



UNIVERSAL DESTINATIONS & EXPERIENCES UK PROJECT

Former Kempston Hardwick Brickworks
and adjoining land, Bedford

Environmental Statement Volume 3

Appendix 9.3 - Construction and Operational Road Traffic Noise Assessment

Report reference: 4.9.3.0

Revision number: 00

Date: June 2025



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1 INTRODUCTION

1.1 APPOINTMENT AND BRIEF

- 1.1.1. This Construction and Operational Road Traffic Noise Assessment has been prepared in support of the planning proposal for the Proposed Development as described in **Chapter 2: Description of the Proposed Development (Volume 1)** of the Environmental Statement (ES)

2 3D NOISE MODELLING

- 2.1.1. A 3D noise model of the Site and the surrounding area has been produced using the CadnaA noise prediction software (version 2024), which implements the CRTN calculation methodology to predict road traffic noise levels at nearby sensitive receptors.
- 2.1.2. Details of the settings used in the noise model are summarised as follows:
- Default ground absorption: $G=0.5$ (mixed ground);
 - Topography data was included in the model as follows:
 - Across the Study Area as a whole, lidar data (2m grid spacing) were downloaded from the Department for Environment Food and Rural Affairs (DEFRA) website <https://environment.data.gov.uk/DefraDataDownload/?Mode=survey> and imported into CadnaA. This formed the Do Minimum topographic layer;
 - Site terrain data and topographical information for the new and re-aligned roads were provided by the project team and incorporated into the model. This formed the Do Something topographic layer;
 - Roads have been spatially aligned using OS MasterMap;
 - Road heights and gradients have been determined automatically from the topographic base layer as created;
 - For roads with an assigned speed below 75 kph, a surface correction of -1.0 dB has been applied, whilst for roads with a speed of 75 kph or greater a surface correction of -0.5 dB has been applied, based on a standard impervious bituminous surface which has a texture depth of 1.5mm;
 - Any speeds below 20 kph have been increased to this threshold;
 - Building outlines have been incorporated into the noise model based on the OS MasterMap buildings layer. Smaller buildings with an area of less than 30m² have been excluded, all other buildings have been assigned a height of 8m, although a limited number of adjustments to heights have been made using web-based street-view and aerial photography;
 - All buildings have been set to be reflective (absorption coefficient of zero), which means that these buildings may potentially reflect noise if they lie close to any road (i.e. opposite reflections using CRTN terminology);
 - Receptors have heights of 4.0m;
 - Predicted sound levels are free-field levels at the receptor façades; and
 - Road traffic data has been taken from the dataset provided by the projects transport consultant.
- 2.1.3. The following sections describe the modelling and assessment of road traffic noise.

3 CONSTRUCTION ROAD TRAFFIC NOISE ASSESSMENT

- 3.1.1. The assessment to determine any changes in road traffic noise levels on the surrounding road network during the Construction Phase uses traffic flow data for the following scenarios, as provided by the project's transport consultants:
- Scenario 1 - 2023 Existing. For the noise assessment, this represents existing baseline traffic conditions in 2023. Hereafter referred to as the '2023 Base Scenario'; and
 - Scenario 2 - 2023 Existing plus Peak Construction. For the noise assessment, this represents peak construction traffic in 2029. Hereafter referred to as the '2029 Peak Construction'.
- 3.1.2. The prediction methodology follows the procedure set out in the Calculation of Road Traffic Noise and the assessment of any changes in noise levels has been undertaken in accordance with the Design Manual for Roads and Bridges, LA 111 Noise and Vibration.
- 3.1.3. The likely differences in road traffic noise levels predicted for the 2023 Base Scenario against the 2029 Peak Construction Scenario have been derived from the Basic Noise Levels (BNLs) (LA10,18hours), as defined in Calculation of Road Traffic Noise (CRTN). A BNL is a source term for determining road traffic noise at 10m from the kerb of the road based on the traffic flow, percentage heavy vehicles and speed. To note, an assessment using BNLs does not take factors such as other noise sources in the immediate vicinity into account. If these unrelated sources were included, they may lessen (or negate) the amount by which the noise levels are predicted to change at any one receptor.
- 3.1.4. The predictions incorporate the 18-hour vehicle flow, speed and the proportion of heavy vehicles as provided by the project's transportation consultants, and the modelling assumptions stated in Paragraph 2.1.1 onwards.
- 3.1.5. One limitation of the CRTN methodology is that with the LA10,T (the parameter used to describe the Basic Noise Level) being a statistical parameter, there is a minimum traffic flow required to generate valid levels. For the 18-hour period, this threshold is 1,000 vehicles. Where the flows provided are below 1,000 vehicles in the 18-hour period, the road link has been removed from the analysis. Where 18-hour flows fall between 1,000 and 4,000, the CRTN procedure requires a low flow correction, and that has been applied.
- 3.1.6. Another limitation of the CRTN methodology is that it cannot be relied upon to generate valid noise levels where the speed on a road is less than 20 kph. Where links are predicted to have a speed of less than 20kph, they have been increased to 20 kph for the purpose of the noise predictions.
- 3.1.7. The resultant BNLs were then imported into CadnaA and the changes in road traffic noise level as a result of construction traffic plotted as noise contours.
- 3.1.8. There are predicted changes of between -5.1 dB and +9.9 dB for the 2023 Base Scenario vs 2029 Peak Construction Scenario. In line with the magnitude of impact scale, as set out in **Table 3-1** below, the magnitude of impact ranges from major beneficial to major adverse. The moderate and major adverse and beneficial changes in construction road traffic noise are set out in detail in **Table 3-2**. The change in noise levels as a result of construction traffic is shown in Figure 9.4 Construction Road Traffic Noise Level Change - Scenario 2 vs Scenario 1 (Volume 2).

Table 3-1 - Magnitude of Impact – Construction Road Traffic Noise

Magnitude of Impact	Short term noise change (dB L _{A10,18hr})
Negligible	Less than 1.0
Minor	1.0 to 2.9
Moderate	3.0 to 4.9
Major	Greater than or equal to 5.0

Table 3-2 – Moderate and Major Changes in Construction Road Traffic Noise

Location	Short term noise change (dB L _{A10,18hr})	Magnitude of Impact
Broadmead Road	Between +3.5 and +9.9	Moderate adverse to major adverse
Manor Road	Between -4.4 and -5.1	Moderate beneficial to major beneficial
Woburn Road	Between +3.0 and +5.2	Moderate adverse to major adverse

- 3.1.9. Along these road links, the following residential communities are subject to the highest changes in road traffic noise level due to construction traffic:
- Broadmead Road - single property at Broadmead Farm: highest predicted change in noise level: +3.7 dB (equivalent to a moderate adverse impact);
 - Broadmead Road – properties along the west of Brick Crescent, Stewartby: highest predicted change in noise level: +2.3 dB (equivalent to a minor adverse impact);
 - Manor Road (west) - Eastwood Cottages: highest predicted change in noise level: -4.6 dB (equivalent to a moderate beneficial impact);
 - Manor Road (east) – individual dwellings south of Manor Road: highest predicted change in noise level: -3.9 dB (equivalent to a moderate beneficial impact); and
 - Woburn Road – single property at Elms Farm: highest predicted change in noise level: +1.2 dB (equivalent to a minor adverse impact).
- 3.1.10. At the above communities, the highest predicted construction traffic noise level was 58.8 dB LA10,18hr at Broadmead Farm, which is below the SOAEL.
- 3.1.11. The sensitivity of the above receptors are assumed to be high as they are residential. As per the guidance in LA 111, other factors should be considered when determining the potential likely significant adverse effect at an individual, or group of receptors. These factors include:
- The absolute noise level in terms of the LOAEL and SOAEL thresholds – for example, LA 111 suggests that a receptor experiencing a minor adverse impact which is also above SOAEL would potentially be a likely significant adverse effect;
 - The location of the noise sensitive parts of a receptor;
 - The acoustic context; and
 - The likely perception of change by residents.

- 3.1.12. Along Manor Road, a moderate decrease in noise level is predicted as a result of construction-related traffic, predominately due to a decrease in vehicle flows and in the proportion of heavy vehicles. Consequently, it is considered that the decreases may be perceptible to residents. The reduction in vehicle flows is based on the assumption that Manor Road will be closed during the Construction Phase as it coincides with Network Rail's Transport and Works Act Order (TWAO) works to construct a new bridge over the Marston Vale Railway Line. Further details are provided in Chapter 5: Traffic and Transport (Volume 1).
- 3.1.13. Depending on the timing of delivery of the Network Rail Manor Road bridge over the Marston Vale Railway Line, Manor Road (west) could be available to construction traffic during some phases of the construction period. However, as shown in the transport assessment, there would be no change in the number of vehicles or proportion of heavy vehicles using Manor Road (west) during the construction works (i.e. vehicles using this route during the Construction Phase would be no greater than the existing scenario) and therefore the impact would be negligible.
- 3.1.14. Consequently, dwellings on Manor Road are predicted to experience Moderate beneficial impacts and these are considered Significant.
- 3.1.15. Along Broadmead Road, a single dwelling is predicted to experience a moderate increase in noise level as a result of construction-related traffic predominately due to an increase in heavy vehicles. Whilst the construction traffic noise levels are below the SOAEL, it is considered that the increase in road traffic noise may be perceptible to residents. However, this is based on a cautious worst case¹ peak construction traffic condition which would not be constant through the construction period and thus mitigation for a single property is considered to not be justified. Consequently, this Moderate adverse impact is considered Significant.
- 3.1.16. Properties located along the west side of Brick Crecent near Broadmead Road are predicted to experience a Minor adverse impact which is Not Significant.
- 3.1.17. Along Woburn Road, the single property at Elms Farm is predicted to experience a Minor adverse impact which is Not Significant.
- 3.1.18. Out of hours (i.e., beyond 07:00 to 19:00) working may be required, details of which are provided in Appendix 2.1: Environmental Statement Basis for Assessment (Volume 3). During such times, except in abnormal circumstance, all commercial vehicles, including heavy duty vehicles (HDVs) and light duty vehicles (LDVs), will be required via a routing agreement to enter and leave the construction site via Woburn Road and then Broadmead Road. Furthermore, the volume of movement of HDVs will be in the order of 20 vehicles and the number of staff approximately 300. These movements will be spread overnight and potentially by different routes and therefore the impact on any one link will be Not Significant.

¹ Cautious worst case is used to mean "a cautious worst case that provides a robust assessment of likely significant effects".

4 OPERATIONAL ROAD TRAFFIC NOISE

4.1 EXISTING ROAD NETWORK

- 4.1.1. An assessment has been undertaken to determine any changes in road traffic noise levels on the surrounding road network during the Operational Phase. Traffic flow data for the following scenarios have been provided by the project's transport consultants:
- Scenario 3 –Reference Case. For the noise assessment, this represents the existing road network and traffic plus traffic associated with agreed consented developments but without the Proposed Development. Hereafter referred to as 'Opening Year Do Minimum';
 - Scenario 4 –Opening Year Reference Case plus Development. For the noise assessment, this represents the existing road network and traffic plus traffic associated with agreed consented developments plus Opening Year related demands from the Site. This is based on Full Wixams Station being open, East West Rail (EWR) running between Oxford and Milton Keynes only and the A421 slips being complete. For clarity this assumes no trip generating development on either the Lake Zone or West Gateway Zone (There may be some drainage or other infrastructure works required on the Lake Zone and West Gateway Zone to support the delivery of development on the Core Zone). Hereafter referred to as 'Opening Year Do Something';
 - Scenario 4a – Opening Year Reference Case plus Development plus Construction. For the noise assessment, this represents the existing road network and traffic plus traffic associated with agreed consented developments plus Opening Year plus 10 years (midpoint between Opening Year and Future Year demands) related demands from the Site. This is based on Full Wixams Station being open, EWR running between Oxford and Milton Keynes only and the A421 slips being complete. This assumes construction activities in the Core Zone and Lake Zone. Hereafter referred to as 'Midpoint Year Do Something'; and
 - Scenario 5 – Future Year - Reference Case plus Development. For the noise assessment, this represents the existing road network and traffic plus traffic associated with agreed consented developments plus Future Year related demands from the Site. This is based on Full Wixams Station being open, EWR running between Oxford and Milton Keynes only and the A421 slips being complete. This assumes full development of the Lake Zone and West Gateway Zone. Hereafter referred to as 'Future Year Do Something'.
- 4.1.2. For each road link within each operational scenario, basic noise levels (BNLs) were calculated using the methodology in CRTN and incorporated into the CadnaA noise model. Comparisons were made as follows:
- Opening Year Reference Case plus Development (Scenario 4) vs Reference Case (Scenario 3);
 - Opening Year Reference Case plus Development plus Construction (Scenario 4a) vs Reference Case (Scenario 3); and
 - Future Year Reference Case plus Development (Scenario 5) vs Reference Case (Scenario 3).
- 4.1.3. The change in noise levels for each road link are identified in the following figures:
- **Figure 9.5 Operational Road Traffic Noise Level Change - Scenario 4 vs Scenario 3 (Volume 2);**
 - **Figure 9.6 Operational Road Traffic Noise Level Change - Scenario 4a vs Scenario 3 (Volume 2); and**

■ **Figure 9.7 Operational Road Traffic Noise Level Change - Scenario 5 vs Scenario 3 (Volume 2).**

- 4.1.4. There are predicted changes in the $L_{A10,18h}$ of road links between:
- -3.6 dB and +2.4 dB for Scenario 4 vs Scenario 3;
 - -3.6 dB and +2.4 dB for Scenario 4a vs Scenario 3; and
 - -3.2 dB and +2.6 dB for Scenario 5 vs Scenario 3
- 4.1.5. There are a number of road links where there is a change in operational road traffic noise of >1dB as a result of strategic changes on the surrounding road network. Where there are sensitive receptors within 50m of these road links, the change is beneficial, i.e. there is a reduction in operational road traffic noise.
- 4.1.6. In line with guidance within LA111, the following roads, and sensitive receptors within 50m of them, have been identified as experiencing a change of >1dB in the short term.

Scenario 4 vs Scenario 3:

- Wilstead Road/Pear Tree View: approximately 25 properties with a change of up to -1.2 dB;
- Stewartby Way: approximately 30 properties on Russet Close and Stewartby Way with a change of up to -1.2 dB;
- Stewartby Way: Stewartby Village Hall with a change of up to -1.2 dB;
- A421, Marston Moretaine: approximately 10 properties at Caves Gardens with a change of up to -2.0 dB;
- A421 Marston Moretaine: Travelodge hotel on Beancroft Road with a change of up to -2.0 dB; and
- Bedford Road: approximately 40 properties with a change of up to -2.3 dB and five properties at Arundel Close with a change of up to -3.6 dB.

Scenario 4a vs Scenario 3:

- Wilstead Road/Pear Tree View: approximately 25 properties with a change of up to -1.2 dB;
- Stewartby Way: approximately 30 properties on Russet Close and Stewartby Way with a change of up to -1.2 dB;
- Stewartby Way: Stewartby Village Hall with a change of up to -1.2 dB;
- A421, Marston Moretaine: approximately 10 properties at Caves Gardens with a change of up to -1.9 dB;
- A421 Marston Moretaine: Travelodge hotel on Beancroft Road with a change of up to -1.9 dB; and
- Bedford Road: approximately 40 properties with a change of up to -2.2 dB and five properties at Arundel Close with a change of up to -3.3 dB.

Scenario 5 vs Scenario 3:

- Wilstead Road/Pear Tree View: approximately 25 properties with a change of up to -1.1 dB;
- Stewartby Way: approximately 30 properties on Russet Close and Stewartby Way with a change of up to -1.2 dB;
- Stewartby Way: Stewartby Village Hall with a change of up to -1.2 dB;
- A421, Marston Moretaine: approximately 10 properties at Caves Gardens: approximately 10 properties with a change of up to -1.7 dB;

- A421 Marston Moretaine: Travelodge hotel on Beancroft Road with a change of up to -1.7 dB; and
- Bedford Road: approximately 40 properties with a change of up to -2.3 dB and five properties at Arundel Close with a change of up to -3.2 dB.

4.1.7. In line with the magnitude of impact scale, as set out in **Table 4-1** below, the magnitude of impact ranges from minor beneficial to minor adverse.

Table 4-1 - Magnitude of Impact – Operational Road Traffic Noise

Magnitude of Impact	Short term noise change (dB L _{A10,18hr})	Long term noise change (dB L _{A10,18hr})
Negligible	Less than 1.0	Less than 3.0
Minor	1.0 to 2.9	3.0 to 4.9
Moderate	3.0 to 4.9	5.0 to 9.9
Major	Greater than or equal to 5.0	Greater than or equal to 10.0

- 4.1.8. For each operational scenario comparison, a single link (268::668 – located on Bedford Road at the approach to a roundabout northwest of Marston Moretaine) exhibited a change in predicted noise level greater than -3 dB, affecting five properties at Arundel Close. However, this road link is influenced by noise from the A421, resulting in a lower impact at these properties than the numerical prediction suggests. As a result, these properties are predicted to experience a Minor beneficial impact which is Not Significant.
- 4.1.9. All other road links exhibited beneficial changes in noise levels of less than 3 dB, equivalent to a Minor beneficial impact which is Not Significant .
- 4.1.10. The above beneficial changes in road traffic noise level are associated with changes in traffic flows as a result of improved strategic connections on the A421.

4.2 NEW ROAD AND ROAD ALIGNMENT AMENDMENTS

- 4.2.1. The Proposed Development will introduce new road links to the surrounding area (the new A421 Junction and associated infrastructure within the Site boundary) as well as alter the existing alignment of Manor Road, which will be dualled.
- 4.2.2. The Study Area has been defined as an area 300m from the proposed road alignment changes and new road links. This Study Area has been defined based on professional experience and is considered to adequately capture the noise impacts likely from the road alignment changes and new road links, which will predominantly occur at the first row of any nearby dwellings.
- 4.2.3. The road traffic noise levels have been predicted at sensitive receptors within the 300m Study Area for the Do Minimum and Do Something scenarios, and the greatest magnitudes of change determined. Noise contour maps of the noise level changes predicted across the Study Area have also been prepared and are presented as:

- **Figure 9.5 Operational Road Traffic Noise Level Change - Scenario 4 vs Scenario 3 (Volume 2);**
- **Figure 9.6 Operational Road Traffic Noise Level Change - Scenario 4a vs Scenario 3 (Volume 2); and**
- **Figure 9.7 Operational Road Traffic Noise Level Change - Scenario 5 vs Scenario 3 (Volume 2).**

- 4.2.4. The noise level changes predicted at sensitive receptors within the Study Area as a result of new or realigned roads have been compared against the short-term criteria in **Table 4-1**. The change in noise level at all receptors is predicted to be Negligible to Minor adverse which is Not Significant, with the exception of one receptor at the eastern end of Manor Road which is predicted to experience a Major adverse impact.
- 4.2.5. The receptor is located to the rear of Vine Cottages at the eastern end of Manor Road and is predicted to experience a 10.3 dB increase as a result of the dualling of Manor Road. However, Vine Cottages have been purchased by UDX and will be removed to deliver the Proposed Development, namely the realignment of Manor Road. As such these properties are no longer sensitive receptors and therefore may be discounted from the assessment.

4.3 VARIATIONS IN NOISE LEVELS DURING PEAK PERIODS

- 4.3.1. In line with current guidance, BNLs have been calculated using the Annual Average Weekday Traffic (AAWT) flows which do not include weekend traffic and furthermore do not account for potential peaks and troughs in operational road traffic flow that may be experienced during special events and off-season periods respectively. As a result, it is possible that the day-to-day experience of operational road traffic flows will be subject to some variation.
- 4.3.2. A sensitivity check was undertaken using the Annual Average Daily Traffic (AADT) flows normally utilised by air quality consultants which includes the contribution from weekend traffic. The changes in BNL determined using the AADT dataset for each operational traffic scenario were found to be very similar to those predicted using the AAWT dataset, although the average BNL was marginally lower. As such, there was no discernible change in the predicted operational road traffic noise impact using the AADT dataset compared with the AAWT dataset, therefore an assessment based on the AAWT remains valid and appropriate.
- 4.3.3. Hourly average road traffic flows provided by the transport consultant indicated peaks in road traffic in the morning (typically between the hours of 08.00 and 10.00) and early evening (typically 17.00 to 19.00), depending on the road link, and, as such, operational traffic noise impacts may be higher during these periods and lower for other periods.



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