

TECHNICAL NOTE

Job Name: Oxfordshire Cotswolds Garden Village

Job No: 39289/3009

Note No: ACO01

Date: April 2019

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Subject: **Baseline Noise Constraints**

1. Introduction

- 1.1. This technical note has been prepared to inform the design team on acoustic matters relating to the proposed development based on the results of an environmental sound survey undertaken at the Oxfordshire Cotswolds Garden Village (OCGV) site.
- 1.2. Preliminary guidance with respect to noise mitigation has previously been provided by PBA based on anticipated noise levels associated with vehicular movements on the A40, given this was anticipated to be the principal area of constraint relating to noise. This previous acoustic guidance included the recommendation for a 60 m setback from the A40 and the use of office/non-noise sensitive uses adjacent to the road. Alternatively, the use of an acoustic barrier/bund was identified as a potential mitigation measure. In addition, it was recommended that private external amenity areas should be located so that the dwellings they serve are located between the amenity areas and the A40.
- 1.3. An environmental sound survey of the site has now been undertaken and this technical note provides updated guidance based on current measured sound levels.
- 1.4. The purpose of this note is to update the preliminary advice previously provided to inform the OCGV masterplan work and in advance of setting draft development parameters for assessment through the EIA.
- 1.5. A full assessment will ultimately be prepared as part of the ES chapter to report final study findings and development impact assessments. This will go further than the assessment reported within this Technical Note in that it will consider further detail including:
 - Future increases in existing traffic flows arising from background growth, and other local committed developments
 - Changes to the existing highway network including an A40 eastbound bus lane adjacent to the site, Eynsham park and ride and the resulting forecast changes to general traffic flows and bus movements

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- Additional traffic arising from the OCGV development
- 1.6. Whilst the final assessment will account for items detailed above, a 1 dB change would require a 25% change in traffic flows and therefore we would not anticipate a material change to the constraints identified in this note.
- 1.7. The Environmental Health Officer at West Oxfordshire District Council (WODC) was contacted to discuss the survey and assessment methodologies. As part of the discussions, sound survey positions were agreed. WODC also requested that baseline sound surveys should be undertaken across a few days to determine any variations of noise across a longer time period. The agreed standards to be used to inform the assessment are followed in this note.

2. Existing Conditions

The Site and Proposed Development

- 2.1. A description of the site, principally relevant to the noise assessment undertaken, is provided below.
- 2.2. The site is bounded by the A40 to the south. Lower Road runs north to south adjacent to the eastern boundary of the site and Cuckoo Lane runs north to south through the central part of the site. The majority of the site is in agricultural use.
- 2.3. There are a number of different farms and agricultural buildings located across the site. There is also an aggregate recycling facility on the eastern part of the site.
- 2.4. The OCGV development will provide approximately 2,200 new homes, as well as associated employment space, community amenities, social infrastructure and green infrastructure – the final development proposals remain subject to ongoing masterplanning work.

Environmental Sound Survey

- 2.5. A baseline environmental sound survey has been undertaken to establish the prevailing sound climate across the site. The results of the survey will be used amongst other things, to verify a computer-generated acoustic model, which will form the basis of an assessment of the suitability of the site for residential development.
- 2.6. The survey was undertaken between 27 February and 7 March 2019 at four locations within the site. The locations are described in Table 1 and presented in Figure 1.

Table 1: Description of Measurement Locations

Location	Description	Dominant Noise Source
LT1	The microphone was located on the southern boundary of the site, approximately 10 m from the edge of the A40 eastbound carriageway. The microphone was situated 1.4 m above ground level in a free-field location.	Road traffic from the A40.
LT2	The microphone was located on the western part of the site, approximately 10 m from the edge of Cuckoo Lane. The microphone was situated 1.4 m above ground level in a free-field location.	Road traffic from Cuckoo Lane.
LT3	The microphone was located on the eastern part of the site, approximately 10 m from the edge of Lower Road. The microphone was situated 1.4 m above ground level in a free-field location.	Road traffic from Lower Road.
LT4	The microphone was located on the Northern part of the site, approximately 850 m from Lower Road and 600 m from Cuckoo Lane. The microphone was situated 1.4 m above ground level in a free-field location.	Distant road traffic.

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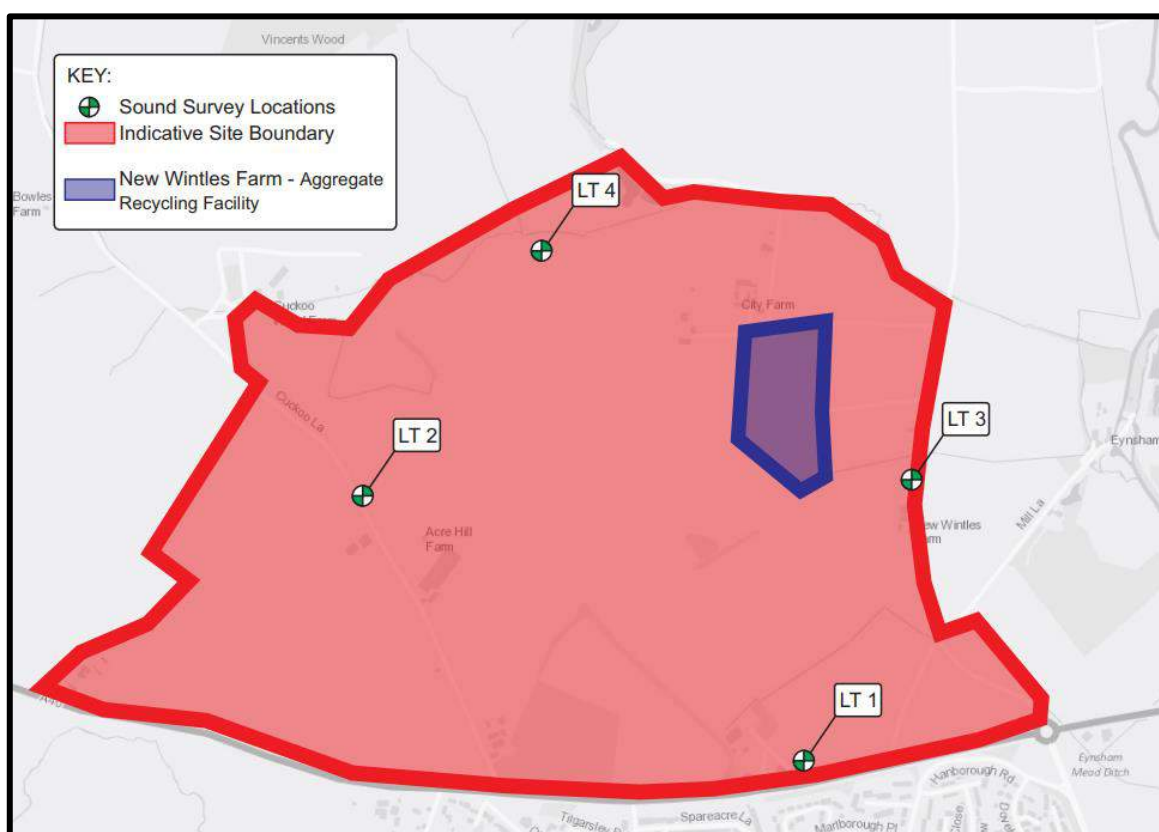


Figure 1: Survey Locations (Contains OS data © Crown Copyright and database right 2019)

- 2.7. A summary of the sound survey results is detailed below in Table 2. Fully logged data including time history graphs will be presented in the ES chapter
- 2.8. The daily daytime ($L_{Aeq,16\text{ hour}}$), night-time ($L_{Aeq,8\text{ hour}}$) and typical L_{A90} and L_{Amax} sound levels at each measurement position have been calculated from the survey data. The daily daytime and night-time sound levels have then been averaged to give the typical sound levels at each position. Within the table T is defined as the period over which the measurement was undertaken and relates to a 16 hour level for daytime and 8 hour level for night-time.
- 2.9. The highest noise levels were recorded to the south of the site with the A40 being the dominant source.

Table 2: Summary of Sound Survey Results

Location	Period, (T)	Measured Sound Level (dB)		
		$L_{Aeq,T}$	Typical L_{AFmax}	Typical $L_{A90,15\text{ minute}}$
1	16 hours Daytime (07:00 – 23:00 hours)	72	87	67
	8 Hours Night-time (23:00 – 07:00 hours)	68	82	45
2	16 Hours Daytime (07:00 – 23:00 hours)	64	80	51
	8 Hours Night-time (23:00 – 07:00 hours)	56	76	37
3	16 Hours Daytime (07:00 – 23:00 hours)	67	84	50
	8 Hours Night-time (23:00 – 07:00 hours)	59	79	38

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4	16 Hours Daytime (07:00 – 23:00 hours)	50	69	46
	8 Hours Night-time (23:00 – 07:00 hours)	43	54	34

3. Internal Ambient Noise

- 3.1. BS8233 sets out desirable guideline values in habitable rooms. The proposed internal ambient noise levels for dwellings are presented in Table 3.

Table 3: Summary of Sound Survey Results

Activity	Location	Daytime 07:00 to 23:00 hours	Night-time 23:00 to 07:00 hours
Resting	Living room	35 dB $L_{Aeq,16h}$	-
Dining	Dining room/area	40 dB $L_{Aeq,16h}$	-
Sleeping(daytime resting)	Bedroom	35 dB $L_{Aeq,16h}$	30 dB $L_{Aeq,8h}$
*Note 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative source of ventilation that does not compromise the façade insulation or the resulting noise levels.			
Note 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.			

*A selection of the available notes

- 3.2. The limiting factor in achieving appropriate internal noise levels is often noise ingress via the glazed and ventilation elements. Conventional thermal double glazing and a standard trickle ventilator constructed in in a masonry wall façade would typically be expected to have a composite sound reduction index of around 30 dB.
- 3.3. Based on the results of the environmental sound survey, preliminary calculations indicate that the proposed internal ambient noise criteria are likely to be achieved across the majority of the site, assuming conventional constructions as detailed above.
- 3.4. Up-rated acoustic glazing and acoustically treated ventilation methods are likely to be required in order to achieve the proposed criteria for internal noise for dwellings within the following set backs from the principal roads surrounding the site.
- Up-rated glazing and acoustically treated ventilation methods are likely for dwellings fronting onto Cuckoo Lane, upto 20 m from the edge of the road;
 - Up-rated glazing and acoustically treated ventilation methods are likely for dwellings fronting onto Lower Road, upto 30 m from the edge of the road;
 - Up-rated glazing and acoustically treated ventilation methods are likely for dwellings fronting onto A40, upto 50 m from the edge of the road.
- 3.5. We would highlight that the above is a preliminary assessment and glazing and ventilation specifications should be determined at the appropriate stage which is likely to be as part of the reserved matters planning application.

4. External Noise Levels

- 4.1. With respect to noise levels in external amenity areas BS8233 provides the following advice:

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“for traditional external areas that are used for amenity space, such as gardens and patios, it is desirable that the external noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable.

In higher noise areas, such as city centres or urban areas adjoining the strategic transport network, a compromise between elevated noise levels and other factors, such as the convenience of living in these locations or making efficient use of land resources to ensure development needs can be met, might be warranted. In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.”

- 4.2. Based on BS 8233:2014, the guidance levels for private external amenity areas range between 50 dB and 55 dB $L_{Aeq,16hrs}$. Whilst there could be a discussion on this with regards to trying achieve a quieter noise environment, it is generally accepted on schemes adjacent to strategic transport networks that noise levels upto 55 dB $L_{Aeq,16hrs}$ are considered suitable.
- 4.3. Based on the results of the environmental sound survey, preliminary calculations indicate that sound levels in external amenity areas are likely to fall above the proposed noise criterion of 55 dB $L_{Aeq,16h}$ without specific mitigation measures along Cuckoo Lane, Lower Road and the A40. Based on the sound survey results presented within Table 2, noise levels range between 64-72 dB $L_{Aeq,16hrs}$ for areas of the site fronting onto Cuckoo Lane, Lower Road and the A40.
- 4.4. In areas towards the centre of the site, noise levels in external amenity areas are likely to fall below the proposed external noise criterion of 55 dB $L_{Aeq,16h}$.
- 4.5. In order to control sound levels in external amenity areas associated with dwellings overlooking Cuckoo Lane, Lower Road and the A40 we would suggest the following measures are considered:
 - Locating private external amenity areas behind dwellings so that they are screened from the road by the buildings they serve. Increased levels of screening could be provided through the use of terraced townhouses or semi-detached properties;
 - Use of a suitably specified acoustic barrier along the surrounding road traffic sources. However, given the principal noise source is the A40, it is likely that use of barriers could be utilised adjacent to this source;
 - Increase the distance between the dwellings and the noise source (i.e. the nearest road). The use of a setback on its own is not usually the most effective method of controlling noise and should be considered only where other measures are not considered to be appropriate.
- 4.6. With private external amenity areas located behind dwellings, the required setback to meet the upper guideline value is likely to be as detailed below:
 - Approximately 50 m from A40;
 - Approximately 15 m from Lower Road; and
 - Approximately 10 m from Cuckoo Lane;
- 4.7. The full extent of the setback and the potential requirement for acoustic barriers will be assessed as part of the ongoing acoustic modelling work.

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5. Aggregate Recycling Facility

- 5.1. The sound survey did not include specific data collection in respect of the NWF Aggregate Recycling Facility due to uncertainty of the operational activity at the time of the survey and the lack of access permission from site operator.
- 5.2. Subject to discussions with Grosvenor in relation to the future of the NWF Aggregate Recycling Facility, a further sound survey will be required to determine the operational sound levels and resulting impacts.
- 5.3. An assessment of the potential impact of the aggregate recycling facility will be undertaken (if required) and presented in the ES chapter.

6. Educational Uses

- 6.1. The Acoustics of Schools: a Design Guide, November 2015 has been produced by the Institute of Acoustics and the Association of Noise Consultants to provide supporting guidance and recommendations on the acoustic design of new and refurbished schools.
- 6.2. Chapter 2 of the document gives guidance on external noise levels. It should be noted that meeting the external levels do not form part of the requirement E4 of the building regulations.
- 6.3. It states that:

“For new schools, 60 dB $L_{Aeq,30min}$ should be regarded as an upper limit for external noise at the boundary of external areas used for formal and informal outdoor teaching and recreation.”
- 6.4. Calculations based on the survey results show that external noise levels for outdoor teaching are likely to meet the criterion for outdoor teaching and recreation.
- 6.5. In order to keep disruption of neighbours to minimum, it is recommended that outdoor sports facilities as part of the school site and play areas should be located at a minimum distance of 30 metres away from the façade of nearby dwellings.

7. MUGA/Play Areas

- 7.1. In order to keep disruption of neighbours to minimum, it is recommended that outdoor sports facilities such as multi use game areas proposed as part of the developments should be located at a minimum distance of 30 metres away from the façade of nearby dwellings.

8. Summary

- 8.1. A baseline environmental sound survey has been undertaken on the site. Based on the results of the survey, an initial assessment of acoustic constraints has been undertaken.
- 8.2. Assessment criteria have been based industry standards and guidance.
- 8.3. With respect to internal ambient noise levels, preliminary calculations indicate that:

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- Appropriate internal noise levels are likely to be achieved across the majority of the site assuming conventional glazing and ventilation methods;
- Appropriate internal noise levels in dwellings overlooking Cuckoo Lane (up to around 20 m from the road), Lower Road (up to around 30 m from the road) and the A40 (up to around 50 m from the road) are likely to be achieved assuming the use of uprated acoustic glazing and acoustically treated ventilation methods. Depending on setback distances the use of mechanical ventilation may also be required.

8.4. With respect to noise levels in private external amenity spaces, preliminary calculations indicate that:

- Appropriate noise levels in external amenity areas are likely to be achieved across the majority of the site;
- Appropriate noise levels in external amenity areas associated with dwellings overlooking Cuckoo Lane, Lower Road and the A40 are likely to be achieved assuming private external amenity areas are located behind the dwellings and adopting the recommended set back distances from the respective roads.
- An acoustic barrier along the A40 and/or a setback distance from the road may also be used as an alternative and potentially reduce the set-back.

8.5. We recognise that the client/design team are accounting for site constraints across different technical specialists and that the specific noise constraints may vary and have to be balanced against other disciplines. Therefore, if the client/design team require additional conference calls or meetings to discuss the noise constraints we would be pleased to attend to ensure the most effective scheme is brought forward accounting for noise.

8.6. A full assessment will be prepared to report final study findings and development impact assessments. The assessment will include the potential impact of the aggregate recycling facility and will be undertaken when the modelling has been completed and will be part of the ES chapter. The full assessment whilst refining the assessment accounting for items listed below is unlikely to materially change the outcomes of this note.

- Future increases in existing traffic flows arising from background growth, and other local committed developments
- Changes to the existing highway network including an A40 eastbound bus lane adjacent to the site, Eynsham park and ride and the resulting forecast changes to general traffic flows and bus movements
- Additional traffic arising from the OCGV development