	06/08/2025	1 hour	12:25	64	35 - 42
1B-7 (Sheet J)	08/08/2025	1 hour	11:00	61	48 - 53
1B-8 (Sheet L)	08/08/2025	1 hour	11:30	69	42 - 54

[Note: A façade correction of +3 dB has been applied to the $L_{Aeq,T}$ field-free measurement data to account for the reflective effect of building facades.]

19.8.14 It is noted that some Part 1b construction activities associated with the trenchless crossings will take place outside of daytime hours, as defined in BS 5228-1 (Ref. 8) and BS 5228-2 (Ref. 9).

19.8.15 In the absence of quantified levels, conservative assumptions have been adopted with regards baseline sound levels during the night time. Where necessary, additional surveys will be completed prior to the completion of the ES.

Future Baseline

19.8.16 In the absence of the Proposed Development, it is expected that the acoustic environment around Part 1b would remain largely unchanged with the exception of small increases in road traffic noise. It is typical that road traffic increases incrementally over time and therefore road traffic noise also increases. Furthermore, potential contributions from train movements associated with HS2 in the very western portion once that becomes

operational. However, it is not envisaged that HS2 will have a significant adverse effect on overall baseline conditions.

19.8.17 It is possible that baseline noise levels in areas where HS2 is currently being constructed (i.e. around the M6, Coleshill) may reduce as HS2 related construction activity reduces and eventually stops.

Environmental Design, Standards and Management

19.8.18 There are no further embedded environmental design, standards and/or management in relation to noise and vibration that are specific to Part 1b of the Proposed Development beyond those stated in section 19.6 for the Proposed Development as a whole.

Assessment of Effects and Significance

19.8.19 This section provides the preliminary assessment of likely significant effects, including determining the level of significance, for Part 1b (Minworth to Atherstone Pipeline) of the Proposed Development.

19.8.20 Where applicable, the requirement for additional mitigation measures and/or monitoring is identified to avoid, prevent, reduce, or if possible offset, any identified significant adverse effects on the environment.

Construction Phase

Direct temporary noise impacts on sensitive receptors

19.8.21 For the purpose of the noise assessment, the construction phase of Part 1b is considered in six distinct sections:

a. Establishment of working corridor (vegetation clearance and minor groundworks);

b. Establishment of site compounds and access corridors;

c. Trenchless crossings;

d. Pipeline construction (comprising trench excavation, pipeline installation, trench backfill and reinstatement);

e. Vehicle movements on access corridors during pipeline construction; and

f. Construction of the Break Pressure Tank (BPT).

19.8.22 The majority of construction noise emissions have been assessed using the daytime criteria to reflect the core working hours. However, trenchless pipeline installation are also assessed using the evening and night-time criteria identified below.

19.8.23 Based on the baseline levels presented above, nearby NVSR locations have been assigned construction noise criteria based on the ABC category they fall within. These assignments are presented **Table 19-20**.

19.8.24 For robustness, in the absence of measured baseline data it has been assumed that the Category A criteria (i.e. the most stringent) apply during the evening and-night-time.

Table 19-20: Part 1b Construction Noise Criteria

Receptors	Measure-ment Location	ABC Category	Daytime Criterion (dB $L_{Aeq,10hr}$)	Evening Criterion (dB $L_{Aeq,4hr}$)	Night-time Criterion (dB $L_{Aeq,8hr}$)
AWTP_125 – AWTP_131	1A -2	A	65	55	45
AWTP_132 – AWTP_140	1A -1	A	65	55	45
NL_PL_001 – NL_PL_005	1A -2	A	65	55	45
NL_PL_006 – NL_PL_049	1B -1	A	65	55	45
NL_PL_050 – NL_PL_059	1B -2	C	75	55	45
NL_PL_60 – NL_PL_63	1B -3	A	65	55	45
NL_PL_064 – NL_PL_086	1B -4	A	65	55	45
NL_PL_87 – NL_PL_89	1B -6	B	70	55	45
NL_PL_90	1B -4	A	65	55	45
NL_PL_091 – NL_PL_105	1B -6	B	70	55	45
NL_PL_107 – NL_PL_158	1B -7	A	65	55	45
NL_PL_159 – NL_PL_223	1B -8	C	75	55	45
NL_PL_224 – NL_PL_266	N/A[1]	A	65	55	45
BPT_001 – BPT_004	1B -7	A	65	55	45
BPT_005 – BPT_007	1B -7	A	65	55	45

[[1] Measurements not completed at time of writing this PEI Report. Measurements to be completed by ES. In the interim conservative estimates have been made regarding the assessment criteria.]

19.8.25 The following construction assumptions have been made:

a. The establishment of the pipeline working corridor will occur in advance of all other activities (in any given area) and will be of relatively short duration;

b. Establishment of site compounds and access corridors will occur prior to any other activities taking place in a given area and will be of short duration (approximately one week);

c. Trenchless crossings will take place in advance of any pipeline construction in the vicinity of the given crossing;

d. Vehicle movements on access corridors, once established, are expected to occur concurrently with nearby pipeline construction; and

e. Construction of the BPT could overlap with pipeline construction in the immediate vicinity.

19.8.26 These construction programme elements are discussed in turn below.

Establishment of Pipeline Working Corridor

19.8.27 Establishment of the pipeline working corridor comprises vegetation clearance and light groundworks (including excavation). This will be carried out using hand tools (e.g. chainsaws, strimmers) chippers and some smaller plant items (e.g. 20 tonnes [t] excavator and 9 t dumper).

19.8.28 The rate of movement of these works will be relatively quick. Based on the indicative construction programme, it is estimated that works will progress at a rate of approximately 250 m per day.

19.8.29 Therefore, as a ‘worst-case’, noise generating plant associated with these works will only be within the scoping distance of any given NVSR for approximately eight days; i.e. less than the ten days in any given 15 temporal criterion detailed above.

19.8.30 As a result, although this activity will result in elevated noise levels at NVSR locations along the pipeline corridor, no impacts are expected due to the limited duration in which noise generating plant will be in the vicinity of any given NVSR.

Establishment of Site Compounds and Access Corridors

19.8.31 Establishment of site compounds and access corridors will occur prior to any other activities taking place in a given area and will be of short duration (approximately one week). Therefore, no significant adverse effects are expected to arise given the duration of the works.

Pipeline Construction

19.8.32 Pipeline construction works can be summarised as two main activities of earthworks (i.e. trench excavation / backfill and material handling) and pipelaying. Pipeline construction will occur after the working corridor, site compounds and access corridors are established.

19.8.33 Earthworks will be carried out using excavators, dumpers and HDVs. Whereas pipelaying will use hand tools like welding sets and associated generators, telehandlers for pipe handling, excavators and HDVs.

19.8.34 Earthworks and pipelaying activities are likely to occur at the same time within close proximity of each other on the proposed pipeline corridor. For the purposes of this assessment, as a ‘worst-case’ scenario, these activities are assumed to be undertaken simultaneously.

19.8.35 It is understood that pipeline construction will start at the western end of the pipeline and progress to the eastern end. Pipeline construction works are estimated to progress at a rate of approximately 30 m per day along this corridor.

19.8.36 For pipeline construction works a non-location specific 3D noise model has been constructed using CadnaA 2025 acoustic modelling software.

19.8.37 The noise model has been used to predict noise levels at receptor locations at various nominal distances from the works on different days as the works progress along the pipeline corridor at a rate of 30 m per day (i.e. adjacent to the receptor on day one, 30 m along the pipeline route day two, etc.).

19.8.38 To ensure a conservative assessment , the model was configured to exclude any attenuation of noise resulting from ground conditions, topography or barriers that might exist between the works and receptor locations.

19.8.39 The results of these calculations are presented in **Appendix 19-P1B-1** in PEI Report **Volume 4**. At closest NVSRs to pipeline construction, noise levels are predicted to exceed the most stringent construction noise criterion of 65 dB $L_{Aeq,T}$ for a maximum of nine days; and that the criterion is not predicted to be exceeded for properties at more than 100 m from the works.

19.8.40 Based on the temporal criterion of ‘10 days in any given 15’ discussed above no significant adverse effects will arise due to the pipeline construction works given that the relevant thresholds will not be exceeded for a sufficient duration.

Trenchless Crossings and On-site Vehicle Movements on Access Roads During Pipeline Construction

19.8.41 There are currently seven locations identified along the pipeline corridor for trenchless techniques to be implemented. These consist of two discrete phases of construction: establishment of drive and reception pits; and pipe installation.

19.8.42 Establishment of drive and reception pits will take place at either end of the specified length of the corridor to be crossed and will likely be carried out using an excavator with piling attachment, dumpers and HGVs. Depending on the ground conditions, alternative quieter methods to piling (such as press-in piling methods) may be possible. At this stage, the ground conditions at these pit locations are unknown, therefore a worst-case scenario has been assessed (i.e. vibratory piling). It is assumed for the establishment of drive and reception pits will be undertaken during the daytime only.

19.8.43 Pipe installation will use a telehandler and crawler crane for pipe handling, and hydraulic ram with associated power pack to push the pipe from drive pit to reception pit. During the pipe installation, an excavator, dumper and an HDV will also be used to handle the material coming out of the crossing. Trenchless pipe installation will be a continuous operation (i.e. 24-hour) until the pipe is fully installed between each drive and reception pit. Therefore, this has been assessed using day, evening and night-time criteria.

19.8.44 With regards access roads serving the trenchless crossings and other areas of the pipeline route, it is estimated that, on average, there will be up to six HGV trips (i.e. three arrivals and three departures) per hour spread across multiple locations along the pipeline corridor. During the peak month of pipeline construction works the vehicle movements on access roads are estimated to increase up to 14 HGV trips (seven arrivals and seven departures) per hour.

19.8.45 To determine the impact of trenchless crossings and vehicle movements on access roads, a 3D noise model was constructed using CadnaA (version 2025) acoustic modelling software.

19.8.46 Receptors where moderate or major (i.e. above SOAEL) daytime, evening and night-time impacts are predicted are fully detailed in Table 2, Table 3 and Table 4 in **Appendix 19-P1B-1** in PEI Report **Volume 4**. **Table 19-21** provides a summary of the significant impact results. All receptors shown were categorised as A under the ABC criterion.

Table 19-21: Summary of predicted Part 1b construction noise levels – daytime, evening and night-time impacts

Time of Impact	Category A Criterion	Predicted Maximum Levels ($L_{Aeq,10hr}$)	Magnitude of Impact	Total number of receptors
Daytime	65	78 – 71	Major	9
		70 – 66	Moderate	17
Evening	55	70 – 61	Major	14
		59 – 56	Moderate	12
Night-time	45	70 – 51	Major	52
		50 – 46	Moderate	58

19.8.47 The identified impacts in the daytime are dominated by the piling activities at drive or reception pit of the trenchless crossings. In the evening and night-time, impacts are dominated by trenchless pipe installation. As explained previously, all receptors have a medium sensitivity.

Construction of the Break Pressure Tank

19.8.48 **Figure 3-P1B-1** in **Volume 3** of this PEI Report shows the location of the proposed BPT.

19.8.49 Construction of the BPT comprises the following key processes / phases:

a. General civil works (groundworks / pipe laying, earthworks, piling works and formwork reinforced concrete (FRC) / precast works);

b. Mechanical, electrical, instrumentation, control, and automation fit out;

c. Reinstatement (earthworks and planting); and

d. Dry and wet testing.

19.8.50 It is understood that the above construction processes will be undertaken sequentially, i.e. one activity at a time.

19.8.51 Details of the indicative noise generating mechanical plant associated with the above processes have subsequently been assigned noise power levels using the data library provided in BS 5228-1 (Ref. 8) and/or relevant manufacturer data. Full details are provided in **Appendix 3-PD-1** in PEI Report **Volume 4**.

19.8.52 To determine the impact of construction noise on existing receptors in the area, a 3D sound model was constructed using CadnaA (version 2025) acoustic modelling software.

19.8.53 Receptors where potential moderate or major impacts (i.e. above SOAEL) are predicted are detailed in **Table 19-** below. A full table of results are given in **Appendix 19-P1B-1** in PEI Report **Volume 4**.

Table 19-22: Part 1b Predicted BPT Construction Noise Levels

Receptor	Applicable ABC Category	ABC Criterion	Predicted Maximum Level ($L_{Aeq,10hr}$)	Magnitude of Impact
BPT_006	A	65	75	Major

19.8.54 The identified impact is dominated by the piling activities at the BPT. The predicted noise maps from these piling activities are shown in **Figure 19-PD-2** in PEI Report **Volume 3**.

Summary of Effects – Part 1b Construction Noise

19.8.55 Based on the above, there is likely to be 163 direct, temporary, adverse effects which are significant.

19.8.56 For all other receptors, there is likely to be a direct, temporary, adverse effect which is either negligible or minor and not significant.

19.8.57 In NPSE terminology, this equates to 163 SOAEL exceedances and 104 LOAEL exceedances.

Additional Mitigation, Enhancement and Monitoring

19.8.58 Options for additional mitigation measures such as temporary noise barriers, sensitive site layouts (i.e. locating noisy activities away from receptors), monitoring and use of quieter mechanical plant / processes (where possible), will be identified as further detail becomes available for the final design of the Proposed Development.

19.8.59 These additional mitigation options will be investigated and incorporated wherever practicable prior to the ES assessment, to avoid significant adverse effects and minimise effects above the LOAEL as far as practicable.

Residual Effect

19.8.60 Although it is likely the identified effects can be reduced and/or removed as more detailed construction phase information becomes available, 163 direct, temporary, adverse effects which are significant are retained on a precautionary basis.

Direct temporary vibration impacts on sensitive receptors

19.8.61 Vibration-generating equipment associated with the construction phase of Part 1b include vibratory piling and impact piling associated with the

construction of the drive and receptions pits for trenchless crossing and the construction of the BPT.

19.8.62 The exact layout of the proposed piles is yet to be determined. However, it is understood that piling will only take place within the footprint of the trenchless crossing pits and BPT permanent structures (as shown in **Figure 19-PD-3** in PEI Report **Volume 3**).

19.8.63 Vibration emissions from piling activities have been calculated using the prediction method given in BS 5228-2 (Ref. 9) to determine the distances from works at which different magnitudes of impacts have the potential to occur.

19.8.64 Figures showing the areas in which significant vibration effects could occur is given in **Figure 19-PD-3** in PEI Report **Volume 3**.

19.8.65 Based on these figures, there is one direct, temporary, adverse effect which is significant.

19.8.66 For all other receptors, there is likely to be a direct, temporary, adverse effect which is either negligible and not significant.

19.8.67 In NPSE terminology, this equates to one SOAEL exceedance and nine LOAEL exceedances.

Table 19-23: Part 1b Vibration Impacts

Receptor	Magnitude of Impact
BPT_006	Moderate or Major
AWTP_130	Minor
AWTP_131	Minor
NL_PL_001	Minor
NL_PL_028	Minor
NL_PL_029	Minor
NL_PL_030	Minor
NL_PL_032	Minor
NL_PL_136	Minor
NL_PL_141	Minor

19.8.68 Several factors suggest that predicted vibration effects are likely to be lower than indicated:

a. BS 5228-2 prediction methods are empirical with built-in safety margins, so measured levels are often lower in practice;

b. Ground conditions typically provide greater attenuation, as actual soil layers dissipate energy more effectively than assumed in the model;

c. In some cases, press-in piling methods may be feasible, avoiding vibration entirely;

d. The exact piling locations are not known at the time of writing; worst-case assumptions have been applied, so actual distances to receptors may be greater; and

e. Operational factors may result in intermittent piling, reducing cumulative exposure.

Additional Mitigation, Enhancement and Monitoring

19.8.69 Mitigation measures will be investigated and implemented wherever appropriate, following review of the final design of the Proposed Development in the ES. This mitigation will seek to avoid significant adverse effects above the SOAEL and minimise effects above the LOAEL as far as practicable, and could include:

a. Selection of piling method, e.g. using hydraulic jacking where feasible;

b. Optimisation of cofferdam design through reduced pile lengths, lightweight pile sections, temporary anchors, and/or interlock lubrication where possible;

c. Use of modern, well-maintained vibratory hammers with variable frequency and amplitude control;

d. Community and stakeholder engagement to provide advance notice and coordinate works around sensitive periods; and

e. Monitoring of actual emission levels to allow modification of working practices where possible and to enable reporting.

19.8.70 Consequently, the actual number and magnitude of effects are likely to be lower than identified above, with mitigation options available for particularly sensitive areas.

19.8.71 These measures will be considered in the ES as more design information becomes available.

Residual Effect

19.8.72 Although it is likely the identified effects can be reduced and/or removed as more detailed construction phase information becomes available, nine direct temporary adverse vibration effects which are not significant and one moderate or greater temporary adverse vibration effect which is significant is retained on a precautionary basis.

Operational Phase

Direct permanent noise impacts on sensitive receptors (BPT only)

19.8.73 The majority of Part 1b comprises a pipeline which, once constructed, will not give rise to any significant noise emissions. The one exception is the BPT. Equipment within the BPT is unlikely to produce noise as they would be below ground level, contained within a surrounding concrete structure. Elements of the BPT would be open to the air but these are not expected to generate noise. This assumption will be revisited in more detail in the ES but is not expected to change.

19.8.74 Based on the above, there is likely to be a direct, permanent adverse effect which is not significant.

Additional Mitigation, Enhancement and Monitoring

19.8.75 No additional mitigation, enhancement or monitoring has been identified

Residual Effect

19.8.76 The residual effect is likely to be direct, permanent adverse and not significant.

Direct permanent vibration impacts on sensitive receptors (BPT only)

19.8.77 Equipment within the BPT is unlikely to produce vibration as they would be below ground level, contained within a surrounding concrete structure. Parts of the BPT would be open to the air but these elements are not expected to generate vibration.

19.8.78 Based on the above, there is likely to be a direct, temporary adverse effect which is not significant.

Additional Mitigation, Enhancement and Monitoring

19.8.79 No additional mitigation, enhancement or monitoring is required / has been identified.

Residual Effect

19.8.80 The residual effect is likely to be direct, permanent adverse and not significant.

Summary

19.8.81 **Table 19-24** summarises the residual noise and vibration effects of Part 1b of the Proposed Development, following the implementation of any identified additional mitigation, enhancement and/or monitoring.

Table 19-24: Summary of residual effects – Part 1b

Description of impact	Sensitivity of receptor	Nature of effect / geographic scale	Magnitude of Impact	Initial classification of effect (with embedded control)	Additional mitigation, enhancement and/or monitoring	Residual effect significance
Construction Phase						
Direct temporary noise impacts on sensitive receptors – as listed in **Appendix 19-P1B-1** in PEI Report **Volume 4**: 76 NVSRs	Medium	Adverse, Direct, Temporary	Major	Major Adverse (Significant)	To be confirmed at ES stage	To be confirmed at ES stage (likely to be less extensive with fewer significant effects)
87 NVSRs	Medium	Adverse, Direct, Temporary	Moderate	Moderate Adverse (Significant)		To be confirmed at ES stage (likely to be Minor or Negligible Adverse [Not Significant])
All other receptors	Medium	Adverse, Direct, Temporary	Minor or Negligible	Minor or Negligible Adverse	None	Minor or Negligible [Not Significant]
Direct temporary vibration impacts on sensitive receptors **Appendix 19-P1B-1** in PEI Report **Volume 4**: 1 NVSR	Medium	Adverse, Direct, Temporary	Moderate or Major	Moderate or Major Adverse (Significant)	To be confirmed at ES stage	To be confirmed at ES stage (likely to be less extensive with fewer significant effects)

Description of impact	Sensitivity of receptor	Nature of effect / geographic scale	Magnitude of Impact	Initial classification of effect (with embedded control)	Additional mitigation, enhancement and/or monitoring	Residual effect significance
9 NVSRs	Medium	Adverse, Direct, Temporary	Minor	Minor Adverse		To be confirmed at ES stage (likely to be Minor [Not Significant])
All other receptors	Medium	Adverse, Direct, Temporary	Negligible	Negligible Adverse	None	To be confirmed at ES stage (likely to be Negligible [Not Significant])
Operational Phase						
Direct permanent noise impacts (BPT only) on sensitive receptors	Medium	To be determined in the ES	To be determined in the ES	To be determined in the ES	To be confirmed at ES stage	To be determined in the ES (likely to be [Not Significant])
Direct permanent vibration impacts (BPT only) on sensitive receptors	Medium	To be determined in the ES	To be determined in the ES	To be determined in the ES	To be confirmed at ES stage	To be determined in the ES (likely to be [Not Significant])

Part 2: Works to the Coventry, Oxford and Grand Union Canals

19.9 Part 2: Works to the Coventry, Oxford and Grand Union Canals

19.9.1 This section provides a focussed description of the environmental baseline, embedded environmental design, standards and management measures (if in addition to the aforementioned) and presents the preliminary assessment of likely significant effects in relation to noise and vibration for Part 2 (Works to the Coventry, Oxford and Grand Union Canals) of the Proposed Development.

Baseline Conditions

19.9.2 This section describes the baseline environmental characteristics with specific reference to noise and vibration.

Noise and Vibration Sensitive Receptors

19.9.3 Part 2 covers a wide area with many NVSRs. As with Part 1b, to assess noise levels at these NVSRs, a series of clusters have been defined.

19.9.4 At the time of preparing this PEI Report, the data necessary to systematically review all receptors and assess their nature and sensitivity was not available. Consequently, receptor identification has been based principally on the locations of nearby structures. This approach will be revisited and refined for the ES.

19.9.5 Initial high-level review shows that nearby NVSRs are predominantly residential, but with some non-residential receptors also present.

19.9.6 To assess noise levels at these NVSRs, a series of ‘clusters’ (i.e. a group of NVSRs in proximity to each other) have been defined. This has been done to provide clarity within the associated figures; predicted noise and/or vibration levels and associated assessment has been carried out at all NVSRs individually.

19.9.7 NVSRs include long-term, moorings along the canal network. Service and short term moorings are not included as they are not assumed to be permanent residences. The locations of these receptors are shown in **Figure 19-PD-1** in PEI Report **Volume 3**.

Existing Baseline

19.9.8 Due to the varied nature of the areas in which the Part 2 works are proposed, baseline sound levels vary from relatively high in urban areas to relatively low in more rural areas (e.g. around Fenny Stratford Lock).

19.9.9 To quantify baseline levels in sections of the corridor where no operational phase noise effects are expected (i.e. areas where there are no above ground elements), short term attended daytime surveys have been

conducted so that construction phase daytime assessment criteria can be determined.

19.9.10 At the time of writing this PEI Report, the unattended measurement surveys for Part 2 have not yet been completed. These surveys will be carried out for the ES.

19.9.11 Where baseline information is still to be quantified, the most stringent noise criteria based on the ABC category has been assigned for the nearby NVSR locations as the worst-case assumption

19.9.12 Some Part 2 construction activities may take place outside of daytime hours (as defined in BS 5228-1 [Ref. 8] and BS 5228-2 [Ref. 9]). The exact locations where this could occur is still to be confirmed.

19.9.13 This will be revisited and assessed prior to the ES as more information becomes available. Additional night-time surveys, or appropriate worst-case assumptions will be implemented.

19.9.14 A summary of the results of the attended short-term measurement survey are provided below in **Table 19-25**. Further details about the survey, regarding instrumentation and location description are provided in **Appendix 19–PD-3** in PEI Report **Volume 4**.

Table 19-25: Part 2 Attended Short-term Measurements

Location ID	Date	Period	Start Time	dB $L_{Aeq, T}$	dB $L_{A90, 15min}$ (Range)
2-1 (Sheet N)	08/08/2025	1 hour	13:00	62	48 – 52
2-2 (Sheet O)	30/07/2025	1 hour	09:25	52	48 – 51
2-3 (Sheet O)	30/07/2025	1 hour	10:35	70	66 – 67
2-5 (Sheet Q)	12/08/2025	1 hour	09:20	55	37 – 42
2-6 (Sheet R)	12/08/2025	1 hour	10:40	52	48 – 50
2-7 (Sheet Z)	28/07/2025	1 hour	10:10	54	47 – 52
2-8 (Sheet AA)	28/07/2025	1 hour	11:50	57	38 – 44
2-9 (Sheet X)	06/08/2025	1 hour	11:10	60	51 – 57
2-10 (Sheet AC)	06/08/2025	1 hour	12:30	50	38-49

[Note: A façade correction of +3 dB has been applied to the field-free measurement data to account for the reflective effect of building façades]

Future Baseline

19.9.15 In the absence of the Proposed Development, the acoustic environment is expected to remain largely unchanged, with only minor increases in road traffic and canal traffic noise due to typical incremental traffic growth.

Environmental Design, Standards and Management

19.9.16 There are no further embedded environmental design, standards and/or management in relation to noise and vibration that are specific to Part 2 of the Proposed Development beyond those stated in section 19.6 for the Proposed Development as a whole.

Assessment of Effects and Significance

19.9.17 This section provides the preliminary assessment of likely significant effects, including determining the level of significance, for Part 2 (Works to the Coventry, Oxford and Grand Union Canals) of the Proposed Development.

19.9.18 Where applicable, the requirement for additional mitigation measures and/or monitoring is identified to avoid, prevent, reduce, or if possible offset, any identified significant adverse effects on the environment.

Construction Phase

Direct temporary noise impacts on sensitive receptors

19.9.19 The construction phase noise assessment for Part 2 of the Proposed Development considers the following elements:

a. Establishment of access corridors and site compounds;

b. Atherstone outfall structure;

c. Pumped bypasses;

d. Gravity bypasses;

e. Canal bank raising;

f. Transfer locks;

g. Bridge 88 modifications; and

h. Modification of control and waste weirs.

19.9.20 Construction noise emissions have been assessed using the daytime criteria to reflect the core working hours.

19.9.21 If and where construction works outside of standard daytime hours are required is still to be confirmed at the time of writing this PEI Report. This will be assessed further for the ES.

Establishment of Access Corridors and Site Compounds (All)

19.9.22 Establishment of site compounds and access corridors will occur prior to any other activities taking place in each area and will be of short duration

(approximately one week). Therefore, no effect is expected given the duration of the works.

Atherstone Outfall Structure

19.9.23 The indicative stages of the construction of the outfall structure are:

a. Stage 1:

   i. Site preparation works.

b. Stage 2:

   i. Installation of temporary dams to allow the canal to remain open whilst outlet construction work is undertaken along/within the canal bank;

   ii. Foundation and base construction, including dewatering of groundwater, if required;

   iii. Wall construction;

   iv. Construction of the inlet system and control building;

   v. Construction of internal energy dissipation features;

   vi. Construction of the outlet system;

   vii. Construction of ground cover and access;

   viii. Removal of temporary dams;

   ix. De-mobilisation; and

   x. Testing and commissioning.

19.9.24 The estimated duration for the construction of the outfall is approximately 15 weeks.

19.9.25 Details of the indicative noise generating plant associated with the construction of the Atherstone Outfall are provided in **Appendix 3-PD-1** in PEI Report **Volume 4**.

19.9.26 Based on the baseline levels presented above, nearby NVSR locations have been assigned construction noise criteria based on the ABC category they fall within. These assignments are presented in **Table 19-26**.

Table 19-26: Part 2 Construction Noise Criteria – Atherstone Outfall

Receptors	Associated Measurement Location	ABC Category	Daytime Criterion (dB $L_{Aeq,10hr}$)
ATH_OUT_001 to ATH_OUT_101	2-1	A	65

Receptors	Associated Measurement Location	ABC Category	Daytime Criterion (dB $L_{Aeq,10hr}$)
Slacks Avenue Mooring	2-1	A	65

19.9.27 To determine the impact of construction noise on existing receptors in the area, a 3D noise model was constructed using CadnaA 2025 acoustic modelling software. Full details of the noise modelling and associated noise maps are given in **Figure 19-PD-2** in PEI Report **Volume 3** and **Appendix 19-P2-1** in PEI Report **Volume 4**.

19.9.28 A summary of the results of the construction noise emission predictions from Atherstone Outfall at receptors where impacts are possible are provided in **Table 19-27**. Full details of the results are provided within **Appendix 19-PD-6** in PEI Report **Volume 4**.

19.9.29 All receptors shown were categorised as A under the ABC criterion.

Table 19-27: Summary of predicted significant Part 2 Atherstone Outfall construction noise levels

Time of Impact	Category A Criterion	Predicted Maximum Levels ($L_{Aeq,10hr}$)	Magnitude of Impact	Total number of receptors
Daytime	65	77 – 74	Major	10
		70 – 66	Moderate	23

Pumped Bypasses

19.9.30 The construction of the pumped bypasses will comprise the following phases:

a. Site and compound establishment;

b. Installation of temporary dams to allow the canal to remain open whilst inlet and outlet construction work is undertaken along / within the canal bank;

c. Construction of the pipelines;

d. Construction of the inlet and outlet weirs;

e. Construction of the pumping station wet well;

f. Construction of the pumping station control building;

g. Removal of temporary dams; and

h. Testing and commissioning.

19.9.31 The estimated duration for constructing the pumped bypasses is approximately 7-9 months (with the exception of the Braunston Pumped Bypass, where the overall duration of works is likely to be approximately 12 months).

19.9.32 Details of the noise generating plant associated with the remaining construction phases of the pumped bypasses have been provided by the design team. This information is detailed within **Appendix 3-PD-1** in PEI Report **Volume 4**.

19.9.33 Based on the baseline levels presented above, nearby NVSR locations have been assigned construction noise criteria based on the ABC category they fall within. These assignments are presented in **Table 19-28**.

Table 19-28: Part 2 Construction Noise Criteria – Pumped Bypasses

Receptors	Associated Measurement Location	ABC Category	Daytime Criterion (dB $L_{Aeq,10hr}$)
PB_HWK_001 to PB_HWK_065	2-2	A	65
Hawkesbury Pump House Moorings	2-2	A	65
Hawkesbury Junction Moorings	2-2	A	65
PB_HIL_01 to PB_HIL_54	2-6	A	65
Hillmorton Bottom Lock Mooring	2-6	A	65
Grantham's Bridge Boat Mooring	2-6	A	65
Hillmorton Bistro Mooring	2-6	A	65
Hillmorton Locks Mooring	2-6	A	65
PB_BRN_01 to PB_BRN_38	2-7	A	65
DRO_WEI_01 to DRO_WEI_04, DRO_WEI_07 to DRO_WEI_09, DRO_WEI_11, DRO_WEI_13	N/A[1]	A	65
South Lea, Archer Avenue Mooring	2-7	A	65
Union Canal Carriers Mooring	2-7	A	65
Braunston Boats Mooring	2-7	A	65
Braunston Marina Mooring	2-7	A	65
Braunston E.O.G. Mooring	2-7	A	65
PB_FEN_01 to PB_FEN_19	2-9	A	65
Fenny Stratford Mooring	2-9	A	65
Fenny Lodge Mooring	2-9	A	65

Receptors	Associated Measurement Location	ABC Category	Daytime Criterion (dB $L_{Aeq,10hr}$)
Fenny Stratford Towpath Moorings	2-9	A	65
Grenville Marina Mooring	2-9	A	65

[[1] Measurements not complete at time of writing this PEI Report. Measurements to be completed by ES. In the interim conservative estimates have been made regarding the assessment criteria.]

19.9.34 To determine the impact of construction noise on existing receptors in the area, a 3D noise model was constructed using CadnaA 2025 acoustic modelling software. Full details of the noise modelling and associated noise maps are given in **Figure 19-PD-2** of PEI Report **Volume 3** and **Appendix 19-P2-1** of PEI Report **Volume 4**.

19.9.35 A summary of the results of the construction noise emission predictions from the proposed pumped bypasses at receptors where moderate or major impacts (i.e. SOAEL exceedances) are possible is provided in **Table 19-29**. Full details of the results are provided in **Appendix 19-P2-1** of PEI Report **Volume 4**. All receptors shown were categorised as A under the ABC criterion.

Table 19-29: Summary of predicted significant Part 2 Pumped Bypasses construction noise levels

Time of Impact	Category A Criterion	Predicted Maximum Levels ($L_{Aeq,10hr}$)	Magnitude of Impact	Total number of receptors
Hawkesbury Pumped Bypass				
Daytime	65	80 – 71	Major	7
		70 – 66	Moderate	9
Hillmorton Pumped Bypass				
Daytime	65	80 – 71	Major	5
		70 – 66	Moderate	6
Braunston Pumped Bypass				
Daytime	65	66	Moderate	2
Fenny Stratford Pumped Bypass				
Daytime	65	82 – 74	Major	11
		68 – 66	Moderate	6

Gravity Bypasses

19.9.36 The construction of the gravity bypasses will comprise the following phases:

a. Site and compound establishment;

b. Installation of temporary dams to allow the canal to remain open whilst inlet and outlet construction work is undertaken along / within the canal bank;

c. Construction of the pipelines;

d. Construction of the inlet and outlet weirs;

e. Construction of the inlet control building;

f. Removal of temporary dams; and

g. Testing and commissioning.

19.9.37 The estimated duration for construction is between 4-6 months per site.

19.9.38 Details of the noise generating plant associated with the construction of the gravity bypasses have been provided by the design team. This information is detailed within **Appendix 19-P2-1** in PEI Report **Volume 4**.

19.9.39 Based on the baseline levels presented above, nearby NVSR locations have been assigned construction noise criteria based on the ABC category they fall within. These assignments are presented in **Table 19-30**.

Table 19-30: Part 2 Construction Noise Criteria – Gravity Bypasses

Receptors	Associated Measurement Location	ABC Category	Daytime Criterion (dB $L_{Aeq,10hr}$)
PB_BUC_01 to PB_BUC_66	2-7	A	65
Buckby Top Lock Mooring	2-7	A	65
Buckby Wharf Mooring	2-7	A	65
Whilton Marina Mooring	2-7	A	65
GP_STO_01 to GP_STO_25	2-8	A	65
Stoke Bruerne Offside Mooring	2-8	A	65
Blagrove Wharf Cottage Mooring	2-8	A	65
Stoke Bruerne Museum Mooring	2-8	A	65
Stoke Bruerne Residential Mooring	2-8	A	65
Rover Tove Mooring	2-8	A	65
GP_RIT_01 to GP_RIT_05	2-8	A	65
TL_COS_01 to TL_COS_08	2-9	A	65
Cosgrove Marina Mooring	2-9	A	65
Walker Norton Homes Mooring	2-9	A	65
Cosgrove Hall Mooring	2-9	A	65

Cosgrove Marina Mooring	2-9	A	65
Clayton Tanneries Mooring	2-9	A	65
The Stocks, Cosgrove Mooring	2-9	A	65

19.9.40 To determine the impact of construction noise on existing receptors in the area, a 3D noise model was constructed using CadnaA 2025 acoustic modelling software. Full details of the sound modelling and associated noise maps are provided within **Figure 19-PD-2** in PEI Report **Volume 3** and **Appendix 19-P2-1** in PEI Report **Volume 4**.

19.9.41 A summary of the results of the construction noise predictions from the gravity bypasses at receptors where moderate or major impacts are possible is given in **Table 19-31**. Full details of the results are provided within **Appendix 19-P2-1** in PEI Report **Volume 4**.

Table 19-31: Summary of predicted significant Part 2 Gravity Bypasses construction noise levels

Time of Impact	Category A Criterion	Predicted Maximum Levels ($L_{Aeq,10hr}$)	Magnitude of Impact	Total number of receptors
Long Buckby (Locks 7 to 9) and Whilton Locks (Locks 10 to 13)				
Daytime	65	87 – 72	Major	15
		70 – 66	Moderate	23
Stoke Bruerne Locks (Locks 14 to 15 and Locks 16-20)				
Daytime	65	87 – 72	Major	14
		70 – 66	Moderate	8
Cosgrove Lock (Lock 21)				
Daytime	65	78 – 76	Major	2
		66	Moderate	1

Canal Bank Raising

19.9.42 Along sections of the canals, impermeable lining of the canal banks may need to be raised by approximately 100-250 millimetres (mm) to accommodate the increase in water level within the canal network.

19.9.43 For bank raising operations, a non-location specific 3D noise model was constructed using CadnaA 2025 noise modelling software. Full details of the sound modelling and associated noise maps are provided within **Appendix 19-P2-1** in PEI Report **Volume 4**.

19.9.44 The model was used to predict noise levels at receptor locations as the works advanced along the canal at a rate of 50 m per day (i.e. adjacent on day one, 50 m away on day two, etc.).

19.9.45 To ensure a worst case scenario is considered, the model was configured to not account for any attenuation of noise resulting from ground conditions, topography or barriers that might exist between the works and receptor locations.

19.9.46 The results of these calculations are presented in **Appendix 19-P2-1** in PEI Report **Volume 4**, and show that, even within 10 m of bank raising operations, noise levels will not exceed the most stringent construction noise criterion of 65 dB $L_{Aeq,T}$ for more than three days, and that the criterion will not ever be exceeded for properties at more than 100 m from the works.

19.9.47 Based on the LA111 (Ref. 15) temporal criterion of '10 days in any given 15', it is therefore not envisaged that any significant adverse effects will arise because of standard bank raising works.

Transfer Locks

19.9.48 Construction of transfer locks will require canal closure and therefore, works are anticipated to be undertaken during the off-season periods across two years.

19.9.49 Construction activities across the two years are likely to comprise the following:

a. Year one off season, over a period of approximately six months:

   i. Site establishment, including setting up construction compounds and access;

   ii. Full closure of the canal section by constructing cofferdams to create dry working conditions; and

   iii. Creation of the civil works for the new lock, including concrete walls, floor and gate footings and sills, and earthworks to narrow the canal to ensure that the partially constructed structure is suitable for navigation.

b. Year two off season, over a period of approximately six months:

   iv. Site establishment, including setting up construction compounds and access;

   v. Full closure of the canal section by constructing cofferdams to create dry working conditions;

   vi. De-mobilisation of site, removal of temporary access and compounds;

   vii. Installation of the mechanical and electrical engineering works including lock gates;

viii. Construction of the pumping station, pipeline and inlet and outlet weirs;

ix. Removal of temporary dams; and

x. Reopening of canal to navigation.

19.9.50 Details of the indicative noise generating plant associated with the construction of the transfer locks is provided in **Appendix 3-PD-1** in PEI Report **Volume 4**.

19.9.51 Based on the baseline levels presented above, nearby NVSR locations have been assigned construction noise criteria based on the ABC category they fall within. These assignments are presented in **Table 19-32**.

Table 19-32: Part 2 Transfer Locks – Construction Noise Criteria

Receptors	Associated Measurement Location	ABC Category	Daytime Criterion (dB $L_{Aeq,10hr}$)
SPRING_001 to SPRING_019	2-1	A	65
Springwood Haven Moorings	2-1	A	65
TL_GRB_001 to TL_GRB_010	2-2	A	65
Colehurst Farm Mooring	2-2	A	65
Wilson's Wharf Mooring	2-2	A	65
TL_DOF_01 to TL_DOF_14	2-7	A	65
Canna Mead Moorings	2-7	A	65
Concoform Marine Moorings	2-7	A	65
Weedon Church Moorings	2-7	A	65
Weedon Wharf Private Moorings	2-7	A	65

19.9.52 To determine the impact of construction noise on existing receptors in the area, a 3D noise model was constructed using CadnaA 2025 acoustic modelling software.

19.9.53 Full details of the noise modelling and associated noise maps are provided within **Figure 19-PD-2** in PEI Report **Volume 3** and **Appendix 19-P2-1** in PEI Report **Volume 4**.

19.9.54 A summary of the results of the construction noise predictions at receptors where moderate or major impacts are possible is given in **Table 19-33**. Full details of the results are given in **Appendix 19-P2-1** in PEI Report **Volume 4**. All receptors shown were categorised as A under the ABC criterion.

Table 19-33: Summary of predicted significant Part 2 Transfer Locks construction noise levels

Time of Impact	Category A Criterion	Predicted Maximum Levels ($L_{Aeq,10hr}$)	Magnitude of Impact	Total number of receptors
Grimes Bridge Transfer Lock				
Daytime	65	80	Major	1
Daytime	65	70 – 66	Moderate	2
South of Cosgrove Transfer Lock (Option 1)				
Daytime	65	67 – 66	Moderate	3
South of Cosgrove Transfer Lock (Option 2)				
Daytime	65	67 – 66	Moderate	5

19.9.55 No significant adverse effects are predicted for the Dodford Road Transfer Lock or the Springwood Transfer Lock Options and therefore these locations are not presented in the table above.

19.9.56 For the total number of impacts / effects presented below, the worst case option for the South of Cosgrove Transfer Lock has been used i.e. Option 2.

Iron Trunk Aqueduct

19.9.57 Due to potential water level changes within the Milton Keynes Trough Pound, modifications may be required to the Wolverton Iron Trunk Aqueduct Scheduled Monument. This may comprise the reversible addition of a 100-150 mm high, removable bar fixed on top of the existing trough wall on the offside of the structure, subject to further detailed assessment and consultation with statutory stakeholders.

19.9.58 Full details of the construction works required are to be confirmed at the time of writing this PEI report, therefore quantitative assessment of noise emissions has not been possible.

19.9.59 A desktop review of the area has shown that the nearest NVSRs are over 180 metres away (Cosgrove Park to the northwest) meaning that construction noise will be attenuated by the intervening distance.

19.9.60 Furthermore, the nature of the proposed works indicates that they are likely to generate relatively low noise levels, as no earthworks or other noisy civil engineering activities are required.

19.9.61 Should this element of the Proposed Development be progressed, potential noise emissions will be assessed in further detail and reported within the ES. Where necessary, appropriate mitigation measures will be identified and implemented to minimise noise impacts. However, given the limited

scope of the works and the separation distance to nearby NVSRs, no significant noise effects are anticipated.

Bridge 88 Modifications

19.9.62 Temporary works to increase the height of Bridge 88's span would likely comprise the following:

a. Access, site establishment and the construction of temporary supports for the bridge structure;

b. Installation of temporary dams to close the canal to navigation and allow the supports and foundations. Establish towpath diversion if necessary;

c. Parapet and deck removal;

d. New deck build-up;

e. Adjust the road approaches to match the new deck height;

f. Parapet reconstruction and finishing; and

g. Completion and removal of temporary works, including removal of temporary dams, and reopening of canal.

19.9.63 For safety, it is likely that the canal will need to be closed during the demolition of the existing arch and rebuilding of the new. This would require closures across two off seasons: one for the demolition and one for the construction. A temporary span would need to be installed during the summer in this scenario.

19.9.64 The temporary works would take approximately 5-8 months to complete the bridge modifications.

19.9.65 Details of the noise generating plant associated with the construction of the transfer locks have been provided by the design team. This information is detailed in **Appendix 3-PD-1** in PEI Report **Volume 4**.

19.9.66 Based on the baseline levels presented above, nearby NVSR locations have been assigned construction noise criteria based on the ABC category they fall within. These assignments are presented in **Table 19-34**.

Table 19-34: Part 2 Measured Baseline Levels – Bridge 88

Receptors	Associated Measurement Location	ABC Category	Daytime Criterion (dB $L_{Aeq,10hr}$)
Bridge_88_001 to Bridge_88_026	2 -9	A	65
MK (Woughton) Marina Moorings	2 -9	A	65
Bridge 88 Mooring	2 -9	A	65

19.9.67 To determine the impact of construction noise on existing receptors in the area, a 3D noise model was constructed using CadnaA 2025 acoustic modelling software. Full details of the noise modelling and associated noise maps are given in **Appendix 19-P2-1** in PEI Report **Volume 4**.

19.9.68 The results of the construction noise emission predictions at receptors where moderate or major impacts are possible is given in Table 19-35. Full details of the results are given in **Appendix 19-P2-1** in PEI Report **Volume 4**.

Table 19-35: Part 2 Predicted Construction Noise Levels - Bridge 88 Modifications

Receptor	Applicable ABC Category	ABC Criterion	Predicted Level ($L_{Aeq,10hr}$)	Magnitude of Impact
Bridge_88_001	A	65	77	Major
Bridge_88_002	A	65	74	Major
Bridge_88_005	A	65	78	Major
Bridge_88_006	A	65	80	Major
Bridge_88_007	A	65	67	Moderate
Bridge_88_008	A	65	68	Moderate

Modifications of Control and Waste Weirs

19.9.69 Minor weir works for installing new fixed plates are assumed to be completed within one week. For the 17 weirs requiring more substantial works, a seven-week construction period has been assumed. Vibration piling and cofferdam construction may be required.

19.9.70 These works are consistent with typical canal maintenance. Furthermore, although a seven-week period is assumed, significant noise-generating activities are not expected for most of this time.

19.9.71 This aspect of the Proposed Development will be considered further for the ES. However, in light of the above, no significant adverse effects are anticipated from the modification of existing control and waste weirs.

Impacts on canal users, including towpaths

19.9.72 During the construction phase it is likely that construction noise will be audible in recreational areas associated with the canal in the vicinity of the various construction sites discussed above.

19.9.73 This has the potential to affect canal users and potentially affect their behaviour during this period, e.g. avoiding the use of these areas or passing through them more quickly.

19.9.74 However, the spatial extent of the proposed works are such that large sections of the canal will not be affected by construction noise and will remain available to canal users who would prefer to avoid construction noise.

19.9.75 In light of this, and given the temporary nature of the construction phase, no adverse impacts are expected as a result of construction noise on canal users. This will be further reviewed at the ES stage.

Summary of Effects

19.9.76 Based on the above, there is likely to be a 156 direct, temporary adverse effect which are significant.

19.9.77 For all other receptors, there is likely to be a direct, temporary, adverse effect which is either negligible or minor and not significant.

19.9.78 In NPSE terminology, this equates to 156 SOAEL exceedances and 133 LOAEL exceedances.

19.9.79 In order to provide a worst case assessment, the above predictions are based on indicative, conservative estimations of the likely construction work necessary and do not factor in many of the mitigation measures presented in section 19.6.

19.9.80 This is because it is not possible to accurately quantify the effect of these measures with the information available at the time of writing this PEI Report. Therefore, in practice construction noise levels are likely to be lower than presented above.

Additional Mitigation, Enhancement and Monitoring

19.9.81 Additional mitigation measures such as noise barriers, sensitive site layouts (i.e. locating noisy activities away from receptors), monitoring and use of quieter mechanical plant / processes (where possible) can be incorporated as detail becomes available.

19.9.82 These additional mitigation options will be investigated and incorporated wherever practicable prior to the ES assessment, to avoid significant adverse effects and minimise effects above the LOAEL as far as practicable.

Residual Effect

19.9.83 Although it is likely the identified effects can be reduced and/or removed as more detailed construction phase information becomes available, 156 direct adverse temporary effects which are significant are retained on a precautionary basis.

Direct temporary vibration impacts on sensitive receptors

19.9.84 Of the construction works described above, the following processes involve mechanical plant with the potential to give rise to significant vibration emissions:

a. Atherstone outfall – general civil works (vibratory piling);

b. Pumped bypasses – general civil works (vibratory piling and impact piling);

c. Gravity bypasses – general civil works (vibratory piling and impact piling);

d. Transfer locks – general civil works (vibratory piling and impact piling); and

e. Bridge 88 modification – landscaping and finishing (vibratory compaction).

19.9.85 Other canal infrastructure (e.g. iron trunk aqueduct) will be confirmed at the ES stage, but likely to be similar in nature to the above.

19.9.86 Vibration emissions from vibratory piling have been calculated using the prediction method given in BS 5228-2 (Ref. 9) to determine the distances from works at which different magnitudes of impacts have the potential to occur.

19.9.87 Moorings along the canal network have not been included as NVSRs for temporary vibration impacts during the construction phase. Houseboats associated with these moorings are floating structures that are not rigidly coupled to the ground. As a result, groundborne vibration is not efficiently transmitted to the receptor, and any vibration effects would be significantly attenuated by the water body.

19.9.88 Full details of the calculation procedure is given in **Appendix 19-P2-1** in PEI Report **Volume 4**. Figures showing the areas in which significant vibration effects could occur is provided within **Figure 19-PD-3** in PEI Report **Volume 3**.

19.9.89 In addition to vibratory piling, vibro-compaction has the potential to give rise to high levels of vibration. However, it is possible to moderate the level of vibration emissions using ‘high’ or ‘low’ vibration settings or, in more sensitive settings, using ‘deadrolling’ (i.e. using the weight of the roller to compact material without any vibration at all).

19.9.90 Furthermore, as stated in **Table 19-9** above, the vibration thresholds adopted *“…can be tolerated if prior warning and explanation has been given to residents”* – i.e. even if engineering requirements mean that

perceptible levels of vibration cannot be avoided through the above measures, this may be acceptable with appropriate liaison.

19.9.91 Therefore, through appropriate management, it is possible to avoid significant adverse effects arising because of vibration from vibro-compaction.

19.9.92 Based on **Figure 19-PD-3** in PEI Report **Volume 3**, there are likely to be 51 direct, temporary, adverse effects which are significant.

19.9.93 For all other receptors, there is likely to be a direct, temporary, adverse effect which is either negligible or minor and not significant.

19.9.94 In NPSE terminology, this equates to 51 SOAEL exceedances and 138 LOAEL exceedance.

Direct temporary vibration impacts on canal infrastructure

19.9.95 Vibration impacts on canal infrastructure have been considered in relation to the criteria identified above.

19.9.96 Based on experience of other projects in proximity to canal infrastructure (e.g. HS2), it has been observed that BS 5228-2 (Ref. 9) equations overestimate vibration emissions where receptor locations are in very close proximity to construction activity.

19.9.97 During the construction of Phase 1 of the HS2 line, it was found to be possible to conduct construction works similar to those proposed in proximity to canal infrastructure without impact, provided that suitable monitoring and mitigation controls are put in place. This was the approach adopted for Phase 1 of HS2 where construction works occurred in proximity to canal infrastructure.

19.9.98 A project commitment is made to adopt a vibration risk management process via the CEMP. This would involve measurement of vibration levels on sensitive assets during construction works to determine if vibration levels will exceed the agreed criteria.

19.9.99 This process would:

a. Be based on the criteria presented above (i.e. 20 millimetres per second [mm/s] PPV at the crest of relevant infrastructure but potentially reduced for listed / heritage assets;

b. Be required at an early stage such that alternative methodologies for works can be identified in the case of vibration damage risk;

c. Consider vibration risks to assets such as earth structures as well as structures; and

d. Require pre works condition surveys and subsequent similar surveys, as required.

19.9.100 Details of the management process will be developed in the Outline CEMP as part of the DCO application.

19.9.101 On the basis that the above measures will be implemented, no significant adverse effects on canal infrastructure are expected to occur as a result of vibration generated by the construction of the Proposed Development.

Impacts on Canal users, including towpaths

19.9.102 During the construction phase it is possible that construction vibration will be perceptible in some recreational areas associated with the canal (e.g. towpaths).

19.9.103 However, for reasons similar to those given for construction noise above, no adverse impacts are expected to arise as a result of this.

Additional Mitigation, Enhancement and Monitoring

19.9.104 The following mitigation measures will be investigated and implemented wherever appropriate:

a. Selection of piling method, e.g. using hydraulic jacking where feasible;

b. Optimisation of cofferdam design through reduced pile lengths, lightweight pile sections, temporary anchors, and / or interlock lubrication where possible;

c. Use of modern, well-maintained vibratory hammers with variable frequency and amplitude control;

d. Community and stakeholder engagement to provide advance notice and coordinate works around sensitive periods; and

e. Monitoring of actual emission levels to allow modification of working practices where possible and to enable reporting.

19.9.105 Consequently, the actual number and level of effects are likely to be lower than identified above, with mitigation options available for particularly sensitive areas.

19.9.106 These measures will be considered in due course as more information becomes available.

Residual Effect

19.9.107 Although it is likely that many of these effects can be reduced and/or removed as more detailed construction phase information becomes

available, 50 direct, temporary, adverse effects which are significant are retained on a precautionary basis.

Operational Phase

Direct permanent noise impacts on sensitive receptors

19.9.108 The main potential sources of operational noise contained within Part 2 are mechanical plant items located with Atherstone Outfall, Pumped Bypasses and Transfer Locks.

19.9.109 Operational phase noise emissions will be assessed in accordance with the BS 4142 (Ref. 12) methodology based on measured baseline levels at nearby NVSR locations and within amenity areas associated with canal infrastructure (e.g. along towpaths).

19.9.110 These baseline measurements have not been completed at the time of writing this PEI Report but will be completed for the ES.

19.9.111 Due to the Proposed Development being at a relatively early design stage, noise data for the above items was not available at the time of writing this PEI Report. Therefore, no quantitative assessment is possible.

19.9.112 Installations such as outfalls and pumped bypasses are commonly found along canals in areas similar to those required for the Proposed Development.

19.9.113 Therefore, it is reasonable to assume it will be possible to incorporate sufficient noise mitigation into the design of the facility such that the above limits are met and adverse effects avoided.

Additional Mitigation, Enhancement and Monitoring

19.9.114 The types of mitigation options available include:

a. Appropriate plant specification;

b. Location of noisy plant away from NVSRs;

c. Acoustics enclosures, attenuators and/or silencers;

d. Acoustic barriers; and

e. Use of topography to provide acoustic screening (e.g. bunds).

19.9.115 This aspect of the Proposed Development will be addressed in further detail for the ES. However, a commitment is made to incorporate sufficient design mitigation into noise generating elements of Part 2 such that any effects are direct, temporary adverse effect which is not significant.

Residual Effect

19.9.116 To be determined for the ES, however the residual effect is likely to be a direct, temporary adverse effect which is not significant.

Direct permanent vibration impacts on sensitive receptors

19.9.117 Equipment within the permanent installations contained within Part 2 include, above ground turbine located at Atherstone Outfall, pumps installed at Pumped Bypasses, penstock valves with actuators installed at both Pumped Bypasses and Transfer Locks.

19.9.118 These plant items typically do not generate high levels of vibration and, in the unlikely event that they do, it will be straightforward to mitigate these emissions through the incorporation of appropriate mitigation measures such as anti-vibration mounts, inertia bases and/or careful plant specification at the detailed design stage.

19.9.119 This aspect of the Proposed Development will be revisited for the ES. However, based on the above, there is likely to be a direct long-term, effect which is not significant.

Additional Mitigation, Enhancement and Monitoring

19.9.120 A commitment is made to incorporate appropriate vibration mitigation measures into the design in due course.

Residual Effect

19.9.121 To be determined for the ES, however this the residual effect is likely to be a direct, temporary adverse effect which is not significant.

Summary

19.9.122 **Table 19-36** summarises the residual noise and vibration effects of Part 2 of the Proposed Development, following the implementation of any identified additional mitigation, enhancement and/or monitoring.

Table 19-36: Summary of residual effects – Part 2

Description of Impact	Sensitivity of receptor	Nature of effect / geographic scale	Magnitude of Impact	Initial classification of effect (with embedded control)	Additional mitigation, enhancement and/or monitoring	Residual effect significance
Construction Phase						
Direct temporary noise impacts on sensitive receptors – as listed in **Appendix 19-P2-1** in PEI Report **Volume 4**: 69 NVSRs	Medium	Adverse, Direct, Temporary	Major	Major Adverse (Significant)	To be confirmed at ES stage	To be confirmed at ES stage (likely to be less extensive with fewer significant effects)
87 NVSRs	Medium	Adverse, Direct, Temporary	Moderate	Moderate Adverse (Significant)		To be confirmed at ES stage (likely to be less extensive with fewer significant effects)
All other receptors	Medium	Adverse, Direct, Temporary	Minor or Negligible	Minor or Negligible Adverse	None	To be confirmed in the ES (likely to be Minor or Negligible Adverse [Not Significant])
Direct temporary vibration impacts on sensitive receptors (including canal infrastructure) – as listed	Medium	Adverse, Direct, Temporary	Moderate or Major	Moderate or Major Adverse (Significant)	To be confirmed at ES stage	To be confirmed at ES stage (likely to be less extensive with

Description of Impact	Sensitivity of receptor	Nature of effect / geographic scale	Magnitude of Impact	Initial classification of effect (with embedded control)	Additional mitigation, enhancement and/or monitoring	Residual effect significance
in **Appendix 19-P2-1** in PEI Report **Volume 4**: 51 NVSRs						fewer significant effects)
138 NVSRs	Medium	Adverse, Direct, Temporary	Minor	Minor Adverse	None	To be confirmed at ES stage (likely to be Minor Adverse [Not Significant])
All other receptors	Medium	Adverse, Direct, Temporary	Negligible	Negligible Adverse	None	To be confirmed at ES stage (likely to be Negligible [Not Significant])
Operational Phase						
Direct permanent noise impacts on sensitive receptors	Medium	To be determined in the ES	To be determined in the ES	To be determined in the ES	To be confirmed at ES stage	To be determined in the ES (likely to be [Not Significant])
Direct permanent vibration impacts on sensitive receptors (including canal infrastructure)	Medium	To be determined in the ES	To be determined in the ES	To be determined in the ES	To be confirmed at ES stage	To be determined in the ES (likely to be [Not Significant])

Part 3: Works to Daventry and Drayton Reservoirs

19.10 Part 3: Works to Daventry and Drayton Reservoirs

19.10.1 This section provides a focussed description of the environmental baseline, embedded environmental design, standards and management measures (if in addition to the aforementioned) and presents the preliminary assessment of likely significant effects in relation to noise and vibration for Part 3 (Works to Daventry and Drayton Reservoirs) of the Proposed Development.

Baseline Conditions

19.10.2 This section describes the baseline environmental characteristics with specific reference to noise and vibration.

Noise and Vibration Sensitive Receptors

19.10.3 Part 3 occupies land near Braunston and east of Daventry, with several NVSRs located close to the site boundary.

19.10.4 At the time of preparing this PEI Report, the data necessary to systematically review all receptors and assess their nature and sensitivity was not available. Consequently, receptor identification has been based principally on the locations of nearby structures. This approach will be revisited and refined for the ES.

19.10.5 Initial high-level review shows that nearby NVSRs are predominantly residential, but with some non-residential receptors also potentially present.

19.10.6 To assess noise levels at these NVSRs, a series of ‘clusters’ (i.e. a group of NVSRs in proximity to each other) have been defined. This has been done to provide clarity within the associated figures; predicted noise and/or vibration levels and associated assessment has been carried out at all NVSRs individually.

19.10.7 The location of these receptors is shown in **Figure 19-PD-1** in PEI Report **Volume 3**.

Existing Baseline

19.10.8 The Daventry Reservoir is located to the east of Daventry and Drayton Reservoir is located within Daventry Country Park Local Nature Reserve (LNR).

19.10.9 Baseline sound levels were primarily influenced by local road traffic, particularly at locations near main roads within Daventry and Little Braunston.

19.10.10 At more rural sites and within housing estates set back from busier corridors, lower background levels were recorded, with dominant sources limited to occasional vehicle movements on local access roads. Secondary

sources were noted, including typical residential activity (e.g. people talking, children playing) and natural sounds such as birdsong.

19.10.11 At the time of writing this PEI Report, only the short-term attended measurements have been completed.

19.10.12 The long-term baseline surveys for Part 3 have not yet been completed. These surveys will be carried out for the ES.

19.10.13 Where baseline information is still to be quantified, the most stringent noise criteria based on the ABC category has been assigned for the nearby NVSR locations as the worst-case assumption

19.10.14 A summary of the results of the attended short-term measurement survey is provided below in **Table 19-37**. Further details about the survey, regarding instrumentation and location description can be found in **Appendix 19–PD-3** in PEI Report **Volume 4**.

Table 19-37: Attended Short-term Measurements – Part 3

Location ID	Date	Period	Start Time	dB $L_{Aeq, T}$	dB $L_{A90, 15min}$ (Range)
3-1 (Sheet T)	12/08/2025	1 hour	12:05	54	36 – 43
3-2 (Sheet T)	12/08/2025	1 hour	13:15	52	42 – 45
3-3 (Sheet X)	14/08/2025	1 hour	10:50	64	52 – 66
3-4 (Sheet U)	14/08/2025	1 hour	12:15	53	40 – 46
3-5 (Sheet W)	14/08/2025	1 hour	13:40	74	44 – 48

[Note: A façade correction of +3 dB has been applied to the field-free measurement data to account for the reflective effect of building façades]

19.10.1 The acoustic environment across the survey locations is generally representative of residential settings.

Future Baseline

19.10.2 If the Proposed Development were not to go ahead, it is expected that the acoustic environment around Part 3 would remain largely unchanged, with the exception of small increases in road traffic noise (it is typical that road traffic increases incrementally over time and therefore road traffic noise also increases).

Environmental Design, Standards and Management

19.10.3 There are no further embedded environmental design, standards and/or management in relation to noise and vibration that are specific to Part 3 of the Proposed Development beyond those stated in section 19.6 for the Proposed Development as a whole.

Assessment of Effects and Significance

19.10.4 This section provides the preliminary assessment of likely significant effects, including determining the level of significance, for Part 3 (Works to Daventry and Drayton Reservoirs) of the Proposed Development.

19.10.5 Where applicable, the requirement for additional mitigation measures and/or monitoring is identified to avoid, prevent, reduce, or if possible offset, any identified significant adverse effects on the environment.

Construction Phase

Direct temporary noise impacts on sensitive receptors

19.10.6 Construction works required for Part 3 will likely comprise the following:

19.10.6 Works to install the 450 mm pipeline leading up to the reservoirs will be similar to those described for Part 1b of the Proposed Development.

a. Works to the inlet and outlet structures at Daventry and Drayton Reservoirs will require excavation to the depth of the existing structures, placement and alignment of pre-cast structures for the inlets and outlets and any associated culverts, concrete works, backfilling and compaction;

b. Bank raising along the existing channel (Daventry only) will be similar to the works described under Canal Bank Raising (discussed above); and

c. Replacement of the existing culvert discharging to the Grand Union Canal with a larger structure will require works similar to those described for the construction of weirs under Pumped Bypasses.

19.10.7 Construction works are expected to take place over a course of 12 months.

19.10.8 Construction noise emissions have been assessed using the daytime criteria to reflect the core working hours.

19.10.9 Pipeline works are likely to give rise to elevated sound levels. However, for the reasons discussed in relation to Part 1b this elevated sound level will be of short duration and below the temporal criterion identified above. Therefore, no adverse effects are expected as a result of these works. Similarly, no adverse effects are expected to arise from bank raising for the reasons presented for Part 2.

19.10.10 Indicative construction plant lists covering the works to the inlet and outlet structures at Daventry and Drayton Reservoirs and the replacement of the existing culvert discharging to the Grand Union Canal are provided in **Appendix 3-PD-1** in PEI Report **Volume 4**.

19.10.11 Based on the baseline levels presented above, nearby NVSR locations have been assigned construction noise criteria based on the ABC category they fall within **Table 19-38**. These assignments are presented below.

Table 19-38: Part 3 Measured Baseline Levels

Receptors	Associated Measurement Location	ABC Category	Daytime Criterion (dB $L_{Aeq,10hr}$)
DAV-REF-01 – DAV-REF-07	3-4	A	65
DRO-REF-01 – DRO-REF-14	3-4	A	65
DRO-OUT-01 – DRO-OUT-16	3-4	A	65
DAV-OUT-01 – DAV-OUT-18	3-3	B	65
DAV-OUT-19 – DAV-OUT-21	3-5	C	75
DAV-WEI-01 – DAV-WEI-32	N/A[1]	A	65
DRO-WEI-01 – DRO-WEI-20	N/A[1]	A	65

[[1] Measurements not complete at time of writing this PEI Report. Measurements to be completed for the ES. In the interim conservative estimates have been made regarding the assessment criteria.]

19.10.12 To determine the impact of construction noise on existing receptors in the area, a 3D noise model was constructed using CadnaA 2025 acoustic modelling software. Full details of the noise modelling and associated noise maps are given in **Figure 19-PD-2** in PEI Report **Volume 3** and **Appendix 19-P3-1** in PEI Report **Volume 4**.

19.10.13 The results of the construction noise emission predictions at receptors where moderate or major impacts are possible is given in **Table 19-39**. Full details of the results are given in **Appendix 19-PD-6** in PEI Report **Volume 4**.

Table 19-39: Part 3 Predicted Construction Noise Levels

Receptor	Applicable ABC Category	ABC Criterion	Predicted Maximum Level ($L_{Aeq,10hr}$)	Magnitude of Impact
DRO_REF_03	A	65	67	Moderate
DRO_REF_04	A	65	67	Moderate
DRO_REF_06	A	65	66	Moderate
DRO_OUT_01	A	65	86	Major
DRO_OUT_02	A	65	76	Major
DRO_OUT_03	A	65	72	Major
DRO_OUT_04	A	65	74	Major
DRO_OUT_05	A	65	73	Major
DRO_OUT_06	A	65	70	Moderate

Receptor	Applicable ABC Category	ABC Criterion	Predicted Maximum Level ($L_{Aeq,10hr}$)	Magnitude of Impact
DRO_OUT_07	A	65	70	Moderate

19.10.14 Based on the above, there is likely to be a 10 direct, temporary adverse effect which are significant.

19.10.15 For all other receptors, there is likely to be a direct, temporary, adverse effect which is either negligible or minor and not significant.

19.10.16 In NPSE terminology, this equates to 10 SOAEL exceedances and seven LOAEL exceedances.

19.10.17 To ensure a worst case assessment, the above predictions are based on indicative, conservative estimations of the likely construction work necessary and do not factor in many of the mitigation measures presented in section 19.6. This is because it is not possible to accurately quantify the effect of these measures with the information available at the time of writing this PEI Report.

19.10.18 Therefore, in practice construction noise levels are likely to be lower than presented above.

Additional Mitigation, Enhancement and Monitoring

19.10.19 Additional mitigation measures such as noise barriers, sensitive site layouts (i.e. locating noisy activities away from receptors), monitoring and use of quieter mechanical plant / processes (where possible) can be incorporated as detail becomes available.

19.10.20 These additional mitigation options will be investigated and incorporated wherever practicable prior to the ES assessment, to avoid significant adverse effects and minimise effects above the LOAEL as far as practicable.

Residual Effect

19.10.21 Although it is likely the identified effects can be reduced and/or removed as more detailed construction phase information becomes available, 10 direct, temporary adverse effect which are significant are retained on a precautionary basis.

Direct temporary vibration impacts on sensitive receptors

19.10.22 There is a small amount of vibratory piling likely required for the Part 3 works, associated with works to the Daventry Outlet and Discharge Channel.

19.10.23 There are no NVSRs within the construction vibration scoping distance identified above. Therefore, no effect will occur.

Additional Mitigation, Enhancement and Monitoring

19.10.24 No additional mitigation, enhancement or monitoring is required as there is no effect

Residual Effect

19.10.25 There is no effect.

Operational Phase

Direct permanent noise impacts on sensitive receptors

19.10.26 This has been scoped out.

Additional Mitigation, Enhancement and Monitoring

19.10.27 No additional mitigation, enhancement or monitoring has been identified.

Residual Effect

19.10.28 None

Direct permanent vibration impacts on sensitive receptors

19.10.29 Likely plant and equipment within the permanent installations contained within Part 3 are described above. These plant items typically do not generate noticeable levels of vibration. However, in the unlikely event that they do, it is expected to be straightforward to further mitigate these emissions through the incorporation of appropriate mitigation measures such as anti-vibration mounts and/or careful plant specification at the detailed design stage.

19.10.30 This aspect of the Proposed Development will be revisited for the ES. However, based on the above, the effect is expected to be a direct, temporary adverse effect which and not significant.

Additional Mitigation, Enhancement and Monitoring

19.10.31 No additional mitigation, enhancement or monitoring has been identified as being required.

Residual Effect

19.10.32 To be determined for the ES, however the residual effect is likely to be a direct, temporary adverse effect which is not significant.

Summary

19.10.33 **Table 19-40** summarises the residual noise and vibration effects of Part 3 of the Proposed Development, following the implementation of any identified additional mitigation, enhancement and/or monitoring.

Table 19-40: Summary of residual effects – Part 3

Description of impact	Sensitivity of receptor	Nature of effect / geographic scale	Magnitude of impact	Initial classification of effect (with embedded control)	Additional mitigation, enhancement and/or monitoring	Residual effect significance
Construction Phase						
Direct temporary noise impacts on sensitive receptors – as listed in **Table 19-39**: 5 NVSRs	Medium	Adverse, Direct, Temporary	Major	Major Adverse (Significant)	Additional mitigation measures such as noise barriers, sensitive site layouts (i.e. locating noisy activities away from receptors), monitoring and use of quieter mechanical plant / processes	To be confirmed at ES stage (likely to be less extensive with fewer significant effects)
5 NVSRs	Medium	Adverse, Direct, Temporary	Moderate	Moderate Adverse (Significant)		To be confirmed at ES stage (likely to be less extensive with fewer significant effects)
All other receptors	Medium	Adverse, Direct, Temporary	Minor or Negligible	Minor or Negligible Adverse	None	To be confirmed in the ES (likely to be Negligible or Minor Adverse [Not Significant])
Direct temporary vibration impacts on sensitive receptors	Medium	Adverse, Direct, Temporary	No effect	No effect	None	No effect

Description of impact	Sensitivity of receptor	Nature of effect / geographic scale	Magnitude of impact	Initial classification of effect (with embedded control)	Additional mitigation, enhancement and/or monitoring	Residual effect significance
Operational Phase						
Direct permanent vibration impacts on sensitive receptors	Medium	To be determined in the ES	To be determined in the ES	To be determined in the ES	Unlikely to be required but may include anti-vibration mounts, plant relocation and/or inertia bases.	To be determined in the ES (likely to be [Not Significant])

Part 4a: Abstraction, Storage and Treatment

19.11 Part 4a: Abstraction, Storage and Treatment

19.11.1 This section provides a focussed description of the environmental baseline, embedded environmental design, standards and management measures (if in addition to the aforementioned) and presents the preliminary assessment of likely significant effects in relation to noise and vibration for Part 4a (Abstraction, Storage and Treatment) of the Proposed Development.

Baseline Conditions

19.11.2 This section describes the baseline environmental characteristics with specific reference to noise and vibration.

Noise and Vibration Sensitive Receptors

19.11.3 Part 4a of the Proposed Development occupies land to the south-east of Bletchley, immediately to the south of the A4146.

19.11.4 Various NVSRs have been identified, which include residences in Water Eaton, residential and non-residential receptors in and around Galley Lane Farm and Bryerley Springs Farm, non-residential receptors and temporary moorings in and around Willowbridge Marina, and various NSVRs along Mill Lane, including The Old Dairy Farm, Westfield Farm and West Lodge.

19.11.5 The location of these receptors is shown in **Figure 19-PD-1** in PEI Report **Volume 3**.

Existing Baseline

19.11.6 A Long-term acoustic survey will be carried out in and around Part 4a to determine baseline levels. At the time of writing this PEI Report this has not yet been completed. The survey will be conducted in accordance with BS 7445-1 (Ref. 6).

19.11.7 The location of Part 4a is on agricultural land to the southeast of Bletchley and south of the A4146. The existing acoustic baseline is expected to be dominated by road traffic from the A4146 and other nearby roads, with other agricultural sound sources (e.g. birdsong, farm operations) also potentially present.

19.11.8 For the preliminary assessment presented below, the most stringent noise criteria based on the ABC category has been assigned for the nearby NVSR locations as the worst-case assumption.

Future Baseline

19.11.9 If the Proposed Development were not to go ahead, it is expected that the acoustic environment around Part 4a would remain largely unchanged, except for small increases in road traffic noise (it is typical that road traffic

increases incrementally over time and therefore road traffic noise also increases).

Environmental Design, Standards and Management

19.11.10 There are no further embedded environmental design, standards and/or management in relation to noise and vibration that are specific to Part 4a of the Proposed Development beyond those stated in section 19.6 for the Proposed Development as a whole.

Assessment of Effects and Significance

19.11.11 This section provides the preliminary assessment of likely significant effects, including determining the level of significance, for Part 4a (Abstraction, Storage and Treatment) of the Proposed Development.

19.11.12 Where applicable, the requirement for additional mitigation measures and/or monitoring is identified to avoid, prevent, reduce, or if possible offset, any identified significant adverse effects on the environment.

Construction Phase

Direct temporary noise impacts on sensitive receptors

19.11.13 Likely construction works required for Part 4a comprise:

a. Construction of an abstraction point (follow the same approach as Part 2 for the construction of weirs and pumping stations);

b. Site set up;

c. Excavation and spoil storage / management;

d. Embankment construction;

e. Construction of the water treatment works, involving:

   i. Site set up;

   ii. Foundations;

   iii. Building erection; and

   iv. Process unit installation.

19.11.14 Construction noise emissions have been assessed using the daytime criteria to reflect the core working hours.

19.11.15 As stated previously, the baseline surveys for Part 4a have not yet been completed. Therefore, the most stringent noise criteria based on the ABC category has been assigned for the nearby NVSR locations as the worst-case assumption.

19.11.16 To determine the impact of construction noise on existing receptors in the area, a 3D noise model was constructed using CadnaA 2025 acoustic modelling software. Full details of the noise modelling and associated noise maps are given in **Figure 19-PD-2** in PEI Report **Volume 3** and **Appendix 19-P4A-1** in PEI Report **Volume 4**.

19.11.17 The results of the construction noise emission predictions at the receptor where a potential moderate or major impacts are possible is provided in **Table 19-41**. Full details of the results are given in **Appendix 19-PD-6** in PEI Report **Volume 4**.

Table 19-41-: Part 4a Predicted Significant Construction Noise Levels

Receptor	Applicable ABC Category	ABC Criterion	Predicted Maximum Level ($L_{Aeq,10hr}$)	Magnitude of Impact
SouthWest_of_A4146_REF_01	A	65	68	Moderate

19.11.18 Based on the above, there is likely to be a one direct, temporary adverse effect which is significant.

19.11.19 For all other receptors, there is likely to be a direct, temporary, adverse impact which is either negligible or minor and not significant.

19.11.20 In NPSE terminology, this equates to one SOAEL exceedances and four LOAEL exceedances.

Additional Mitigation, Enhancement and Monitoring

19.11.21 Additional mitigation measures such as noise barriers, sensitive site layouts (i.e. locating noisy activities away from receptors), monitoring and use of quieter mechanical plant / processes (where possible) can be incorporated as detail becomes available.

19.11.22 These mitigation options will be investigated and incorporated wherever practicable prior to the ES assessment, to avoid significant adverse effects and minimise effects above the LOAEL as far as practicable.

Residual Effect

19.11.23 Although it is likely the identified effects can be reduced and / or removed as more detailed construction phase information becomes available, one direct, temporary, adverse effect is retained on a precautionary basis.

Direct temporary vibration impacts on sensitive receptors

19.11.24 For the construction of Part 4a, vibro-compaction will likely be required for the earthworks associated with the water storage. Vibro-compaction has the potential to give rise to high levels of vibration. However, it is possible to

moderate the level of vibration emissions using ‘high’ or ‘low’ vibration settings or, in more sensitive settings, using ‘deadrolling’ (i.e. using the weight of the roller to compact material without any vibration at all).

19.11.25 Furthermore, as stated in **Table 19-9** above, the vibration thresholds adopted *“…can be tolerated if prior warning and explanation has been given to residents”* – i.e. even if engineering requirements mean that perceptible levels of vibration cannot be avoided through the above measures, this may be acceptable with appropriate liaison.

19.11.26 Therefore, through appropriate management, it is possible to avoid any adverse effects arising from vibro-compaction.

19.11.27 Based on the above, there is likely to be a direct, temporary adverse effect which is negligible and not significant.

Additional Mitigation, Enhancement and Monitoring

19.11.28 No additional mitigation, enhancement or monitoring has been identified.

Residual Effect

19.11.29 To be determined in the ES. However, based upon the information currently available, the residual effect is likely to be direct, temporary adverse effect which is negligible and not significant.

Operational Phase

Direct permanent noise impacts on sensitive receptors

19.11.30 The main potential sources of operational noise contained within Part 4a of the Proposed Development are mechanical plant items located within the pumping station and water treatment works.

19.11.31 Operational phase noise emissions will be assessed in accordance with the BS 4142 (Ref. 12) methodology based on measured baseline levels at nearby NVSR locations and within amenity areas associated with canal infrastructure (e.g. along towpaths).

19.11.32 These baseline measurements have not been completed at the time of writing this PEI Report but will be completed in time for the ES.

19.11.33 Due to the Proposed Development being at a relatively early design stage, noise data for the above items was not available at the time of writing this PEI Report. Therefore, no quantitative assessment is possible.

19.11.34 However, there is significant scope for the inclusion of noise mitigation measures in the design of Part 4a, meaning that it should be reasonably straightforward to reduce noise emissions to below the relevant criteria.

19.11.35 Therefore, the effect is likely to be a direct, permanent and not significant.

Additional Mitigation, Enhancement and Monitoring

19.11.36 The types of mitigation available include:

a. Appropriate plant specification;

b. Location of noisy plant away from NVSRs;

c. Acoustics enclosures, attenuators and/or silencers;

d. Acoustic barriers; and

e. Use of topography to provide acoustic screening (e.g. bunds).

19.11.37 This aspect of the Proposed Development will be addressed in further detail for the ES.

19.11.38 A commitment is made to incorporate sufficient design mitigation into noise generating elements of Part 4a such that no adverse effects arise.

Residual Effect

19.11.39 To be determined in the ES. However, based upon the information currently available, the residual effect is likely to be a direct, permanent and not significant.

Direct permanent vibration impacts on sensitive receptors

19.11.40 The main potential sources of operational vibration emissions are the same as listed for noise emissions.

19.11.41 These plant items typically do not generate high levels of vibration and, in the unlikely event that they do, it will be straightforward to mitigate emissions using appropriate mitigation measures such as anti-vibration mounts, inertia bases and/or careful plant specification at the detailed design stage.

19.11.42 A commitment is made to investigate and implement these measures, where required, in due course.

19.11.43 As a result, a direct permanent effect which is not significant is expected.

Additional Mitigation, Enhancement and Monitoring

19.11.44 No additional mitigation, enhancement or monitoring has been identified as being required.

Residual Effect

19.11.45 To be determined in the ES. However, based upon the information currently available, the residual effect is likely to be a direct permanent effect which is not significant.

Summary

19.11.46 **Table 19-42** summarises the residual noise and vibration effects of Part 4a of the Proposed Development, following the implementation of any identified additional mitigation, enhancement and/or monitoring.

Table 19-42: Summary of residual effects – Part 4a

Description of impact	Sensitivity of receptor	Nature of effect / geographic scale	Magnitude of impact	Initial classification of effect (with embedded control)	Additional mitigation, enhancement and/or monitoring	Residual effect significance
Construction Phase						
Direct temporary noise impacts on sensitive receptors: SouthWest_of_A4146_REF_01	Medium	Adverse, Direct, Temporary	Moderate	Moderate Adverse (Significant)	To be determined at ES.	`To be confirmed at ES stage (likely to be less extensive with fewer significant effects)
All other receptors	Medium	Adverse, Direct, Temporary	Minor or Negligible	Minor or Negligible Adverse	None	To be confirmed at ES stage (likely to be Minor or Negligible Adverse [Not Significant])
Direct temporary vibration impacts on sensitive receptors	Medium	Adverse, Direct, Temporary	No effect	Negligible	Management measures as detailed above.	Negligible
Operational Phase						

Description of impact	Sensitivity of receptor	Nature of effect / geographic scale	Magnitude of impact	Initial classification of effect (with embedded control)	Additional mitigation, enhancement and/or monitoring	Residual effect significance
Direct permanent noise impacts on sensitive receptors	Medium	Adverse, Direct, Permanent	To be determined in the ES	To be determined in the ES	Additional mitigation measures such as appropriate plant specification, locate noisy plant away from NVSRs, acoustics enclosures, attenuators and/or silencers, acoustic barriers and use of topography to provide acoustic screening (e.g. bunds)	To be determined in the ES (likely to be [Not Significant])
Direct permanent vibration impacts on sensitive receptors (including canal infrastructure)	Medium	To be determined in the ES	To be determined in the ES	To be determined in the ES	Unlikely to be required but may include anti-vibration mounts, plant relocation and/or inertia bases.	To be determined in the ES (likely to be [Not Significant])

Part 4b: Pipeline to an Existing Underground Reservoir near Luton

19.12 Part 4b: Pipeline to an Existing Underground Reservoir near Luton

19.12.1 This section provides a focussed description of the environmental baseline, embedded environmental design, standards and management measures (if in addition to the aforementioned) and presents the preliminary assessment of likely significant effects in relation to noise and vibration for Part 4b (Pipeline to an Existing Underground Reservoir near Luton) of the Proposed Development.

Baseline Conditions

19.12.2 This section describes the baseline environmental characteristics with specific reference to noise and vibration.

Noise and Vibration Sensitive Receptors

19.12.3 The route has been carefully selected to avoid, where possible, passing in / close proximity to NVSRs. However, there are several points where the route will pass within 300 m of NVSRs, e.g. receptors in Little Brickhall, South of Grange Farm, Dunstable Downs, Manshead Church of England Academy.

19.12.4 At the time of preparing this PEI Report, the data necessary to systematically review all receptors and assess their nature and sensitivity was not available. Consequently, receptor identification has been based principally on the locations of nearby structures. This approach will be revisited and refined for the ES.

19.12.5 Initial high level review shows that nearby NVSRs are predominantly situated within residential areas, but with some non-residential receptors also present.

19.12.6 Part 4b covers a wide area with many NVSRs along the corridor. As with Part 1b, to assess noise levels at these NVSRs, a series of clusters have been defined.

19.12.7 The location of these receptors is shown in **Figure 19-PD-1** in PEI Report **Volume 3** with a summary provided below.

Existing Baseline

19.12.8 Due to the spatial extent of Part 4b, long-term unattended baseline sound surveys were not possible due to practical constraints. Therefore, a risk based proportional approach was adopted, implementing short-term attended measurements. The survey will be conducted in accordance with BS 7445-1 (Ref. 6).

19.12.9 The acoustic environment along Part 4b is mostly rural, where road traffic is not expected to be a consistent source of noise. Natural sounds such as birdsong, with occasional human activity like talking or dog walking may be present. At the eastern end of Part 4b, as the route approaches Luton, the acoustic environment is likely to be more urban, with road traffic becoming a more significant contributor.

19.12.10 For the preliminary assessment presented below, conservative assumptions have been made with regards existing baseline i.e. the adoption of the most stringent criteria possible.

Future Baseline

19.12.11 If the Proposed Development were not to go ahead, it is expected that the acoustic environment around Part 4b would remain largely unchanged, except for small increases in road traffic noise (it is typical that road traffic increases incrementally over time and therefore road traffic noise also increases).

Environmental Design, Standards and Management

19.12.12 There are no further embedded environmental design, standards and/or management in relation to noise and vibration that are specific to Part 4b of the Proposed Development beyond those stated in section 19.6.

Assessment of Effects and Significance

19.12.13 This section provides the preliminary assessment of likely significant effects, including determining the level of significance, for Part 4b (Pipeline to Underground Reservoir near Luton) of the Proposed Development. Where applicable, the requirement for additional mitigation measures and/or monitoring is identified to avoid, prevent, reduce, or if possible offset, any identified significant adverse effects on the environment.

Construction Phase

Direct temporary noise impacts on sensitive receptors

19.12.14 For the purpose of the noise assessment, the construction phase of Part 4b is considered in five distinct sections:

a. Establishment of Working Corridor (Vegetation clearance and minor groundworks);

b. Establishment of site compounds and access corridors;

c. Trenchless crossings;

d. Pipeline construction (comprising trench excavation, pipeline installation, trench backfill and reinstatement); and

e. Vehicle movements on access corridors during pipeline construction.

19.12.15 The following construction assumptions have been made:

a. The establishment of the pipeline working corridor will occur in advance of all other activities (in any given area) and will be of relatively short duration; approximately 250 m of working corridor will be established per day;

b. Establishment of site compounds and access corridors will occur prior to any other activities taking place in a given area and will be of short duration (approximately one week);

c. Trenchless crossings will take place in advance of any pipeline construction in the vicinity of the given crossing; and

d. Vehicle movements on access corridors, once established, are expected to occur concurrently with nearby pipeline construction.

Establishment of Working Corridor

19.12.16 Establishment of the Working Corridor comprises vegetation clearance and light groundworks. This will be carried out using hand tools (e.g. chainsaws, strimmers) chippers and some smaller plant items (e.g. 20 t excavator, 9 t dumper).

19.12.17 The rate of movement of these works will be relatively quick; based on the indicative programme provided it is estimated that works will progress at a rate of approximately 250 m per day.

19.12.18 Therefore, as a worst-case, noise generating plant associated with these works will only be within the scoping distance of any given NVSR for approximately eight days – i.e. less than the ten days in any given 15 temporal criterion detailed above.

19.12.19 As a result, although this activity will result in elevated noise levels at NVSR locations along the corridor, no adverse effects are expected due to the limited duration in which noise generating plant will be in the vicinity of any given NVSR.

Establishment of Site Compounds and Access Corridors

19.12.20 Establishment of site compounds and access corridors will occur prior to any other activities taking place in a given area and will be of short duration (approximately one week). Therefore, no effect is expected to arise given the duration of the works.

Pipeline Construction (Open Cut)

19.12.21 Pipeline construction will occur after the working corridor, site compounds and access corridors are established.

19.12.22 Pipeline construction works can be summarised as two main activities of earthworks (trench excavation / backfill and material handling) and pipelaying.

19.12.23 Earthworks will be carried out using excavators, dumpers and HDVs. Whereas pipelaying will use hand tools like welding set and associated generators, telehandlers for pipe handling, excavators and HDVs.

19.12.24 Earthworks and pipelaying activities are likely to occur at the same time within close proximity of each other on the proposed pipeline corridor. For the purposes of this assessment, as a worst-case scenario, they are assumed to be undertaken simultaneously.

19.12.25 It is understood that pipeline construction could likely start at the northern end of the pipeline and progress to the southern end. Pipeline construction works are estimated to progress at a rate of approximately 30 m per day along this corridor.

19.12.26 For pipeline construction works a non-location specific 3-dimensional sound model was constructed using CadnaA 2025 noise modelling software. Full details of the noise modelling are given in **Appendix 19-P2-1** in PEI Report **Volume 4**.

19.12.27 This model was used to predict noise levels at receptor locations at various nominal distances from the works on different days as the works progress along the pipeline corridor at a rate of 30 m per day (i.e. adjacent to the receptor on day 1, 30 m along the route on day 2, etc.).

19.12.28 To ensure the robustness of the calculated levels, the model was configured to not account for any attenuation of noise resulting from ground conditions, topography or barriers that might exist between the works and receptor locations.

19.12.29 The results of these calculations are presented in **Appendix 19-P4B-1** in PEI Report **Volume 4** and show that, at the assumed closest NVSRs at 10 m of pipeline construction, noise levels will exceed the most stringent construction noise criterion of 65 dB LAeq,T for a maximum of nine days, and that the criterion will not ever be exceeded for properties at more than 100 m from the works.

19.12.30 Based on the LA111 (Ref. 15) temporal criterion of ‘10 days in any given 15’, it is therefore not envisaged that any adverse effects will arise because of pipeline construction works.

Trenchless Crossings

19.12.31 There are 15 indicative locations along the pipeline corridor where open cut method for pipeline construction is not feasible and therefore trenchless techniques will be employed. The exact locations will be confirmed for the ES.

19.12.32 These consist of two discrete phases for trenchless techniques: establishment of drive and reception pits, and pipe installation.

19.12.33 Establishment of drive and reception pits will take place at either end of the specified length of the corridor to be crossed and will be carried out using an excavator with piling attachment, dumpers and HDVs. Depending on the ground conditions alternative quieter and methods to piling (such as press-in piling methods) may be possible. At this stage, the ground conditions at these pit locations are unknown; therefore, a worst-case scenario has been assessed. Establishment of drive and reception pits will be undertaken during the daytime only.

19.12.34 Pipe installation will use a telehandler and crawler crane for pipe handling, and hydraulic ram with associated power pack to push the pipe from drive pit to reception pit. During the pipe installation an excavator, dumper and an HDV will also be used to handle the material coming out of the crossing. Pipe installation will be a continuous operation till the pipe is fully installed between each drive and reception pit, therefore assessed using day, evening and night-time criteria.

19.12.35 To determine the impact of trenchless crossing noise on existing receptors in the area, a 3D noise model was constructed using CadnaA (version 2025) noise modelling software.

19.12.36 Receptors where potential moderate or major daytime, evening and night-time impacts (i.e. SOAEL exceedances) are predicted are detailed in **Table 19-43**. A full table of results are given in **Appendix 19-P4B-1** in PEI Report **Volume 4**.

Table 19-43: Summary of predicted significant Part 4b construction noise levels – daytime, evening and night-time impacts

Time of Impact	Category A Criterion	Predicted Maximum Levels ($L_{Aeq,10hr}$)	Magnitude of Impact	Total number of receptors
Daytime	65	80 – 72	Major	8
		70 – 66	Moderate	14
Evening	55	72 – 61	Major	8
		60 – 56	Moderate	11
Night-time	45	72 – 51	Major	30
		50 – 46	Moderate	24

19.12.37 The identified exceedances in the daytime are driven by the piling activities at drive or reception pit of the trenchless crossings. Whereas in the evening and night-time, the only operation will be trenchless pipe installation and therefore the exceedances are driven by this activity.

Summary of Effects

19.12.38 Based on the above, there is likely to be a 95 direct, temporary adverse effect which are significant.

19.12.39 For all other receptors, there is likely to be a direct, temporary, adverse effect which is either negligible or minor and not significant.

19.12.40 In NPSE terminology, this equates to 95 SOAEL exceedances and 40 LOAEL exceedances.

19.12.41 To ensure a worst case scenario is considered, the above predictions are based on indicative, conservative estimations of the likely construction work necessary and do not factor in many of the mitigation measures presented in section 19.6. This is because it is not possible to accurately quantify the effect of these measures with the information available at the time of writing this PEI Report.

19.12.42 Therefore, in practice construction noise levels are likely to be lower than presented above.

Additional Mitigation, Enhancement and Monitoring

19.12.43 Additional mitigation measures such as noise barriers, sensitive site layouts (i.e. locating noisy activities away from receptors), monitoring and use of quieter mechanical plant / processes (where possible) can be incorporated as detail becomes available.

19.12.44 These mitigation options will be investigated and incorporated wherever practicable prior to the ES assessment, to avoid significant adverse effects and minimise effects above the LOAEL as far as practicable.

Residual Effect

19.12.45 Although it is likely the identified effects can be reduced and/or removed as more detailed construction phase information becomes available, 95 direct, temporary adverse effects which are significant are retained on a precautionary basis.

Direct temporary vibration impacts on sensitive receptors

19.12.46 Vibration-generating equipment associated with the construction phase of Part 4b include vibratory piling and impact piling associated with the construction of the drive and receptions pits for trenchless crossings.

19.12.47 The exact layout of the proposed piles is yet to be determined; however it is understood that piling will only take place within the footprint of the trenchless crossing pits (as shown in **Figure 19-PD-3** in PEI Report **Volume 3**).

19.12.48 Vibration emissions from piling activities have been calculated using the prediction method given in BS 5228-2 (Ref. 9) to determine the distances from works at which different magnitudes of effects have the potential to occur.

19.12.49 Figures showing the areas in which significant vibration effects could occur is given in **Figure 19-PD-3** in PEI Report **Volume 3**.

19.12.50 Based on the above, there are likely to be no direct, temporary, adverse effects which are significant and one direct, temporary, adverse effect which is either negligible or minor and not significant.

19.12.51 In NPSE terminology, this equates to no SOAEL exceedances and seven LOAEL exceedances.

19.12.52 Several factors suggest that predicted vibration effects are likely to be lower than indicated:

a. BS 5228-2 (Ref. 9) prediction methods are empirical with built-in safety margins, so measured levels are often lower in practice;

b. Ground conditions typically provide greater attenuation, as actual soil layers dissipate energy more effectively than assumed in the model;

c. In some cases, press-in piling methods may be feasible, avoiding vibration entirely;

d. The exact piling locations are not known at the time of writing; worst-case assumptions have been applied, so actual distances to receptors may be greater; and

e. Operational factors may result in intermittent piling, reducing cumulative exposure.

Additional Mitigation, Enhancement and Monitoring

19.12.53 Mitigation measures will be investigated and implemented wherever appropriate, following review of the final design of the Proposed Development in the ES. These will seek to avoid significant adverse effects above the SOAEL and minimise effects above the LOAEL as far as practicable, and could include:

a. Selection of piling method, e.g., using hydraulic jacking where feasible;

b. Optimisation of cofferdam design through reduced pile lengths, lightweight pile sections, temporary anchors, and/or interlock lubrication where possible;

c. Use of modern, well-maintained vibratory hammers with variable frequency and amplitude control;

d. Community and stakeholder engagement to provide advance notice and coordinate works around sensitive periods; and

e. Monitoring of actual emission levels to allow modification of working practices where possible and to enable reporting.

19.12.54 Consequently, the actual number and magnitude of effects are likely to be lower than identified above, with mitigation options available for particularly sensitive areas.

19.12.55 These measures will be considered in the ES as more information becomes available.

Residual Effect

19.12.56 Although it is likely the identified effects can be reduced and/or removed as more detailed construction phase information becomes available, seven direct temporary adverse vibration effects which are not significant are retained on a precautionary basis.

Operational Phase

Direct permanent noise impacts on sensitive receptors

19.12.57 This has been scoped out.

Additional Mitigation, Enhancement and Monitoring

19.12.58 No additional mitigation, enhancement or monitoring has been identified.

Residual Effect

19.12.59 None

Direct permanent vibration impacts on sensitive receptors

19.12.60 Part 4b comprises a pipeline which, once constructed, will not give rise to any significant vibration emissions. This assumption will be revisited in more detail in the ES but is not expected to change.

Additional Mitigation, Enhancement and Monitoring

19.12.61 No additional mitigation, enhancement or monitoring is required.

Residual Effect

19.12.62 To be determined in the ES, however a direct, permanent adverse effect which is not significant.

Summary

19.12.63 **Table 19-44** summarises the residual noise and vibration effects of Part 4b of the Proposed Development, following the implementation of any identified additional mitigation, enhancement and/or monitoring.

Table 19-44: Summary of residual effects – Part 4b

Description of impact	Sensitivity of receptor	Nature of effect / geographic scale	Magnitude of impact	Initial classification of effect (with embedded control)	Additional mitigation, enhancement and/or monitoring	Residual effect significance
Construction Phase						
Direct temporary noise impacts on sensitive receptors – as listed in **Appendix 19-P4B-1** in PEI Report **Volume 4**: 46 NVSRs	Medium	Adverse, Direct, Temporary	Major	Major Adverse (Significant)	To be determined at ES	To be confirmed at ES stage (likely to be less extensive with fewer significant effects)
49 NVSRs	Medium	Adverse, Direct, Temporary	Moderate	Moderate Adverse (Significant)		To be confirmed at ES stage (likely to be less extensive with fewer significant effects)
All other receptors	Medium	Adverse, Direct, Temporary	Minor or Negligible	Minor or Negligible Adverse	None	To be confirmed at ES stage (likely to be Minor or Negligible Adverse [Not Significant])
Direct temporary vibration impacts on sensitive receptors – as listed in **Appendix**	Medium	Adverse, Direct, Temporary	Minor	Minor Adverse	To be determined at ES	To be confirmed at ES stage (likely to be Minor [Not Significant])

Description of impact	**Sensitivity of receptor**	**Nature of effect / geographic scale**	**Magnitude of impact**	**Initial classification of effect (with embedded control)**	**Additional mitigation, enhancement and/or monitoring**	**Residual effect significance**
19-P4B-1 in PEI Report **Volume 4**: 7 NVSRs						
All other receptors	Medium	Adverse, Direct, Temporary	Negligible	Negligible	None	To be confirmed at ES stage (likely to be Negligible [Not Significant])
Operational Phase						
Direct permanent vibration impacts on sensitive receptors	Medium	Medium	To be determined in the ES	To be determined in the ES	To be determined in the ES	To be confirmed at ES stage (likely to be [Not Significant])

19.13 Combined Effects between Proposed Development Parts

19.13.1 This section provides a review of the above findings of the individual Parts of the Proposed Development, to understand and interpret the potential combined effects on a shared receptor(s) that may be of greater significance when compared to individual effects arising from one of the six Parts of the Proposed Development. Where combined effects are identified, these are considered additively and qualitatively using professional judgement.

19.13.2 As further explained in **Chapter 6: Environmental Impact Assessment Methodology** in PEI Report **Volume 2**, the approach undertaken for this assessment is summarised in the following steps:

a. Step 1: Review and identification of shared receptors from assessments undertaken for each technical chapter for interfacing Parts of the Proposed Development; and

b. Step 2: Assessment of combined effects for any shared receptors identified under Step 1.

Part 1a and Part 1b Combined Effects

Step 1: Screening, review and identification of shared receptors

19.13.3 **Table 19-45** reviews the relevant receptor groups to consider the potential for a combined effect to occur across Parts 1a and 1b of the Proposed Development.

Table 19-45: Potential for combined effects between Parts 1a and 1b

Receptor groups	Potential for combined effects
Residential and commercial noise sensitive receptors	There is the potential for noise emissions from both Part 1a and Part 1b to affect the same receptor, leading to a combined effect. This will only happen for receptors which are in proximity to more than one Part of the Proposed Development and where the relevant works across the two Parts are scheduled at the same time. Although this may not occur in practice, on a precautionary basis, this is assumed to be possible.
Residential and commercial vibration sensitive receptors	With regard to vibration, this will not occur as the assessment metric (i.e. PPV) is a peak value. Therefore, contributions from more than one source will not ‘sum’ in the same way that time average values do (i.e. as is the case for noise).

Step 2: Source-pathway-receptors identification

19.13.4 The assessment of combined effects described in this section does not consider the embedded, control and management measures, and mitigation measures identified earlier within this PEI Report chapter to ensure a worst case scenario is considered.

Summary of potential combined effects on Part 1a and Part 1b

19.13.5 **Table 19-46** provides a summary of the potential combined effects review for Parts 1a and 1b of the Proposed Development.

Table 19-46: Summary of potential combined effects between Parts 1a and 1b

Receptor	ABC Category	Part 1a Predicted Level (dB LAeq,T)	Part 1b Predicted Level (dB LAeq,T)	Combined Level (dB LAeq,T)	Potential combined significant effect? (Yes / No)	Significance of combined effects
AWTP_130	A	70	78	79	Yes	It is not known whether the works affecting this receptor by Parts 1a and 1b will occur simultaneously. However, if they do, they will not combine to form an effect of greater order than already reported.
AWTP_131	A	70	70	73	Yes	Combines to a major effect, however it is unknown whether the works will occur simultaneously.
AWTP_132	A	65	65	68	Yes	Combines to a major effect, however it is unknown whether the works will occur simultaneously.
AWTP_133	A	62	62	65	No	Even in combination, the noise levels from Part 1b and 2 affecting these receptors do not give rise to a significant effect.
AWTP_134	A	55	55	58	No	
AWTP_134	A	55	55	58	No	
AWTP_135	A	62	62	65	No	
AWTP_136	A	59	59	62	No	
AWTP_137	A	53	53	56	No	
AWTP_138	A	60	60	63	No	
NL_PL_001	A	70	70	73	Yes	Combines to a major adverse effect, however it is unknown whether the works will occur simultaneously.

Part 1b and Part 2 Combined Effects

Step 1: Screening, review and identification of shared receptors

19.13.6 The same potential for combined effects between Part 1a and Part 1b exists for Parts 1b and Part 2, as presented in **Table 19-45**.

Step 2: Source-pathway-receptors identification

19.13.7 The assessment of combined effects described in this section considers the embedded, control and management measures, and mitigation measures identified earlier within this PEI Report chapter.

Summary of potential combined effects on Part 1b and Part 2

19.13.8 **Table 19-46** provides a summary of the potential combined effects review for Parts 1b and 2 of the Proposed Development.

Table 19-47: Summary of potential combined effects between Parts 1b and 2

Receptor	ABC Category	Part 1b Predicted Level (dB LAeq,T)	Part 2 Predicted Level (dB LAeq,T)	Combined Level (dB LAeq,T)	Potential combined effect? (Yes / No)	Significance of combined effects
NL_PL_246	A	40	63	63	No	Even in combination, the noise levels from Part 1b and 2 affecting these receptors do not give rise to a significant effect.
NL_PL_247	A	40	64	64	No	
NL_PL_266	A	44	67	67	No	
NL_PL_265	A	44	66	66	No	
NL_PL_264	A	44	65	65	No	
NL_PL_263	A	44	65	65	No	
NL_PL_262	A	44	64	64	No	
NL_PL_261	A	43	64	64	No	
NL_PL_260	A	42	64	64	No	
NL_PL_259	A	40	63	63	No	
NL_PL_258	A	37	63	63	No	

Part 2 and Part 3 Combined Effects

19.13.9 No combined effects are anticipated for Part 2 and Part 3, as there are no NVSRs which are within 300 m (i.e. the scoping distance) of both Part 2 and Part 3 works.

Part 2 and Part 4a Combined Effects

19.13.10 No combined effects are anticipated for Part 2 and Part 4a, as there are no NVSRs which are within 300 m (i.e. the scoping distance) of both Part 2 and Part 3 works.

Part 4a and Part 4b Combined Effects

Step 1: Screening, review and identification of shared receptors

19.13.11 The same potential for combined effects between Part 1a and Part 1b exists for Parts 4a and Parts 4b, as presented in **Table 19-45**.

Step 2: Source-pathway-receptors identification

19.13.12 The assessment of combined effects described in this section considers the embedded, control and management measures, and mitigation measures identified earlier within this PEI Report chapter.

Summary of potential combined effects on Part 4a and Part 4b

19.13.13 **Table 19-46** provides a summary of the potential combined effects review for Parts 4a and 4b of the Proposed Development.

Table 19-48: Summary of potential combined effects between Parts 4a and 4b

Receptor	ABC Category	Part 4a Predicted Level (dB LAeq,T)	Part 4b Predicted Level (dB LAeq,T)	Combined Level (dB LAeq,T)	Potential combined effect? (Yes / No)	Significance of combined effects
SouthEast_of_A4146_REF_01	A	63	80	80	No	It is not known whether the works affecting this receptor in Parts 4a and 4b will occur simultaneously. However, if they do, they will not combine to a form an effect which is of a greater order than already reported
SouthEast_of_A4146_REF_02	A	61	74	74	No	
SouthEast_of_A4146_REF_03	A	59	70	70	No	
SouthEast_of_A4146_REF_04	A	59	56	61	No	Even in combination, the noise levels from Part 4a and 4b affecting these receptors do not give rise to a significant effect.
SouthEast_of_A4146_REF_05	A	56	53	58	No	
SouthEast_of_A4146_REF_06	A	56	61	62	No	
SouthEast_of_A4146_REF_07	A	55	65	65	No	
SouthEast_of_A4146_REF_08	A	56	63	64	No	
SouthEast_of_A4146_REF_10	A	55	60	61	No	

19.14 Summary and Next Steps

19.14.1 On a precautionary bases, the preliminary assessment of effects has identified 231 sensitive receptors predicted to experience direct temporary moderate adverse (significant) noise effects and 196 sensitive receptors predicted to experience direct temporary major adverse (significant) noise effects arising from temporary construction activities.

19.14.2 In addition, direct temporary vibration is anticipated to result in direct temporary moderate or major adverse (significant) effects at 52 vibration sensitive receptors located in close proximately to construction activities.

19.14.3 Effects from operational noise and vibration impacts are currently assessed as negligible or unable to be quantified at this stage due to the limited availability of noise data.

19.14.4 However, it is not anticipated based upon currently available information that they will give rise to any significant noise or vibration emissions. These aspects will be revisited in the ES.

19.14.5 The information provided in this PEI Report is preliminary, with the final assessment of likely significant effects to be reported in the ES.

19.14.6 Where comprehensive detail is not available, conservative assumptions have been made on a precautionary basis. However, this may have led to an overestimation of effects. These areas will be investigated further are refined, where possible, in the ES.

19.14.7 Further work to be undertaken to support the assessments presented in the ES includes:

a. Completion of outstanding baseline surveys to confirm assessment criteria (where applicable);

b. Updated assessment of construction phase noise and vibration effects as more detailed information relating to the construction phase becomes available (including confirmation of approach in relation to moorings / houseboats); and

c. Quantitative assessment of operational phase sound and vibration emissions based on predictions of emissions at NVSR locations calculated from detailed mechanical plant information.

19.15 References

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