Noise Impact Assessment

Queens Road

Reference: 50-477-R3-2

Date: August 2024

NOISE IMPACT ASSESSMENT

Queens Road
Manchester

Prepared for:

Casey Group

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EXECUTIVE SUMMARY

BACKGROUND

Site Address	Queens Road, Manchester M40 8TQ
National Grid Reference	E 385957 N 400149
Proposed Development	Proposed residential development comprising 8 residential units along with access and landscaping.
Report Objectives	The objectives of this report are to: - Identify, measure and assess the potential impact of any existing noise sources in the immediate vicinity of the Site upon proposed residential receptors. The report follows current and relevant British Standards in order to provide a robust assessment.

ASSESSMENT

Surveys Completed	E3P have undertaken attended measurements of road traffic sound along Queens Road during a typical weekday period in accordance with Calculation of Road Traffic Noise. This has been supplemented by a recent 24-hour road and rail traffic survey on an adjacent site.
Assessments	A 3D noise model has been constructed to assess road and rail traffic sound across the site and incident upon facades and within external amenity areas. Road and rail traffic sound impact is assessed in accordance with the criterion, for day and night, given in BS 8233:2014+A1:2019.
Mitigation Requirements	The assessment has recommended higher specification glazing and provided advice on Part O requirements when windows are opened to mitigate overheating. Acoustic barriers are also required for certain plots where rear gardens have line of sight to Queens Road.

CONCLUSIONS

With mitigation measures in place, this assessment has shown that no adverse impact is predicted day or night at the receptors due to road and rail traffic sound.

As such, there are no noise related reasons why planning permission should not be granted from the proposed development as long as the recommendations of this report are followed and included within the design stage.

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1. INTRODUCTION

1.1. BACKGROUND

E3P were commissioned by Casey Group to undertake a Noise Impact Assessment for a proposed residential development on land off Queens Road in Manchester, to be referred to hereafter as '*the Site*'.

This assessment looks to determine the key noise sources in the immediate vicinity of the Site and to assess their impact, if any, upon proposed residential receptors and to specify mitigation measures, where required.

1.2. PROPOSED DEVELOPMENT

The client is proposing a residential development on existing disused land off Queens Road which includes 8 residential units along with access and landscaping.

The key sources of sound impacting upon the Site is road traffic associated with Queens Road.

The assessment has been undertaken in accordance with the following planning drawing:

- Proposed Plan and Massing for both sites.

1.3. LIMITATIONS

Where a noise or vibration survey is required to inform an assessment, E3P will endeavour to ensure that all noise and vibration measurements taken are robust, representative and reliable in order to inform an accurate assessment.

Where mitigation measures are specified in this report, it should be noted that these measures are relative to a specific sound or vibration source, both in terms of the measured sound pressure and vibration level and the character of the sound source. Where either the sound pressure level or the character of the sound varies following completion of the sound survey, E3P cannot be held responsible for any subsequent variations in the proposed mitigation performance.

2. ASSESSMENT METHODOLOGY

2.1. NATIONAL PLANNING POLICY FRAMEWORK

To prevent unacceptable risks from pollution, planning policies and decisions should ensure that new development is appropriate for its location. The effects (including cumulative effects) of pollution on health, the natural environment or general amenity, and the potential sensitivity of the area or proposed development to adverse effects from pollution, should be considered.

The national planning policy framework states that planning policies and decisions should aim to:

- Avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development.
- Mitigate and reduce to a minimum, other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions.
- Recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established.
- Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

2.2. NATIONAL PLANNING PRACTICE GUIDANCE

Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

Local planning authorities' plan-making and decision-making should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or is likely to occur.
- Whether or not an adverse effect is occurring or is likely to occur.
- Whether or not a good standard of amenity can be achieved.

In line with the explanatory note of the NPSE, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase, where applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

The "observed effect levels" are as follows:

- **Significant observed adverse effect level:** This is the level of noise exposure above which significant adverse effects on health and quality of life occur.
- **Lowest observed adverse effect level:** This is the level of noise exposure above which adverse effects on health and quality of life can be detected.
- **No observed effect level:** This is the level of noise exposure below which no effect at all on health or quality of life can be detected.

Table 2.1 summarises the noise exposure hierarchy, based on the likely average response.

TABLE 2.1 NOISE EXPOSURE HIERARCHY

PERCEPTION	EXAMPLES OF OUTCOMES	INCREASING EFFECT LEVEL	ACTION
Not Noticeable	No effect.	No observed effect	No specific measures required
Noticeable and Not Intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No observed adverse effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and Intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television, speaking more loudly, or having to close windows for some of the time because of the noise where there is no alternative ventilation. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed adverse effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and Disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion, having to keep windows closed most of the time because of the noise where there is no alternative ventilation. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant observed effect	Avoid
Noticeable and Very Disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening, loss of appetite, significant/medically definable harm (auditory and non-auditory).	Unacceptable adverse effect	Prevent

The subjective nature of noise means that there is not a simple relationship between noise levels and the impact on those affected. This will depend on how various factors combine in any situation. These factors include the following:

- The source and absolute level of the noise together with the time of day it occurs. Some types and level of noise will cause a greater adverse effect at night than if they occurred during the day. The adverse effect can also be greater simply because there is less background noise at night.
- For non-continuous sources of noise, the number of noise events, and the frequency and pattern of occurrence of the noise can be important.
- The spectral content of the noise and the general character of the noise. The local topology and topography should also be considered along with the existing and, where appropriate, the planned character of the area.

More specific factors to consider when relevant:

- Where applicable, the cumulative impacts of more than one source should be considered along with the extent to which the source of noise is intermittent and of limited duration.
- Consideration should also be given to whether adverse internal effects can be completely removed by closing windows and, in the case of new residential development, if the proposed mitigation relies on windows being kept closed most of the time. In both cases, a suitable alternative means of ventilation is likely to be necessary.
- If external amenity spaces are an intrinsic part of the overall design, then the acoustic environment of those spaces should be considered so that they can be enjoyed as intended.

2.3. BUILDING REGULATIONS: APPROVED DOCUMENT F – VOLUME 1: DWELLINGS (JUNE 2022)

Approved document F Volume 1: Dwellings (ADF) provides guidance set by the Department for Levelling Up, Housing and Communities, that relates to means of ventilation within dwellings. The ventilation strategy specified within the ADF are as follows.

> *1.9 The ventilation strategy in this approved document relies on a combination of all of the following.*
>
> *a. Extract ventilation from rooms where water vapour or pollutants are likely to be released (e.g. bathrooms and kitchens), to minimise their spread to the rest of the building. Ventilation fans may be either intermittent operation or continuous operation.*
>
> *b. Whole dwelling ventilation to provide fresh air to the building and to dilute, disperse and remove water vapour and pollutants not removed by extract ventilation.*
>
> *c. Purge ventilation to remove high concentrations of pollutants and water vapour. Purge ventilation is used intermittently and required only for pollutants produced by occasional activities (e.g. fumes from painting).*
>
> *1.10 Ventilation may be delivered through natural ventilation, mechanical ventilation or a combination of both.*

1.11 The ventilation systems in this approved document are examples of systems that comply with Part F of the Building Regulations. Other ventilation systems may be acceptable if they can be shown to meet an equal level of performance.

Within the ADF there are three system specific ventilation systems that can be utilised to provide sufficient ventilation. These methods are as follow.

1.Natural ventilation with background ventilators and intermittent extract fans (guidance suitable only for less airtight dwellings) - Ventilation provided by thermal, wind or diffusion effects through doors, windows or other intentional openings without the use of mechanically driven equipment. For the purposes of this approved document, natural ventilation refers to a ventilation strategy using background ventilators and intermittent extract ventilation.

2.Continuous mechanical extract ventilation - Mechanically driven ventilation that continuously extracts indoor air and discharges it to the outside.

3. Mechanical ventilation with heat recovery - A mechanically driven ventilation system that both continuously supplies outdoor air to the inside of the dwelling and continuously extracts indoor air and discharges it to the outside. For the purposes of this approved document, the guidance for mechanical ventilation with heat recovery applies to centralised or decentralised supply and extract systems, with or without heat recovery.

2.4. BUILDING REGULATIONS: APPROVED DOCUMENT O – OVERHEATING (JUNE 2022)

Approved document O - Overheating (ADO) provides guidance set by the Department for Levelling Up, Housing and Communities, that relates to the mitigation of overheating. In relation to noise the ADO provides the following guidance.

3.2 In locations where external noise may be an issue (for example, where the local planning authority considered external noise to be an issue at the planning stage), the overheating mitigation strategy should take account of the likelihood that windows will be closed during sleeping hours (11pm to 7am).

3.3 Windows are likely to be closed during sleeping hours if noise within bedrooms exceeds the following limits.

a. 40dB LAeq,T, averaged over 8 hours (between 11pm and 7am).
b. 55dB LAFmax, more than 10 times a night (between 11pm and 7am).

3.4 Where in-situ noise measurements are used as evidence that these limits are not exceeded, measurements should be taken in accordance with the Association of Noise Consultants'

Measurement of Sound Levels in Buildings with the overheating mitigation strategy in use.

NOTE: Guidance on reducing the passage of external noise into buildings can be found in the National Model Design Code: Part 2 – Guidance Notes (MHCLG, 2021) and the Association of Noise Consultants' Acoustics, Ventilation and Overheating: Residential Design Guide (2020)

2.5. MANCHESTER CITY COUNCIL PLANNING CONDITION

> *An acoustic assessment under the requirements of paragraph 180 of the National Planning Policy Framework, (Core Strategy DM1 and Saved Unitary Development Plan Policy DC26) which provides details of the existing noise levels in the area including levels during daytime, night time and weekends along with an indication of noise levels that you propose to achieve within the accommodation and details of the acoustic glazing and acoustically treated ventilation you propose to use and what measures will need to be implemented on site to meet internal noise requirements. In terms of the proposed uses, the study should identify the acoustic treatment and measures that will limit the breakout of noise in accordance with a noise study of the premises. The scheme proposed shall include measures such as acoustic lobbies at access and egress points of the premises, acoustic treatment of the building structure, sound limiters linked to sound amplification equipment, and specified maximum internal noise levels (Core Strategy DM1 and Saved Unitary Development Plan Policy DC26).*

The report addresses the above condition through the assessment and mitigation of noise. E3P note that it stipulates weekend noise levels should be assessed. However, considering the residential nature of the site area, no particular weekend sources are present with road traffic sound dominant and at a higher-level during weekday periods.

Furthermore, the proposed usage of the site is residential and so no consideration of proposed noise break-out is required.

2.6. BRITISH STANDARD BS 8233:2014+A1:2019 – GUIDANCE ON SOUND INSULATION AND NOISE REDUCTION FOR BUILDINGS

2.6.1. NOISE CRITERIA LIMITS

The scope of this standard is the provision of recommendations for the control of noise in and around buildings including residential dwellings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate.

The standard suggests suitable internal noise levels within different types of buildings, including residential dwellings, as shown in Table 2.2.

TABLE 2.2 BS 8233:2014 RECOMMENDED INTERNAL NOISE LEVELS

CRITERION	TYPICAL SITUATION	DESIGN CRITERION, $L_{Aeq,T}$ (dB)
Suitable Resting and Sleeping Conditions	Living Room	35
	Bedroom	30

BS 8233 goes on to recommend noise levels for gardens:

> *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 might be warranted.*

BS 8233 goes on to say:

> *In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.*

2.7. WORLD HEALTH ORGANISATION (WHO) – GUIDELINES FOR COMMUNITY NOISE

The WHO gives guidance on desirable levels of environmental noise. The levels presented in the WHO Community Guidelines are those at which adverse effects become measurable. The 1980 WHO document suggested that *"general daytime outdoor noise levels of less than 55 dB(A) $L_{eq,16hr}$ are desirable to prevent any significant community annoyance."* This level is an external free-field noise level. The 1980 document also stated in relation to internal levels, *"that night-time noise levels of 35 dB(A) $L_{eq,8hr}$ or less will not interfere with the restorative process of sleep"*.

A report was submitted to the WHO in 1995 for consideration as a revision to the 1980 document and revised community guidelines were issued in 2000. In the 2000 guidelines, it is considered that the sleep disturbance criteria should be taken as an internal noise level of 30 dB $L_{Aeq,8\ hr}$ or an external level of 45 dB $L_{Aeq,8\ hr}$. It also recommends that internal L_{Amax} levels of 45 dB and external L_{Amax} levels of 60 dB should be limited where possible.

3. SURVEY RESULTS

3.1. ROAD TRAFFIC SOUND MEASUREMENT – QUEENS ROAD

E3P have undertaken a road traffic sound survey in accordance with the shortened measurement procedure given in Calculation of Road Traffic Noise (CRTN) during a typical weekday period. The survey was undertaken during the following period:

- 13:30-16:30 Thursday 11th November 2021.

The following noise measurement position was chosen for the Road Traffic Noise Survey:

- Noise Measurement Position 1 (NMP1): Located on the western boundary of the Palgrave Avenue Site to the north, approximately 10 m from the roadside edge. The microphone was located at a height of 1.5 m above ground level and in free-field conditions. Sound sources consisted of road traffic along Queens Road.

Table 3.1 details the measured sound pressure levels.

TABLE 3.1 MEASURED ROAD TRAFFIC SOUND LEVELS – QUEENS ROAD

MEASUREMENT START TIME	MEASURED SOUND PRESSURE LEVELS (dB)			
	$L_{Aeq,T}$	10th Highest $L_{Amax,fast}$	$L_{A90,T}$	$L_{A10,T}$
13:30	65.8	77.1	55.0	69.2
14:30	65.3		54.9	68.7
15:30	65.5		53.5	68.8
Derived Daytime Noise Level, $L_{Aeq,16hr}$				**65.9**
Derived Night-time Noise Level, $L_{Aeq,8hr}$				**57.3**

During the survey, conditions remained dry and wind speeds rarely exceeded 5 m/s. The equipment outlined in Table 3.2 was used for the noise survey.

TABLE 3.2 NOISE MEASUREMENT EQUIPMENT AND CALIBRATION DATES

MEASUREMENT POSITION	EQUIPMENT DESCRIPTION	MANUFACTURER & TYPE NUMBER	SERIAL NUMBER	CALIBRATION DUE DATE AT TIME OF SURVEY
NMP1	Sound Level Meter	Norsonic Nor145	14529152	18th June 2023
	Pre-amplifier	Norsonic Nor1209	22293	
	Microphone	Norsonic Nor1227	332220	
	Calibrator	Norsonic Nor1255	125525208	18th June 2022

The sound level meter was field calibrated on site using the above-mentioned calibrator prior to and after noise measurements were taken. No significant drift was witnessed as noted above. Calibration certificates are available upon request.

Following submission, MCC requested that night-time measurements be conducted for Queens Road. However, E3P are in possession of 24-hour road traffic data for Queens Road, collected as part of a development to the south of the Site. The survey was conducted in January 2024 from 11:00 on Monday 15th to 11:00 on Tuesday 16th at a distance of 12 m from the nearside edge of Queens Road to the immediate south of existing receptors. The resultant measured values were 64.7 dB during the day and 60.3 dB during the night. As such, these values will be used to inform the assessment. The daytime is comparable to that measured above when distance corrected.

This position, although to the south of this development is considered representative as no major junctions exist between the NMP and the site and traffic conditions are considered to be the same at these two positions with flows and speeds representative.

The data is shown below.

TABLE 3.2 MEASURED ROAD TRAFFIC SOUND LEVELS – QUEENS ROAD – JANUARY 2024

MEASUREMENT START TIME	MEASURED SOUND PRESSURE LEVELS (dB)			
	$L_{Aeq,T}$	10th Highest $L_{Amax,fast}$	$L_{A90,T}$	$L_{A10,T}$
15/01/2024 11:00	64.9	N/A	57.4	67.4
15/01/2024 12:00	64.7		55.6	67.4
15/01/2024 13:00	64.8		56.4	67.6
15/01/2024 14:00	64.9		57.0	67.5
15/01/2024 15:00	64.6		55.9	67.2
15/01/2024 16:00	64.9		59.0	66.9
15/01/2024 17:00	64.8		57.8	67.2
15/01/2024 18:00	66.7		56.9	67.8
15/01/2024 19:00	65.0		57.0	67.8
15/01/2024 20:00	64.2		55.1	67.1
15/01/2024 21:00	63.5		51.0	67.0
15/01/2024 22:00	62.3		47.0	66.1
15/01/2024 23:00	60.7	73.9	45.9	64.7
16/01/2024 00:00	59.4		43.2	63.7
16/01/2024 01:00	58.2		42.4	63.1
16/01/2024 02:00	56.5		41.4	61.6
16/01/2024 03:00	56.7		41.7	61.4
16/01/2024 04:00	58.6		41.3	62.1
16/01/2024 05:00	61.0		43.9	65.5
16/01/2024 06:00	64.6		51.3	67.8
16/01/2024 07:00	63.5		53.2	66.9
16/01/2024 08:00	65.0		56.1	67.3

MEASUREMENT START TIME	MEASURED SOUND PRESSURE LEVELS (dB)			
	$L_{Aeq,T}$	10th Highest $L_{Amax,fast}$	$L_{A90,T}$	$L_{A10,T}$
16/01/2024 09:00	65.0		55.4	67.9
16/01/2024 10:00	65.1		57.3	67.7
Derived Daytime Noise Level, $L_{Aeq,16hr}$				**64.7**
Derived Night-time Noise Level, $L_{Aeq,8hr}$				**60.3**

In addition to this, MCC have requested that the railway line to the south is considered. As such, the survey undertaken for the same site above for the railway line has been used which was measured during the same period at a distance of 19 m from the closest rail and sufficient distance from Queens Road to limit any extraneous noise.

The data is shown below.

TABLE 3.3 MEASURED RAIL TRAFFIC SOUND LEVELS – JANUARY 2024

MEASUREMENT START TIME	MEASURED SOUND PRESSURE LEVELS (dB)			
	$L_{Aeq,T}$	10th Highest $L_{Amax,fast}$	$L_{A90,T}$	$L_{A10,T}$
15/01/2024 10:00	59.2	N/A	45.6	53.7
15/01/2024 11:00	59.2		44.5	56.0
15/01/2024 12:00	58.5		42.8	51.2
15/01/2024 13:00	59.4		42.6	51.0
15/01/2024 14:00	59.4		42.2	51.6
15/01/2024 15:00	60.0		41.5	53.6
15/01/2024 16:00	58.4		43.4	51.2
15/01/2024 17:00	58.2		42.6	47.9
15/01/2024 18:00	58.0		42.2	50.7
15/01/2024 19:00	58.0		43.0	48.1
15/01/2024 20:00	59.7		42.6	52.0
15/01/2024 21:00	59.8		41.1	51.9
15/01/2024 22:00	59.3		40.4	54.3
15/01/2024 23:00	59.5	78.4	39.8	55.0
16/01/2024 00:00	54.8		38.9	46.3
16/01/2024 01:00	57.5		37.9	42.3
16/01/2024 02:00	52.1		35.8	39.0
16/01/2024 03:00	54.3		35.6	39.1
16/01/2024 04:00	53.8		35.6	40.0

MEASUREMENT START TIME	MEASURED SOUND PRESSURE LEVELS (dB)			
	$L_{Aeq,T}$	10th Highest $L_{Amax,fast}$	$L_{A90,T}$	$L_{A10,T}$
16/01/2024 05:00	56.2		37.4	53.9
16/01/2024 06:00	58.1		43.8	52.3
16/01/2024 07:00	60.2	N/A	44.9	50.8
16/01/2024 08:00	59.3		47.0	53.5
16/01/2024 09:00	56.8		47.0	52.3
Derived Daytime Noise Level, $L_{Aeq,16hr}$				**59.0**
Derived Night-time Noise Level, $L_{Aeq,8hr}$				**56.4**

4. NOISE IMPACT ASSESSMENT

For the purposes of this assessment, E3P has used noise modelling software, CadnaA 2024 MR1, to determine the impact of noise from road and rail traffic sound.

The following inputs have been included in the model:

- Proposed Plan and Massing.
- Site elevations have been taken as existing by way of a 2 m grid Digital Terrain Model (DTM) which contains public sector information licensed under the Open Government License v3.0.
- A reflection order of 2 has been used in all calculations.
- Noise levels generated using ISO 9613-1 and ISO 9613-2 "*Acoustics – Attenuation of sound during propagation outdoors*" as incorporated into CadnaA software.

Figures 2 and 3 determine the noise levels across the Site during the daytime and night-time periods, respectively, due to road and rail traffic.

4.1. EXTERNAL AMENITY AREA NOISE LEVEL ASSESSMENT

The noise model has been used to predict noise levels in external amenity areas. The predicted levels range from 45 to 65 dB in these areas.

As such, the predicted levels are considered acceptable and fall within the design range given in BS 8233:2014 with no adverse impact predicted in most gardens. Therefore, no mitigation measures are required.

However, the gardens exposed to Queens Road to the north west and south east are subject to noise levels of up to 65 dB. As such, acoustic barriers are required for this garden area and are discussed in Section 5.0.

4.2. INTERNAL NOISE LEVEL ASSESSMENT

With regards internal noise levels, E3P has assumed a standard glazing specification of 4 mm glass/20 mm air space/4 mm glass affords sound insulation performance in the order of 31 dB however this is for a pink noise spectrum. The same unit, weighted for road traffic noise using the '+C_{tr}' correction, has a sound insulation performance value of approximately 25 dB and so this value has been used to calculate internal noise levels.

The model has been used to predict façade noise levels at all floors on façade orientations. In order to determine any requirements for mitigation, E3P has added the reduction provided by the glazing (25 dB) to the relevant criterion for day (35 dB) and for night (30 dB). As such, any facades subject to noise levels higher than 60 dB during the day and/or 55 dB during the night will require higher specification glazing.

The highest predicted day and night façade levels here are 68 dB and 62 dB respectively. As such, higher specification glazing is required for all western habitable room windows.

It is also important to consider the maximum noise levels during the night-time period. The 10th highest measured level was 74 dB $L_{Amax,fast}$ noted at 12 m. This level is distance corrected to the closest facades, resulting in a predicted external noise level of 80 dB. When considering a sound reduction of 31 dB for standard glazing, this results in an internal noise level of 49 dB, 4 dB in exceedance of the criterion.

With regards opening windows, there is a requirement to consider the need to open windows for ventilation and the mitigation of overheating. At this stage, the assessment assumes that ventilation would be provided by way of extract fans in kitchens and bathrooms and openable windows.

4.2.1. VENTILATION CONDITION

It is assumed that the developer would be installing a whole dwelling ventilation system in accordance with Part F of the Building Regulations.

Where background ventilators form part of the system, consideration is required to the sound reduction provided by these when in the open position and, as such, are discussed in Section 6.0.

4.2.2. OVERHEATING CONDITION

E3P has considered the potential impact of noise, internally, should windows be opened to mitigate overheating, as per the criteria stipulated in ADO. Any plots/facades that pass this test can open windows for this without resulting in unacceptable internal noise levels. Those that fail the test would be subject to a Part O Overheating Assessment by a suitably qualified consultant.

Part O only applies to bedrooms at night in relation to the average 8-hour noise level and 10th highest maximum noise level.

Given that the site is within a moderate risk location, as per guidance within Approved Document O the external noise limit threshold is 49 dB during the night-time ($L_{Aeq,8hr}$) and 64 dB more than 10 times a night ($L_{Af,max}$).

As can be seen from Figure 4, all plots will experience an exceedance of the above criterion on at least one façade. As such, a full overheating assessment in accordance with the guidelines indicated in Part O is required for these plots. A full overheating assessment should be carried out by a suitable qualified consultant. The plots which have facades above the Part O criterion are highlighted in red on Figure 4.

5. MITIGATION

5.1. ACOUSTIC BARRIERS

The previous section determined that the rear gardens of the two side on plots would experience noise levels of up to 65 dB. As such, acoustic barriers are required for these gardens in order to achieve, at most, 55 dB.

An additional grid noise map has been run with 2.1 m high close boarded fences in place, see Figure 5. As shown, this barrier achieves the required criterion in the garden with noise levels reduced to, at most, 55 dB.

The barriers must be of wooden fence or brick wall construction, be free from holes, sealed at the base and have a minimum mass of 10 kg/m^2.

5.2. FAÇADE INSULATION

The previous section determined that habitable room windows fronting Queens Road would require higher specification glazing. As such, the below is required to all living room and bedroom windows located on southern, western or northern elevations of all plots:

- The glazing must achieve 35 dB R_w and 33 dB $R_w + C_{t,r}$ reduction. An example specification would be 6 mm glass / nominal air space / 6.8 Pilkington Optiphon glass (38 dB R_w (-2;-5)).

Where a different specification is used, it is important the glazing achieves, as a minimum, the above R_w and $R_w + C_{t,r}$ reductions.

It is assumed a whole dwelling ventilation system in accordance with Part F would be installed across the site. In order to achieve the required internal ambient noise levels, any background ventilators must achieve at least 33 dB $D_{n,e,w} + C_{t,r}$ in the open position. This level of reduction is likely to be achieved by a standard background ventilator. The number of background ventilators per room will be dependent on the requirements given in Building Regulations Part F.

However, as noted in Figure 4, certain plots would experience an exceedance of the Part O criterion should bedroom windows be opened at night. As such, a Part O overheating assessment is required to be undertaken by a suitably qualified individual to consider whether the proposed ventilation system is sufficient when considering this constraint.

6. CONCLUSION AND RECOMMENDATIONS

E3P were commissioned by Casey Group in order to undertake a Noise Impact assessment for a proposed residential development at Queens Road in Manchester.

Attended road traffic measurements have been undertaken in order to determine the impact of the sound sources upon the Site. This is supplemented by data collected in January 2024 for an adjacent site which included 24-hour road and rail measurements.

A 3D noise model has been constructed to assess road and rail traffic sound impact and is assessed in accordance with the criterion, for day and night, given in BS 8233:2014+A1:2019.

The assessment has recommended that higher specification glazing be installed for all plots on exposed facades and that a Part O overheating assessment would need to consider western elevation bedroom windows to be closed at night.

Two 2.1 m high acoustic barriers are also required for two plots.

With mitigation measures in place, this assessment has shown that no adverse impact is predicted day or night at the receptors due to road traffic sound.

As such, there are no noise related reasons why planning permission should not be granted from the proposed development as long as the recommendations of this report are followed and included within the design stage.

END OF REPORT

APPENDIX I
GLOSSARY OF ACOUSTIC TERMINOLOGY

NOISE

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source. The most widely used weighting mechanism that best corresponds to the response of the human ear is the "A"-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq}, L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective but, as a general guide, a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions. An indication of the range of sound levels commonly found in the environment is given in the following table.

TABLE A1 TYPICAL SOUND PRESSURE LEVELS

SOUND PRESSURE LEVEL	LOCATION/EXAMPLE
0	Threshold of hearing
20–30	Quiet bedroom at night
30–40	Living room during the day
40–50	Typical office
50–60	Inside a car
60–70	Typical high street
70–90	Inside a factory
100–110	Burglar alarm at 1 m away
110–130	Jet aircraft on take off
140	Threshold of pain

ACOUSTIC TERMINOLOGY

TABLE A2 TERMINOLOGY

DESCRIPTOR	EXPLANATION
dB (decibel)	The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2E-05 Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. "A" weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq, T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the "fast" sound level meter response.
L_{10} and L_{90}	If a non-steady noise is to be described, it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the "average maximum level". Similarly, L_{90} is the "average minimum level" and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and away from buildings.
Fast	A time weighting used in the root-mean-square section of a sound level meter with a 125-millisecond time constant.
Slow	A time weighting used in the root-mean-square section of a sound level meter with a 1000-millisecond time constant.

APPENDIX II
FIGURES

Figure 1 - Noise Survey Measurement Positions

Project:
Queens Road

Project-No:
50-477

Client:
Casey Group

N

e3p

Project Engineer: L Faulkner
Date: 13/08/2024

Figure 2 - Daytime Grid Noise Map - Calculation at 1.5 m above ground level

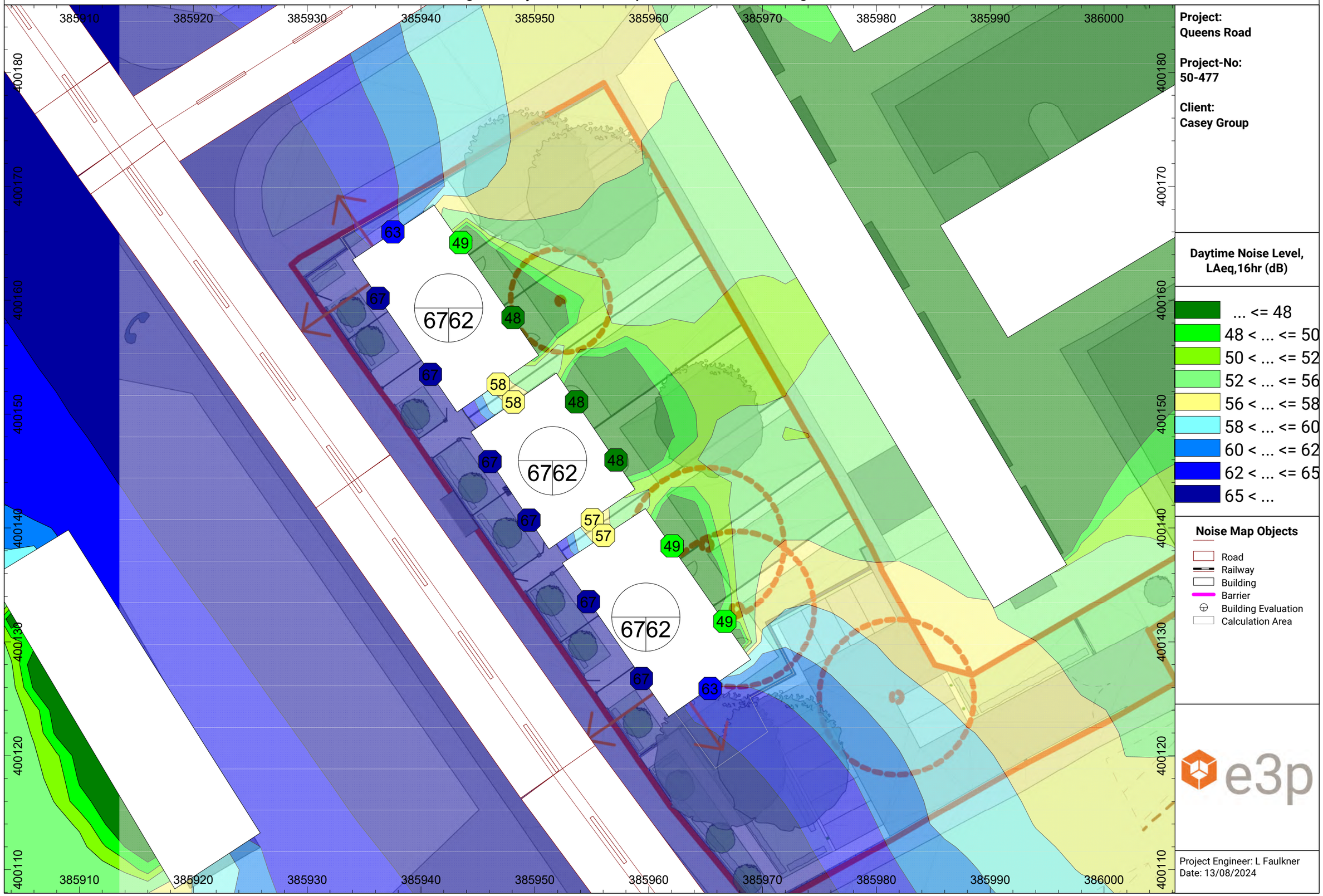

Figure 3 - Night-time Grid Noise Map - Calculation at 4 m above ground level

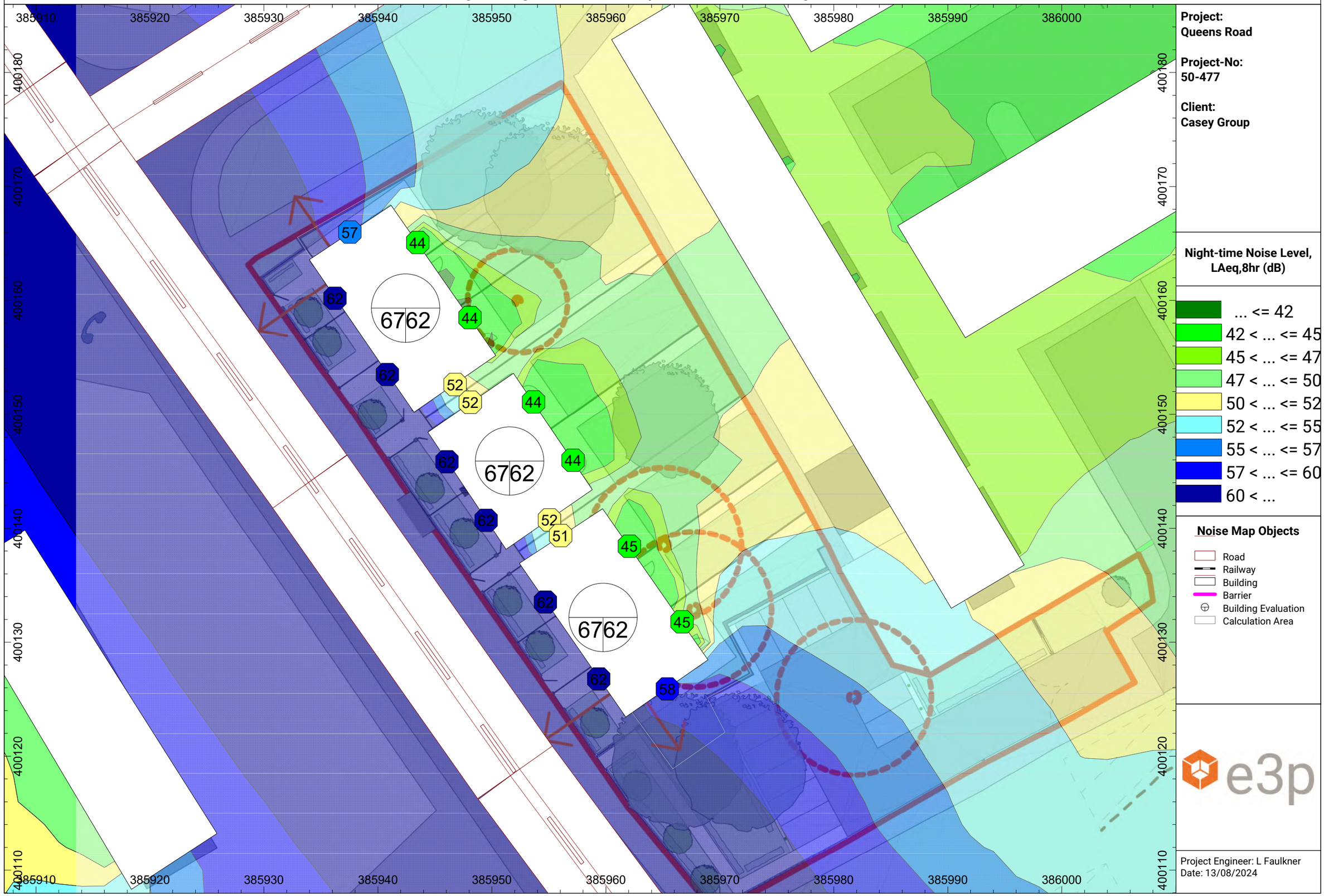

Figure 4 - Night-time Part O Requirements

Project:
Queens Road

Project-No:
50-477

Client:
Casey Group

Night-time Noise Level, LAeq,8hr (dB)

... <= 49.0

49.0 < ...

Noise Map Objects

- Road
- Railway
- Building
- Barrier
- Building Evaluation
- Calculation Area

Project Engineer: L Faulkner
Date: 13/08/2024
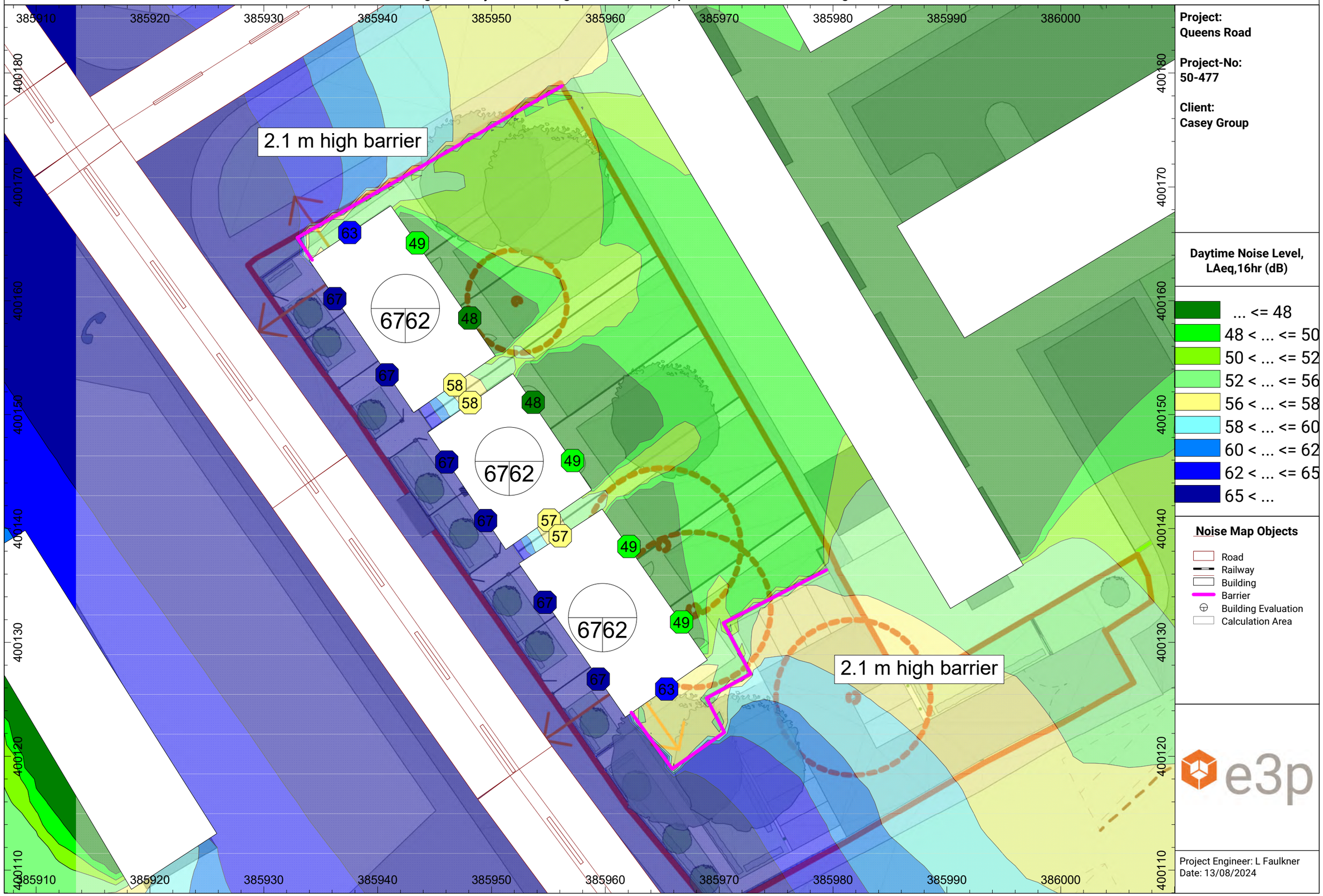
Figure 5 - Daytime with Mitigation Grid Noise Map - Calculation at 1.5 m above ground level