hepworth acoustics

LAND AT NEWGATE LANE (SOUTH), FAREHAM

ROAD TRAFFIC NOISE ASSESSMENT

On behalf of:

Bargate Homes Ltd

Report No: P18-122-R03v4
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ROAD TRAFFIC NOISE ASSESSMENT

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1.0 INTRODUCTION

1.1 Hepworth Acoustics Ltd was commissioned by Bargate Homes Ltd to carry out a road traffic noise impact assessment for a site known as Land at Newgate Lane (South), Fareham, in connection with an outline planning application for the development of up to 115 dwellings, with all matters except access to be reserved.

1.2 The existing use of the site is predominantly agricultural. The site is bounded to the west by the original Newgate Lane and to the east by the Newgate Lane relief road.

1.3 To the north the site is bounded by agricultural land that is already subject to a separate outline planning application for the development of up to 75 dwellings, as per P/18/1118/OA.

1.4 To the south the site is bounded by existing residential properties, accessed via a cul-de-sac from the original Newgate Lane to the west.

1.5 The recent opening of the Newgate Lane South relief road has introduced a potentially significant local road traffic noise source at the eastern boundary of the site.

1.6 The original Newgate Lane to the west is now blocked at its current junction with Peel Common roundabout, resulting in significantly decreased road traffic noise to the west of the site.

1.7 An illustrative masterplan has been developed for the site, as shown in Figure 1. The plan in Figure 1 has been considered as part of this assessment, however it is stressed that the layout shown is in outline form at this stage.

1.8 This noise assessment was ordinally undertaken prior to opening of the Newgate Lane South relief road and hence is based on the projected road traffic data, sourced from the Hampshire County Council document *Newgate Lane Southern Section Transport Assessment*, published in June 2015.

1.9 The noise assessment has included:

- A desktop review of the site location and development proposals
- A review of available Transport Assessment information relating to the new relief road
- Computerised modelling of future road traffic noise at the site
- Outline recommendations of appropriate noise mitigation measures.

1.10 It is noted that a separate aircraft noise assessment was been undertaken at the site in December 2018 specifically in relation to the potential impact of noise associated with Solent Airport. That assessment is set out in Hepworth Acoustics letter report P18-122-R04, dated 18 December 2018.

1.11 The assessment set out herein relates only to road traffic noise.

1.12 The various noise units and indices referred to in this report are described in Appendix I. All noise levels mentioned in the text have been rounded to the nearest decibel, as fractions of decibels are imperceptible.

2.0 NOISE CRITERIA

2.1 The *National Planning Policy Framework* (NPPF) 2018 states at paragraph 170 that "*Planning policies and decisions should contribute to and enhance the natural and local environment by: … e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of … noise pollution …*".

2.2 Further, paragraph 180 states that "*Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the site or the wider area to impacts that could arise from the development. In doing so they should: a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life …*".

2.3 However, there is as yet no specific guidance on numerical acoustic assessment/design criteria for proposed new housing developments provided in the NPPF, accompanying Technical Guidance document, National Planning Practice Guidance 'Noise', nor the *Noise Policy Statement for England* (NPSE) 2010.

ProPG: Planning & Noise

2.4 ProPG: Planning & Noise '*Professional Practice Guidance on Planning & Noise'* 2017 provides "guidance on a recommended approach to the management of noise within the planning system in England", predominantly for proposed new residential developments on land that is exposed to transportation noise. It is noted that the guidance has no legal status. It does not constitute an official government code of practice and does not provide an authoritative interpretation of the law or government policy.

2.5 The ProPG recommends a staged approach to assessment. Stage 1 is an initial site noise risk assessment, indicating whether the proposed site is considered to pose a negligible, low, medium or high risk from a noise perspective.

2.6 At low noise levels, the more likely the site is to be acceptable from a noise perspective provided that a good acoustic design process is followed and an ADS (Acoustic Design Statement) confirms how the adverse impacts of noise will be mitigated and minimised in the finished development. This can be ensured by way of condition.

2.7 As noise levels increase, the site is likely to be less suitable from a noise perspective and any subsequent application may be refused unless a good acoustic design process is followed and an ADS confirms how the adverse impacts of noise will be mitigated and minimised, and which clearly demonstrate that a significant adverse noise impact will be avoided in the finished development.

2.8 High noise levels indicate that there is an increased risk that development may be refused on noise grounds. This risk may be reduced by following a good acoustic design process that is demonstrated in a detailed ADS.

2.9 Stage 2 of the recommended approach in ProPG is a full assessment to consider good acoustic design. The guidelines of ProPG in terms of suitable acoustic design criteria are broadly consistent with the guidance of BS 8233, and the sound insulation recommendations made later in this report have been designed to achieve the BS8233 guidelines, as described below.

BS 8233

2.10 British Standard 8233: 2014 *Guidance on sound insulation and noise reduction for buildings,* which carries the full weight of an adopted British Standard recommends guidance on design criteria for acceptable noise levels within residential accommodation. BS 8233 guidelines for the daytime (0700-2300hrs) and night-time (2300-0700hrs) periods are summarised in Table 1.

Table 1 : BS 8233 Recommended Acoustic Design Criteria

Activity	Location	Internal Noise Levels	
		Daytime 0700-2300hrs	Night-time 2300-0700hrs
Resting	Living room	35 dB $L_{Aeq,16hr}$	-
Dining	Dining room / area	40 dB $L_{Aeq,16hr}$	-
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$

2.11 BS 8233 also states that, "*where development is considered necessary or desirable … the internal target levels* [i.e. those in Table 1] *may be relaxed by up to 5dB and reasonable internal conditions still achieved*".

2.12 BS 8233 clarifies that the above guidance relates only to noise without specific character (e.g. such as that which has a distinguishable, discrete and continuous tone, is irregular enough to attract attention, or has strong low-frequency content) and that where such characteristics are present, lower noise limits might be appropriate.

2.13 Further, BS 8233 states that if there is a reliance on closed windows to meet the guide values, "*there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level*". Further, it is stated that assessments should be based on a room with "*adequate ventilation provided (e.g. trickle ventilators should be open)*".

2.14 BS 8233 also recognises that regular individual noise events at night can cause sleep disturbance. Peaks of noise from individual events are usually described in terms of L_{Amax} values and these can be highly variable and unpredictable. ProPG states that "*in most circumstances in noise-sensitive rooms at night (e.g. bedrooms) good acoustic design can be used so that individual noise events do not normally exceed 45dB $L_{Amax,F}$ more than 10 times a night. However, where it is not reasonably practicable to achieve this guideline then the judgement of acceptability will depend not only on the maximum noise levels but also on factors such as the source, number, distribution, predictability and regularity of noise events*". This is broadly consistent with research described in WHO *Community Noise Guidelines* that states "*for a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{Amax} more than 10-15 times per night*".

2.15 Regarding outdoor living areas, BS 8233 states that "*it is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB L_{Aeq}, which would be acceptable in noisier environments. However, it is 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, 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, developments should be designed to achieve the lowest practicable levels in these external amenity spaces, but should not be prohibited*".

3.0 PREDICTION AND MODELLING OF FUTURE ROAD TRAFFIC NOISE LEVELS

3.1 Future road traffic noise levels across the site have been predicted and assessed using the CadnaA noise prediction software. This software enables a 3-dimensional computer model of the topography of the site and the surrounding area to be used as a basis for undertaking automated noise calculations using the algorithms set out in the Department of Transport document *Calculation of Road Traffic Noise* (CRTN), 1988.

3.2 Geographical data for the site and surroundings (including ground height data) was obtained from Ordnance Survey digital data.

3.3 Projected traffic flow data has been sourced the Newgate Lane Southern Section Transport Assessment, specifically data set out in Table 6.6 of that document. That table sets out projected road traffic flows for a number of key links in terms of the 12-hour traffic flows for the period 0700-1900hrs, separated by direction and detailing the total flows and the numbers of HGVs.

3.4 The data adopted for the noise predictions is that quoted for the 'DS2' scenario for the year 2036. This includes background traffic growth associated with a number of planned and committed developments and transport improvement schemes, including the Newgate Lane Southern Section scheme and the proposed Stubbington Bypass scheme, which it is understood will proceed.

3.5 Use of the 2036 data is considered to be highly robust. The next less distant future data available is for the year 2019, however realistically that will have elapsed prior to any potential occupation of dwellings at the Application site.

3.6 For the noise prediction, the data quoted for Newgate Lane North of Peel Common has been applied to the new bypass, and the data quoted for Old Newgate Lane West of New Road has been applied to the original Newgate Lane, and its link to the new bypass. The data in Table 6.6. of the Transport Assessment is provided separately for each direction of travel and hence this has been combined for determine 2-way 12-hour flows.

3.7 For noise prediction purposes, it is necessary to derive from the above described data, representative values for the 2-way, 16-hour traffic flows for the period 0700-2300hrs, hence corresponding to the daytime period defined in BS 8233. This has been achieved by applying a default multiplication factors of 1.15, which is a standard factor set out in the COBA (COst Benefit Analysis) manual. The percentage ratio of HGVs has been taken to be the same for the 12-hour and 16-hour periods.

3.8 In consideration of night-time noise levels, no data has been provided demonstrating projected traffic flows for the period 2300-0700hrs. For assessment purposes, it is estimated based on a wealth of experience of comparable environments, that night-time $L_{Aeq,8hr}$ noise levels will be at least 5dB lower than the corresponding daytime $L_{Aeq,16hr}$ value. Night-time traffic flows have hence been derived on that basis.

3.9 Based on the above, the following 2-way traffic flow values has been used for noise prediction purposes, based on the daytime 0700-2300hrs and night-time 2300-0700hrs periods:

- New Bypass (1.3% HGV) – Daytime: 24,936 / Night-time 3,943
- Original Newgate Lane (2.5% HGV) – Daytime: 1,447 / Night-time 229

3.10 Further to the above, the noise modelling has accounted for speeds of 40mph on all roads, and has assumed 5mm deep impervious bitumen carriageway surfaces. The modelling has also included the effects of acoustic barriers to the roadside incorporated within the Newgate Lane Southern Section scheme.

3.11 Initial iterations of the noise propagation model have been generated to provide predicted $L_{Aeq,16hr}$ daytime and $L_{Aeq,8hr}$ night-time noise levels at 1.5m above local ground height across the site, as presented in Figures 1 and 2 respectively.

3.12 Subsequently, indicative residential blocks have been incorporated into the model to demonstrate the likely effects of development buildings on the site upon road traffic noise propagation. The indicative buildings have been incorporated based building heights of 10m, to represent typical 3-storey blocks with pitched roof.

3.13 Iterations of the noise propagation model incorporating indicative residential blocks have been generated to provide predicted $L_{Aeq,16hr}$ daytime and $L_{Aeq,8hr}$ night-time noise levels at 1.5m, 4.5m and 7.5m above local ground height across the site, representative of ground floor, first floor and second floor levels respectively.

3.14 The noise contour plans for the model iterations incorporating indicative residential blocks are presented in Figures 3, 4 and 5 for the daytime scenario and in Figures 6, 7 and 8 for the night-time scenario, at the respective heights in each case.

4.0 OUTLINE NOISE MITIGATION RECOMMENDATIONS

4.1 Consideration of the predicted 2036 noise contours shown in Figures 2-9 indicates that, as would be expected, predicted future road traffic noise levels are highest towards the east of the site, commensurate with proximity to the Newgate Lane South relief road.

4.2 Predicted future road traffic noise levels towards the west of the site are considerably lower. This is also as would be expected given that the original Newgate Lane is now a no through road.

4.3 Based on the indicative masterplan layout considered in this plan, the computerised noise models indicate predicted daytime noise levels at residential façades of up to about 69dB $L_{Aeq,16hr}$. The corresponding predicted night-time noise levels are hence up to about 64dB $L_{Aeq,8hr}$. These worst-case noise levels are predicted at 2nd floor level, with slightly lower noise levels at ground floor level.

4.4 Based on the predicted noise levels, it will necessary to incorporate noise mitigation measures to ensure adequate control or road traffic noise in habitable internal areas and external living areas.

4.5 The form and specification of necessary noise mitigation will be variable, proportionate to the noise levels in specific areas of proposed development.

4.6 As the current proposals are in outline form, it is recommended that specific details of appropriate noise mitigation measures are enforced for planning purposes by way of a suitable planning condition.

4.7 Based on this assessment, subject to careful implementation of noise mitigation measures, potentially including those set out below, there is not considered to be any material constraint to implementing measures that secure acceptable internal and outdoor acoustic conditions for residential purposes across the site, in accordance with the guidelines set out in BS 8233 and ProPG: Planning & Noise.

4.8 There is potential to incorporate acoustic screening towards the boundary of the site in key areas, either by way of earth bunding formed from movement of soil during ground works early in the construction process, by way of erection of purpose-built acoustic barriers, or potentially a combination of the two (i.e. a barrier constructed at the apex of an earth bund.

4.9 This type of mitigation may be employed in order to gain effective control of road traffic noise at its source, and hence minimise the need for further mitigation directly at residential plots. However, acoustic boundary screening is not a necessity, as mitigation may be considered in alternative forms.

4.10 With respect outdoor living areas of future residences (e.g. rear gardens), subject to an adequate distance buffer and careful layout design, it is likely that adequate control of road traffic noise levels may be achieved in most areas, in accordance with the guidelines set out in BS 8233 and ProPG: Planning & Noise, by way of orientation of such areas to the opposite side of the development buildings to the road.

4.11 Alternatively, specialist proprietary acoustic timber fencing of adequate specification and height at the boundaries of individual gardens (or blocks of gardens) will be adequate to achieve the guideline levels.

4.12 With respect to internal habitable areas, as well as potential boundary and localised screening, measures such as careful orientation of buildings and design of internal layouts are recommended and may be used to minimise the exposure to road traffic noise at habitable rooms façades, and hence reduce and reliance upon the acoustic performance of glazing and ventilation systems.

4.13 Notwithstanding, some reliance upon façade sound insulation is expected to be likely in areas proximate to road traffic noise sources, not least at upper floor levels where the efficacy of any physical acoustic screening will be less.

4.14 The precise requirements in respect of glazing and acoustic trickle ventilators will be dependent upon numerous variables, including final site layout, plot orientations and room/window dimensions, and whether any further physical acoustic screening is introduced.

4.15 However, based on the likely worst-case situation of habitable room windows directly overlooking the new bypass at a distance of 15m, an acoustic glazing specification of a 10mm standard pane and a 8.4mm laminated pane on a 12mm air gap (i.e. $10\text{-}12\text{-}8.4_{lam}$), with acoustically attenuated trickle ventilators of typical acoustic rating 45dB $D_{n,e,w}$ may be appropriate. For habitable room windows directly overlooking the new bypass at a distance of 30m, a glazing specification of a 10mm and 4mm standard panes on a 12mm air gap (i.e. 10-12-6), with acoustically attenuated trickle ventilators of typical acoustic rating 40dB $D_{n,e,w}$ may be appropriate.

4.16 Such sound insulation measures are commonly implemented at residential developments which are exposed to road traffic noise.

4.17 In quieter areas, e.g. where residences are located slightly further back from the road or where the angle of view is restricted by virtue of their orientation, lower specification systems will be adequate.

4.18 The precise specifications of all noise mitigation measures will be subject to detailed design, however the above demonstrates that adequately controlling internal and external noise levels in accordance with the guidelines set out in BS8233 will be readily achievable.

5.0 SUMMARY AND CONCLUSION

5.1 Hepworth Acoustics has undertaken a road traffic noise impact assessment for a site known as Land at Newgate Lane (South), Fareham, in connection with an outline planning application for the development of up to 115 dwellings, with all matters except access to be reserved.

5.2 Outline recommendations of appropriate noise mitigation measures have been made in order to achieve acceptable internal and outdoor acoustic conditions for residential purposes across the site, in accordance with the guidelines set out in BS 8233 and ProPG: Planning & Noise.

Figure 1 – Illustrative Masterplan

Figure 2 – Predicted 2036 Noise Contours – Existing Site, Daytime, 1.5m

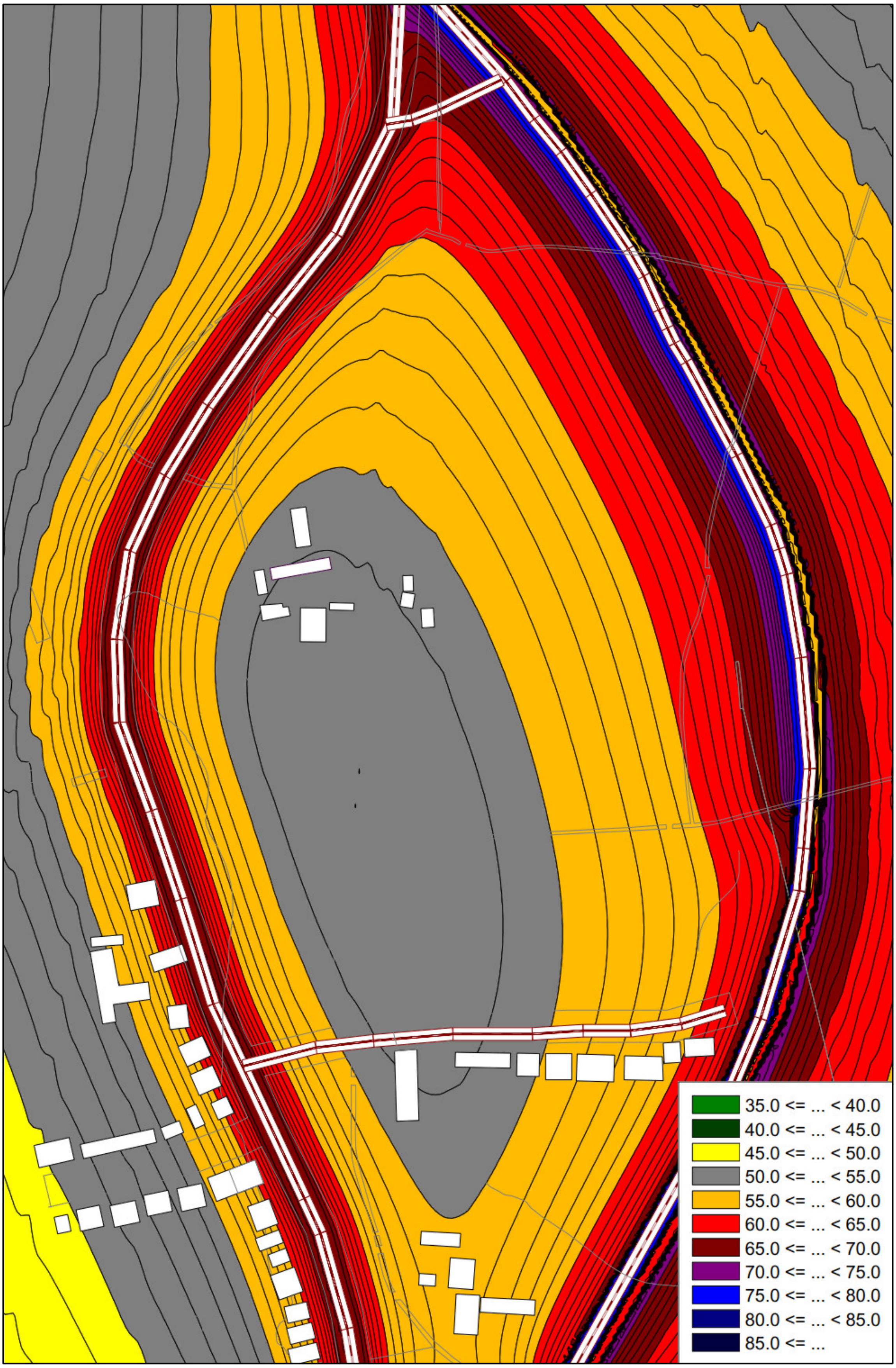


Figure 3 – Predicted 2036 Noise Contours – Existing Site, Night-time, 1.5m

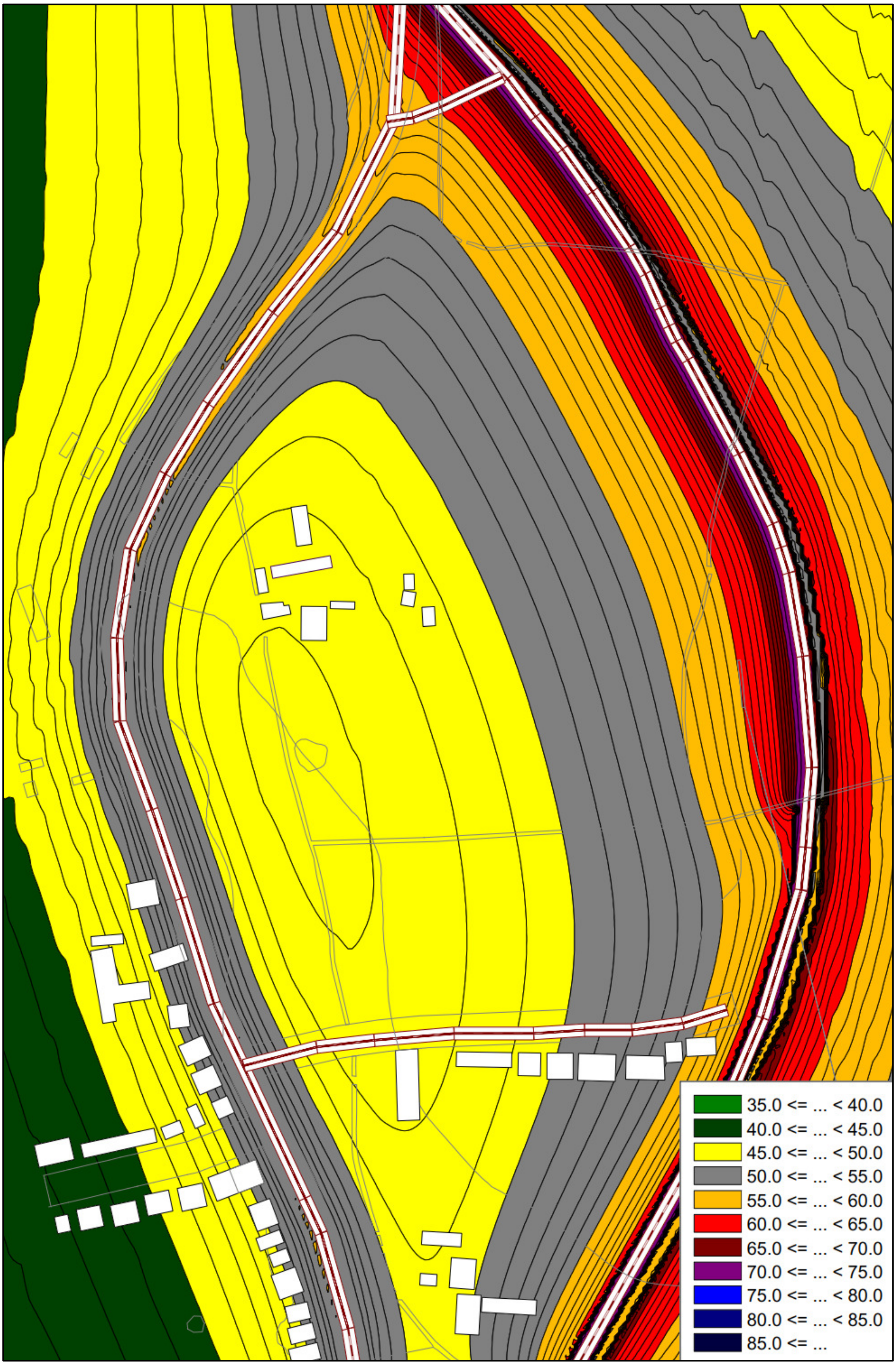


Figure 4 – Predicted 2036 Noise Contours – Indicative Development, Daytime, 1.5m

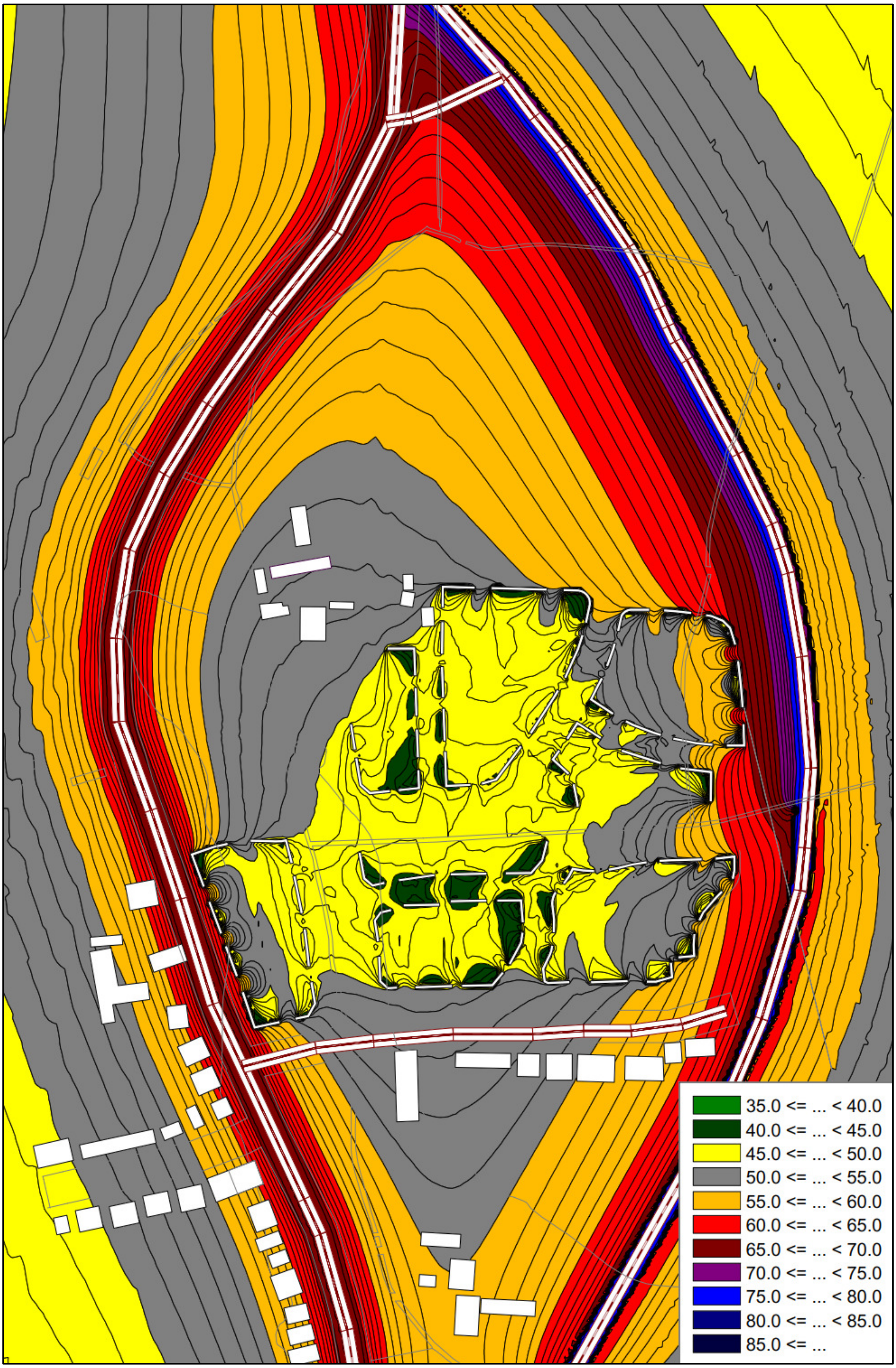


Figure 5 – Predicted 2036 Noise Contours – Indicative Development, Daytime, 4.5m

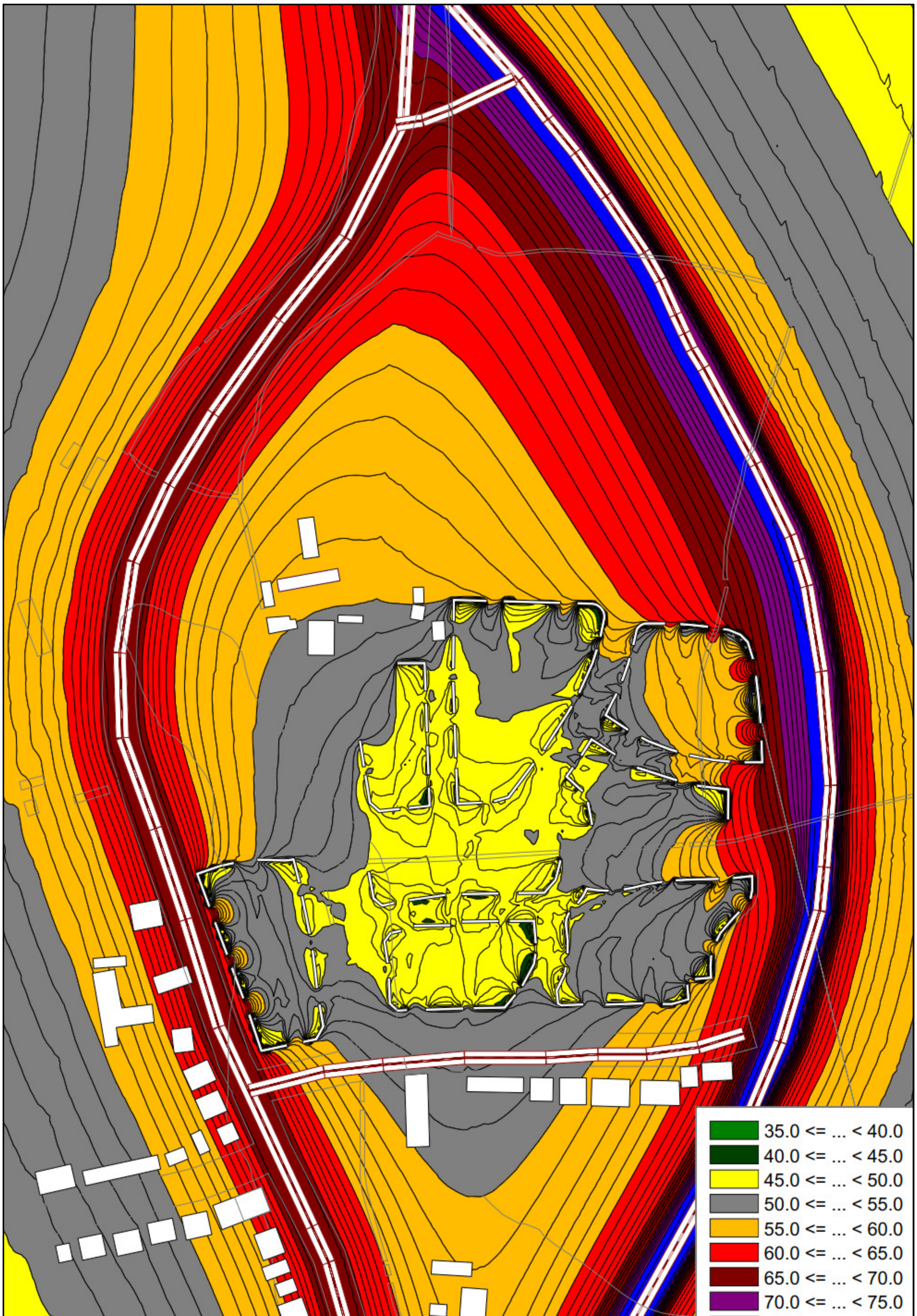


Figure 6 – Predicted 2036 Noise Contours – Indicative Development, Daytime, 7.5m

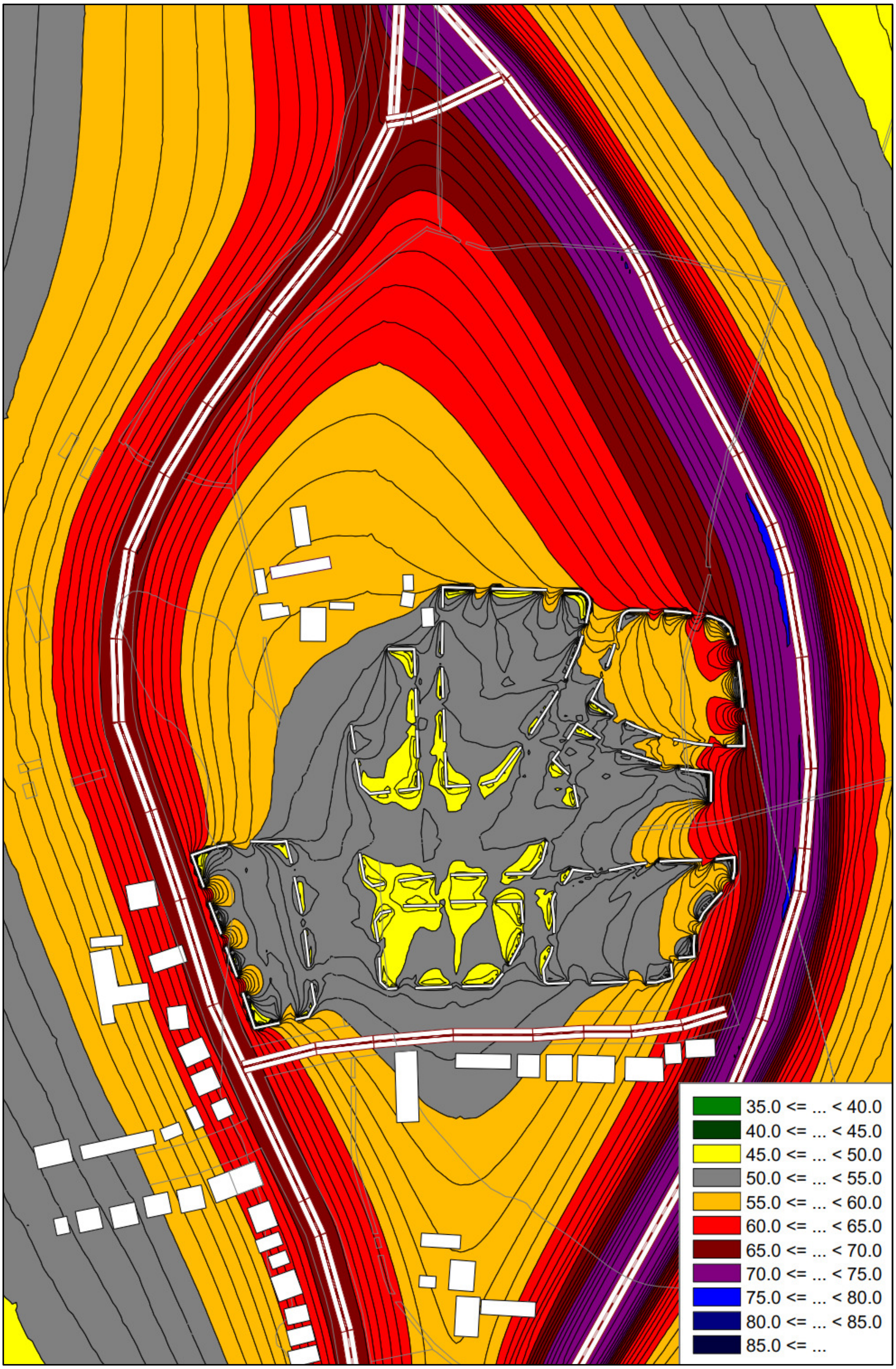


Figure 7 – Predicted 2036 Noise Contours – Indicative Development, Night-time, 1.5m

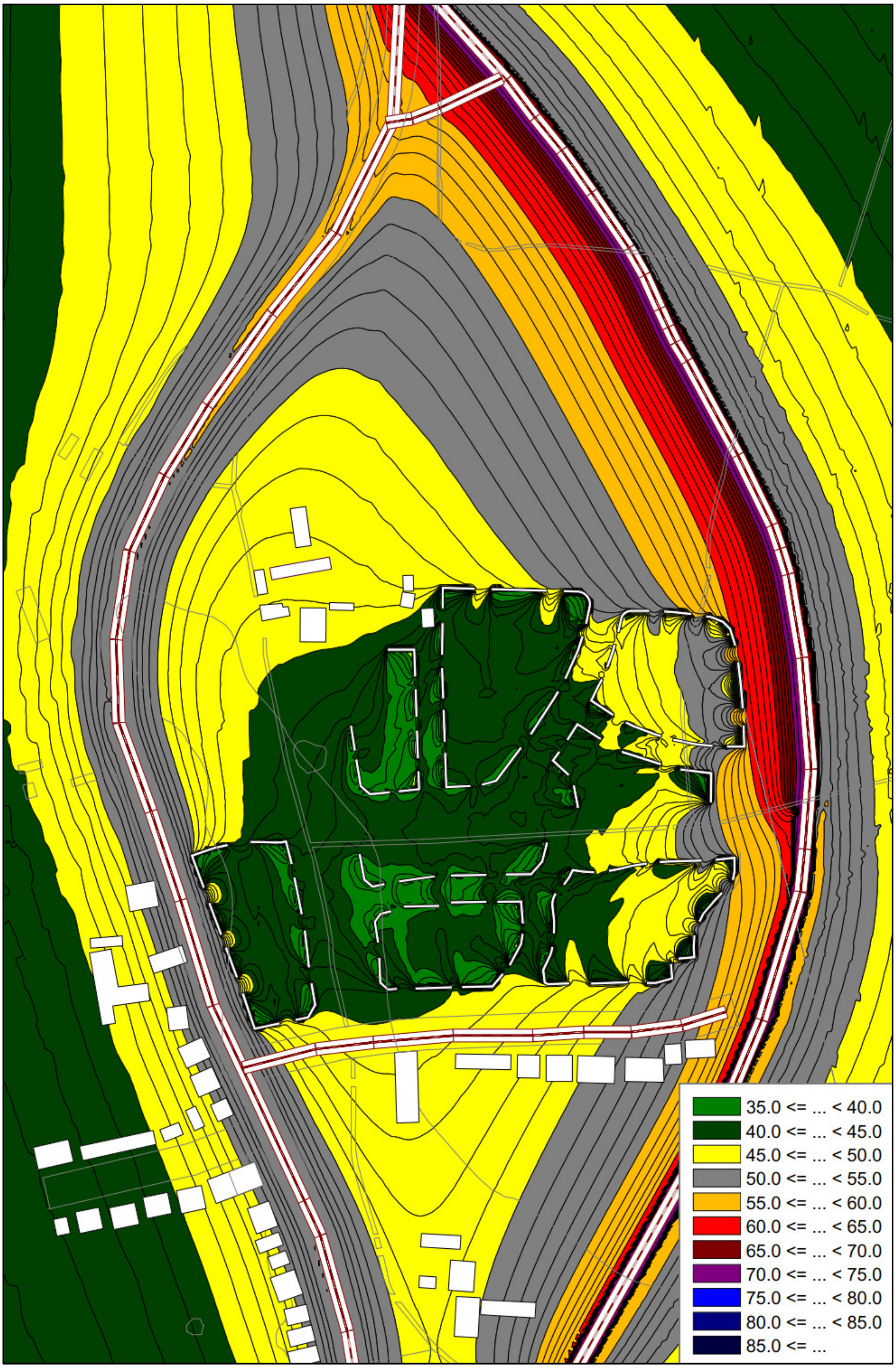


Figure 8 – Predicted 2036 Noise Contours – Indicative Development, Night-time, 4.5m

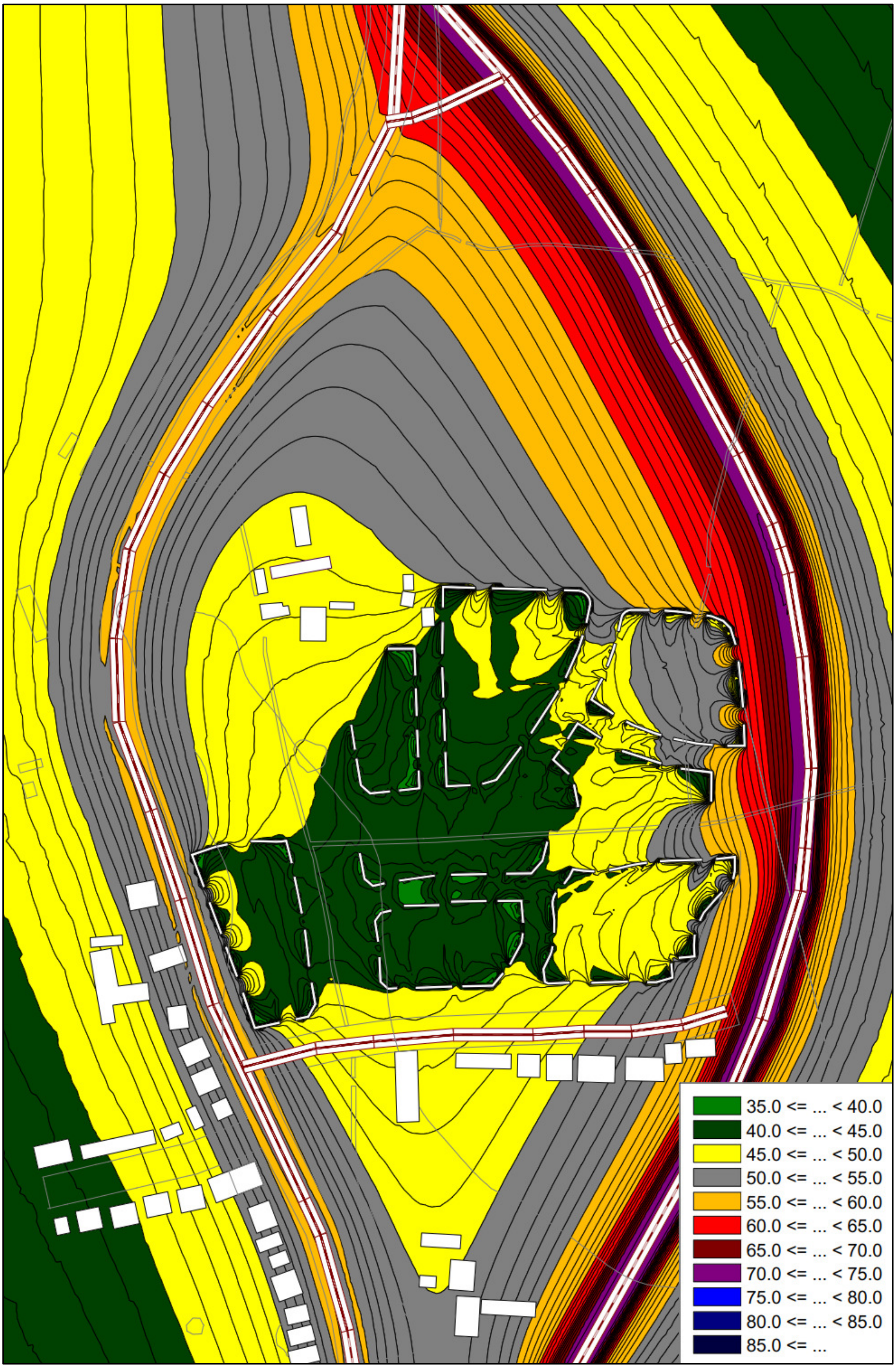
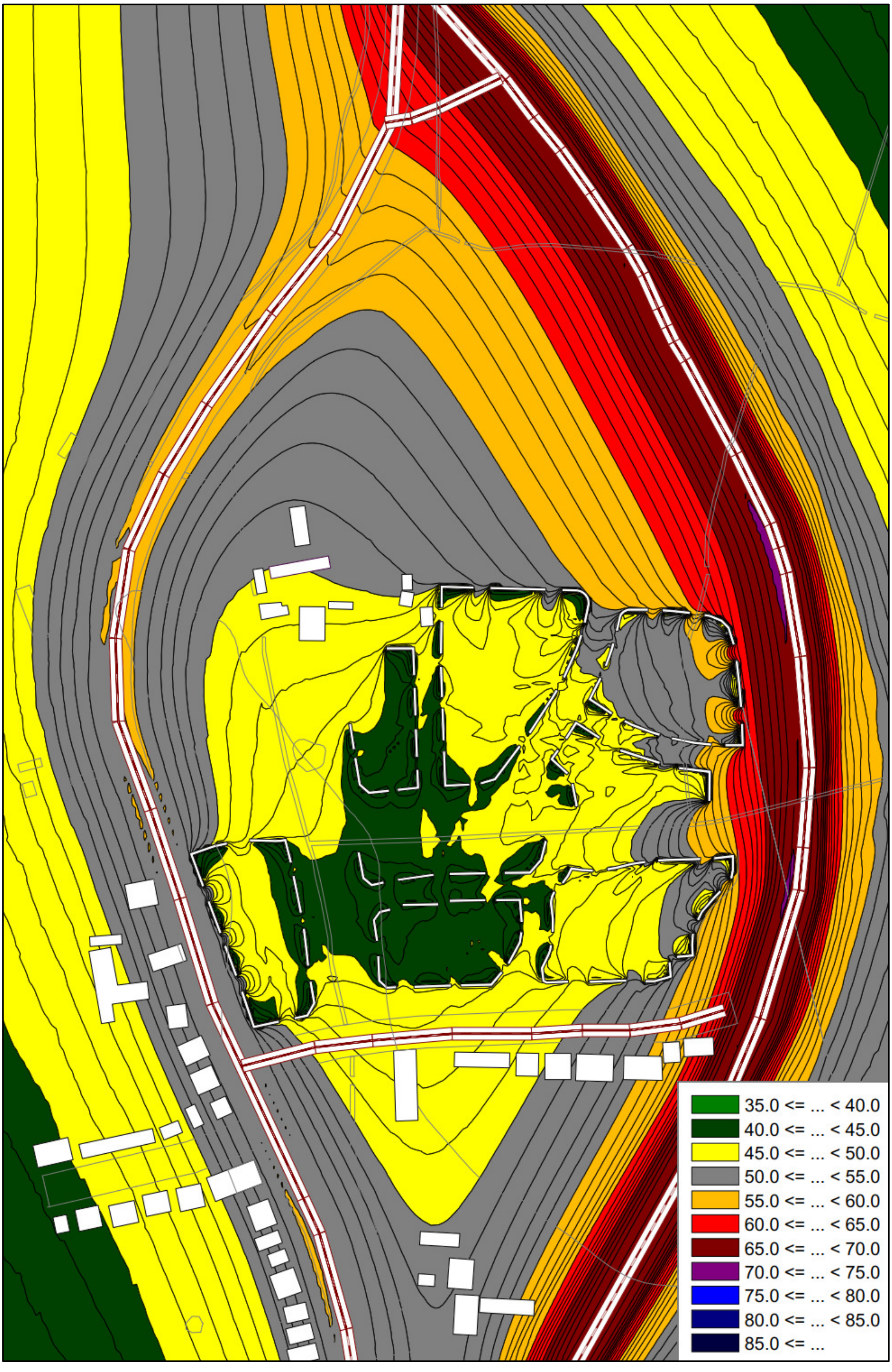


Figure 9 – Predicted 2036 Noise Contours – Indicative Development, Night-time, 7.5m



Appendix I – Noise Units & Indices

Sound and the decibel

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120dB (threshold of pain).

Due to the logarithmic nature of decibels, when two noises of the same level are combined together, the total noise level is (under normal circumstances) 3 dB(A) higher than each of the individual noise levels e.g. 60 dB(A) plus 60 dB(A) = 63 dB(A). In terms of perceived 'loudness', a 3 dB(A) variation in noise level is a relatively small (but nevertheless just noticeable) change. An increase in noise level of 10 dB(A) generally corresponds to a doubling of perceived loudness. Likewise, a reduction in noise level of 10 dB(A) generally corresponds to a halving of perceived loudness.

The ear is not equally sensitive to sound at all frequencies. It is less sensitive to sound at low and very high frequencies, compared with the frequencies in between. Therefore, when measuring a sound made up of different frequencies, it is often useful to 'weight' each frequency appropriately, so that the measurement correlates better with what a person would actually hear. This is usually achieved by using an electronic filter called the 'A' weighting, which is built into sound level meters. Noise levels measured using the 'A' weighting are denoted dB(A) or dBA.

Frequency and Hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kiloHertz (kHz), where 1 kHz = 1000 Hz.

Young people with normal hearing can hear frequencies in the range 20 Hz to 20 kHz. However, the upper frequency limit gradually reduces as a person gets older.

Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB(A) level. However, when the noise level varies with time, the measured dB(A) level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB(A) value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The indices used in this report are described below.

L_{Aeq} This is the A–weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, L_{Aeq} is the level of a continuous noise which has the same total (A–weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

L_{Amax} This is the maximum A–weighted noise level that was recorded during the monitoring period.

L_{A10} This is the A–weighted noise level exceeded for 10% of the time period. L_{A10} is usually used as a measure of traffic noise.