



Noise Impact Assessment

Acornfield Phase 2, Knowsley

Reference: 50-910-R1-2

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NOISE IMPACT ASSESSMENT

**Acornfield Phase 2,
Knowsley**

Prepared for:

Prime Property Consultancy Ltd

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EXECUTIVE SUMMARY

BACKGROUND

Site Address	Acornfield Road, Liverpool, L33 7SY
National Grid Reference	E 343609 N 398600
Proposed Development	Erection of four industrial/commercial units, with associated car parking and landscaping.
Report Objectives	To identify, measure and assess the potential impact of the proposed commercial development upon existing residential receptors in the immediate vicinity of the Site. The report follows current and relevant British Standards in order to provide a robust assessment.

ASSESSMENT

Surveys Completed	E3P had undertaken unattended weekday and weekend background sound survey in a position considered representative of the closest existing residential receptors to the development for Phase 1 of the development, this previously measured data has been used for this assessment. The sound level meter was located along the western boundary of the site in a position representative of the closest receptors located on Farnworth Street.
Assessments	E3P has undertaken detailed 3D noise modelling of all the proposed sources in order to predict noise levels at ground and 1st floor windows for the daytime and night-time periods respectively, in accordance with BS 4142:2014+A1:2019, at the closest receptors to the site. The assessment has shown that the predicted rating level falls well below the background sound level during daytime and night-time periods. Furthermore, acceptable internal noise levels can be achieved at receptors in respect of suitable sleeping conditions. This assessment has shown that there should be no adverse impact upon existing residential receptors due to the proposed operations.
Mitigation Requirements	No mitigation measures are required.

CONCLUSIONS

The assessment has shown that the predicted rating level would fall below the background sound levels at the closest receptors, day and night. As such, no adverse impact is predicted, especially considering the context of the area and the existing commercial sound impacting upon the receptors.



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1. INTRODUCTION

1.1. BACKGROUND

E3P were commissioned Prime Property Consultancy Ltd to undertake a Noise Impact Assessment for the proposed commercial development at Acornfield Road in Knowsley, to be referred to hereafter as 'the site'.

This assessment looks to determine the key noise sources associated with the development and undertake an assessment of any impacts upon existing noise sensitive receptors.

1.2. PROPOSED DEVELOPMENT

The Site is an active industrial/commercial estate in a mixed-use area. The proposed development will comprise of 4 new multi let industrial units with associated yard frontage and car parking.

The key sources of sound associated with the development will be, HGV delivery operations, noise break-out from the units and car park usage.

This assessment has been undertaken in accordance with the following supplied drawings:

-  Phase 2 - Proposed Site Plan (PPC59 / F010) dated received 3rd October 2023.

The Proposed Site Plan is shown in Figure 2 & 3 of Appendix II.

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 at the time.

E3P will endeavour to capture all existing and proposed sources of sound and vibration at the time of the surveys and/or assessments. However, should new sources of sound be introduced, existing sources modified/changed, or characteristics of the sound be altered following completion of such, E3P cannot be held accountable for this.

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, for either absolute levels or frequency content.



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. BS 4142: 2014+A1:2019 'METHODS FOR RATING AND ASSESSING INDUSTRIAL AND COMMERCIAL SOUND'

This standard describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- ✿ Sound from industrial and manufacturing processes.
- ✿ Sound from fixed installations which comprise mechanical and electrical plant and equipment.
- ✿ Sound from the loading and unloading of goods and materials at industrial and / or commercial premises; and
- ✿ Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

The procedure detailed in the standard compares the measured or predicted specific noise level from any of the above with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is typical.

The specific noise level also acknowledges the reference time intervals depending upon whether the noise source operates during daytime (1-hour) or night-time (15-minute) periods.



There are several 'penalties' which can be attributed to the specific sound level depending upon the 'acoustic features' of the sound level under investigation as follows:

Tonality

-  +2 dB: where the tonality is just perceptible.
-  +4 dB: where the tonality is clearly perceptible; and
-  +6 dB: where the tonality is highly perceptible.

Impulsivity

-  +3 dB: where the impulsivity is just perceptible.
-  +6 dB: where the impulsivity is clearly perceptible; and
-  +9 dB: where the impulsivity is highly perceptible.

Intermittency

-  +3dB: where the intermittency is readily distinctive against the acoustic environment.

In addition to the above, there is a penalty for 'other sound characteristics' of +3 dB where a sound exhibits characteristics that are neither tonal nor impulsive, though are readily distinctive against the acoustic environment. BS 4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

Assessment of the rating level relative to the background sound level can yield the following commentary:

-  Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of impact.
-  A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
-  A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context; and
-  The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

It is common that a Local Planning Authority (LPA) will specify their own criterion and, where this is the case, this criterion will usually take precedence over a simple comparison of the rating level against the background sound level.



3. SURVEY RESULTS

E3P has previously undertaken a full weekday and weekend background for Phase 1 of the development located directly to the north of the site. As such, E3P have used the previously measured background sound levels for the assessment. The report the below data is taken from is as follows '50-081-R1-1 - Noise Impact Assessment - Draw Well Road, Knowsley'.

3.1. UNATTENDED BACKGROUND AND AMBIENT SOUND SURVEY

As the proposed development can operate 24 hours per day over 7 days, E3P has conducted a full weekday and weekend Background Sound Survey to quantify the existing levels of background sound at the closest non-associated residential receptors to the development. The survey was carried out over the following period:

 10:15 Thursday 14th May to Monday 18th May 2020.

The following noise measurement position was chosen for the Background Sound Survey:

 Noise Measurement Position 1 (NMP1): Located within the site boundary in the north western area of the site. A position close to the receptors to the east and south was not possible to leave a meter unattended. However, the lowest measured levels will be used for daytime and night-time to inform a worst-case assessment. Dominant sources of noise included road traffic and existing commercial sound in the immediate vicinity.

Table 3.1 details the range and median measured background sound levels. The daytime levels correspond to the $L_{A90,1hr}$ and the night-time levels to the $L_{A90,15mins}$. The lowest measured levels are displayed. The levels to be used in the assessment are the lowest measured over the entire period and correspond to the most robust and worst-case assessment possible.

TABLE 3.1 MEDIAN AND RANGE OF MEASURED BACKGROUND SOUND PRESSURE LEVELS

DATE	TIME PERIOD	RANGE OF MEASURED BACKGROUND SOUND PRESSURE LEVELS, $L_{A90,T}$ (dB)	LOWEST MEASURED BACKGROUND SOUND PRESSURE LEVELS, $L_{A90,T}$ (dB)
THURSDAY 14th MAY 2020	10:15–23:00	40-44	40
	23:00–07:00	40-42	40
FRIDAY 15th MAY 2020	07:00–23:00	41-47	41
	23:00–07:00	38-41	38
SATURDAY 16th MAY 2020	07:00–23:00	35-43	35
	23:00–07:00	35-39	35
SUNDAY 17th MAY 2020	07:00–23:00	38-42	38
	23:00–07:00	38-41	38

Weather forecasts were monitored throughout the survey to ensure no adverse conditions occurred during the survey. Conditions remained dry and wind speeds rarely exceeded 10mph.



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	Cirrus CR:171B	G301925	27th November 2022
	Pre-amplifier	Cirrus MV:200F	10730F	
	Microphone	Cirrus MK:224	213437D	
	Calibrator	Cirrus CR:515	93700	27th November 2021

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



4. NOISE IMPACT ASSESSMENT

This assessment has made assumptions on the sources of sound relating to the development, to predict the noise level impact on the existing closest residential dwellings during the daytime and night-time periods. At this stage, it is assumed that all units will operate 24/7.

With regard to assumptions for the assessment, the following has been considered for the full planning application aspects:

- ✿ Ground 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.
- ✿ The daytime period has been assessed between the hours of 07:00 to 23:00. For the assessment, BS 4142:2014+A1:2019 has been used to determine the likelihood of adverse impact within the garden areas over a reference time period of 1 hour.
- ✿ The night-time period has been assessed between the hours of 23:00 and 07:00 for a reference time period of 15 minutes.
- ✿ During the daytime periods, it is assumed, that roller shutters to each of the units are open. During the night-time, roller shutters are assumed to be closed.
- ✿ During the daytime periods, it is assumed, in order to inform a worst-case assessment, that a HGV will be in attendance at each loading bay at once with HGVs driving up and reversing into the bays and then unloading/loading activities then taking place. At night-time it is assumed half the amount of loading bays will be in use. A sound power level of 75.9 dBA has been used for the loading bays, this is from previous historic data captured by E3P.
- ✿ Noise breakout from the façades of the proposed units has been input into the model as vertical area sources; and
- ✿ Soft ground attenuation has been applied, where necessary.

At this stage, the exact noise sources for the proposed development are not known. As such, the only viable sources that can be modelled, in addition to the proposed HGV loading and unloading activities are breakout noise and car park usage. Advice is provided on fixed plant sound. Noise sources associated with Phase one of the development have been included within the model, this can be considered worst case.

With regards to B2 usage, this is generally industrial in nature and there could be any noise source associated with this, but all operations not assessed here or advised upon would be internal only. Given that a minimum sound reduction of 31 dB is expected for a typical industrial building facade and that it is highly unlikely that internal operations at any unit would exceed 80 dB inside, external noise levels at the facades are expected to be, at most, 43 dB radiating from the façade itself. Roller shutter entrances are assumed to be open with a vertical area source sound power level of 74 dB. A simple equation of Sound pressure level outside = Sound pressure level inside – Sound Reduction Index (SRI) of building envelope – 6 dB for diffuse field to free-field correction.

For the BS 4142:2014+A1:2019 assessments, penalties are applied to the specific sound level in order to provide the rating level. These penalties relate to the acoustic features of the sound source. However, the proposed usage does not differ from the existing sources of sound and, as such, the character of the proposed sound climate would not differ to that that currently exists. As such, no corrections are applied.



4.1. DAYTIME ASSESSMENT

Table 4.1 details the resultant rating level at each receptor, output from the model. The grid noise map can be seen in Figure 2 of Appendix II.

The lowest measured background sound level during the daytime periods have been used for each corresponding receptor. This informs a worst-case assessment. Levels correspond to worst case garden noise levels.

TABLE 4.1 BS 4142:2014+A1:2019 ASSESSMENT - DAYTIME

RECEPTOR	CALCULATED RATING LEVEL, $L_{A,r}$ (dB)	LOWEST MEASURED BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)	CRITERION, $L_{A,r} = L_{A90} - 5$ dB (dB)	DIFFERENCE +/- (dB)
Eastern Receptor	17	35	30	-13
Southern Receptors	14	35	30	-16

Table 4.1 indicates that the predicted rating level falls below the required criterion. As such, no consideration towards mitigation measures is required.

4.2. NIGHT-TIME ASSESSMENT

The noise model has been used to predict the rating level at the receptors during the night-time period. Table 4.2 details the calculated rating level at the receptors and compares the rating level with the background sound level. Levels here correspond to façade levels.

TABLE 4.2 BS 4142:2014+A1:2019 ASSESSMENT – NIGHT-TIME

RECEPTOR	CALCULATED RATING LEVEL, $L_{A,r}$ (dB)	LOWEST MEASURED BACKGROUND SOUND LEVEL, $L_{A90,1hr}$ (dB)	CRITERION, $L_{A,r} = L_{A90} - 5$ dB (dB)	DIFFERENCE +/- (dB)
Eastern Receptor	9	35	30	-21
Southern Receptors	7	35	30	-23

Table 4.3 indicates that the predicted rating level falls below the required criterion. As such, no consideration towards mitigation measures is required.



4.3. PROPOSED FIXED PLANT

At the time of submission, details of proposed fixed plant items were unknown. As such, the following recommendations have been made:

-  Any fixed plant items should be located within the site and not at the rear of the facades as, more often than not, these facades face noise sensitive receptors.
-  The resultant rating level from the cumulative impact of all proposed fixed plant items must not exceed the existing background sound levels, accounting for the above proposed noise levels, at the closest receptors.

It is assumed that any fixed plant items proposed would have a low noise level and most likely will consist of A/C units. Considering the typical noise levels of these units and the surrounding existing usage, the impact of these would be negligible.

Where this is not the case, it is recommended that an acoustician is involved to ensure the plant to be installed will not adversely affect the receptors.



5. CONCLUSION AND RECOMMENDATIONS

E3P were commissioned by Prime Property Consultancy to undertake a Noise Impact Assessment for a proposed commercial development on land off Acornfield Road in Knowsley.

A full weekday and weekend background sound survey was previously undertaken for phase 1 of the development in a position considered representative of the closest existing residential receptor to the east and south, with the lowest measured levels used to inform a worst-case assessment.

E3P has undertaken detailed 3D noise modelling of all the proposed sources to predict noise levels at garden areas and facades of existing dwellings for the daytime and night-time periods, in accordance with BS 4142:2014, at the closest receptors.

The assessment has determined that the predicted rating levels would fall well below the lowest measured background sound levels with no adverse impact predicted. Indeed, the rating levels are sufficiently low so as not to be audible at the receptors given the context of the area.

This assessment has shown that there should be no adverse impact upon existing residential receptors due to the proposed operations. As such, noise should not be a determining factor in the determination of the planning application.

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.
L₁₀ and L₉₀	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

MEASURED SOUND PRESSURE LEVELS

TABLE A1: HOURLY AMBIENT AND BACKGROUND SOUND LEVEL DATA – NMP1

PERIOD START	MEASURED AMBIENT SOUND PRESSURE LEVEL, $L_{Aeq,1HR}$ (dB)	MEASURED BACKGROUND SOUND LEVEL, $L_{A90,1HR}$ (dB)
14/05/2020 12:00	48.2	40.6
14/05/2020 13:00	48.0	42.8
14/05/2020 14:00	51.0	43.3
14/05/2020 15:00	47.8	43.7
14/05/2020 16:00	46.0	41.9
14/05/2020 17:00	45.7	42.1
14/05/2020 18:00	50.3	42.7
14/05/2020 19:00	45.1	40.8
14/05/2020 20:00	44.5	39.9
14/05/2020 21:00	44.0	40.5
14/05/2020 22:00	44.6	40.5
14/05/2020 23:00	42.3	40.4
15/05/2020 00:00	42.3	40.7
15/05/2020 01:00	43.5	42.0
15/05/2020 02:00	42.5	40.9
15/05/2020 03:00	42.1	40.8
15/05/2020 04:00	44.5	41.5
15/05/2020 05:00	45.0	41.3
15/05/2020 06:00	45.3	42.0
15/05/2020 07:00	47.4	43.4
15/05/2020 08:00	50.5	45.2
15/05/2020 09:00	55.4	45.8
15/05/2020 10:00	51.1	46.3
15/05/2020 11:00	51.0	46.3
15/05/2020 12:00	63.8	46.0
15/05/2020 13:00	57.0	46.9
15/05/2020 14:00	50.4	47.0
15/05/2020 15:00	53.5	46.2
15/05/2020 16:00	48.6	45.6
15/05/2020 17:00	48.2	44.3
15/05/2020 18:00	49.3	43.3
15/05/2020 19:00	48.9	42.9
15/05/2020 20:00	47.2	41.6



PERIOD START	MEASURED AMBIENT SOUND PRESSURE LEVEL, $L_{Aeq,1HR}$ (dB)	MEASURED BACKGROUND SOUND LEVEL, $L_{A90,1HR}$ (dB)
15/05/2020 21:00	42.5	40.5
15/05/2020 22:00	43.2	40.7
15/05/2020 23:00	43.1	40.0
16/05/2020 00:00	41.4	39.9
16/05/2020 01:00	42.1	40.1
16/05/2020 02:00	41.2	39.8
16/05/2020 03:00	40.2	38.7
16/05/2020 04:00	41.3	38.3
16/05/2020 05:00	41.6	38.3
16/05/2020 06:00	41.7	38.6
16/05/2020 07:00	42.3	38.4
16/05/2020 08:00	43.1	40.1
16/05/2020 09:00	46.5	43.3
16/05/2020 10:00	45.4	42.8
16/05/2020 11:00	44.9	42.1
16/05/2020 12:00	44.4	41.4
16/05/2020 13:00	43.9	40.6
16/05/2020 14:00	45.5	42.3
16/05/2020 15:00	44.9	40.8
16/05/2020 16:00	43.4	40.2
16/05/2020 17:00	43.4	39.8
16/05/2020 18:00	42.0	39.1
16/05/2020 19:00	42.7	39.1
16/05/2020 20:00	49.0	37.0
16/05/2020 21:00	37.8	36.0
16/05/2020 22:00	39.7	35.3
16/05/2020 23:00	38.4	35.9
17/05/2020 00:00	37.9	36.1
17/05/2020 01:00	39.7	37.7
17/05/2020 02:00	39.1	37.4
17/05/2020 03:00	38.4	36.3
17/05/2020 04:00	39.9	37.9
17/05/2020 05:00	40.1	37.7
17/05/2020 06:00	41.3	38.4



PERIOD START	MEASURED AMBIENT SOUND PRESSURE LEVEL, $L_{Aeq,1HR}$ (dB)	MEASURED BACKGROUND SOUND LEVEL, $L_{A90,1HR}$ (dB)
17/05/2020 07:00	42.5	39.6
17/05/2020 08:00	43.8	40.0
17/05/2020 09:00	47.9	41.3
17/05/2020 10:00	43.9	41.5
17/05/2020 11:00	42.7	39.7
17/05/2020 12:00	43.3	40.9
17/05/2020 13:00	44.2	41.4
17/05/2020 14:00	43.1	40.5
17/05/2020 15:00	41.4	38.4
17/05/2020 16:00	41.6	37.8
17/05/2020 17:00	41.3	38.7
17/05/2020 18:00	44.4	39.6
17/05/2020 19:00	50.5	39.6
17/05/2020 20:00	42.5	40.0
17/05/2020 21:00	43.3	40.0
17/05/2020 22:00	41.6	38.6
17/05/2020 23:00	43.2	40.0
18/05/2020 00:00	41.8	39.9
18/05/2020 01:00	42.0	40.3
18/05/2020 02:00	42.3	40.3
18/05/2020 03:00	41.0	38.8
18/05/2020 04:00	43.4	40.9
18/05/2020 05:00	43.6	41.2
18/05/2020 06:00	45.0	41.1
18/05/2020 07:00	52.8	42.2
18/05/2020 08:00	64.4	47.6
18/05/2020 09:00	66.8	48.8



APPENDIX III

FIGURES

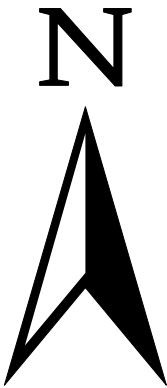
Figure 1 - Noise Survey Measurement Positions



Project:
Acornfield Phase 2,
Knowsley

Project-No:
50-910

Client:
Prime Property
Consultancy



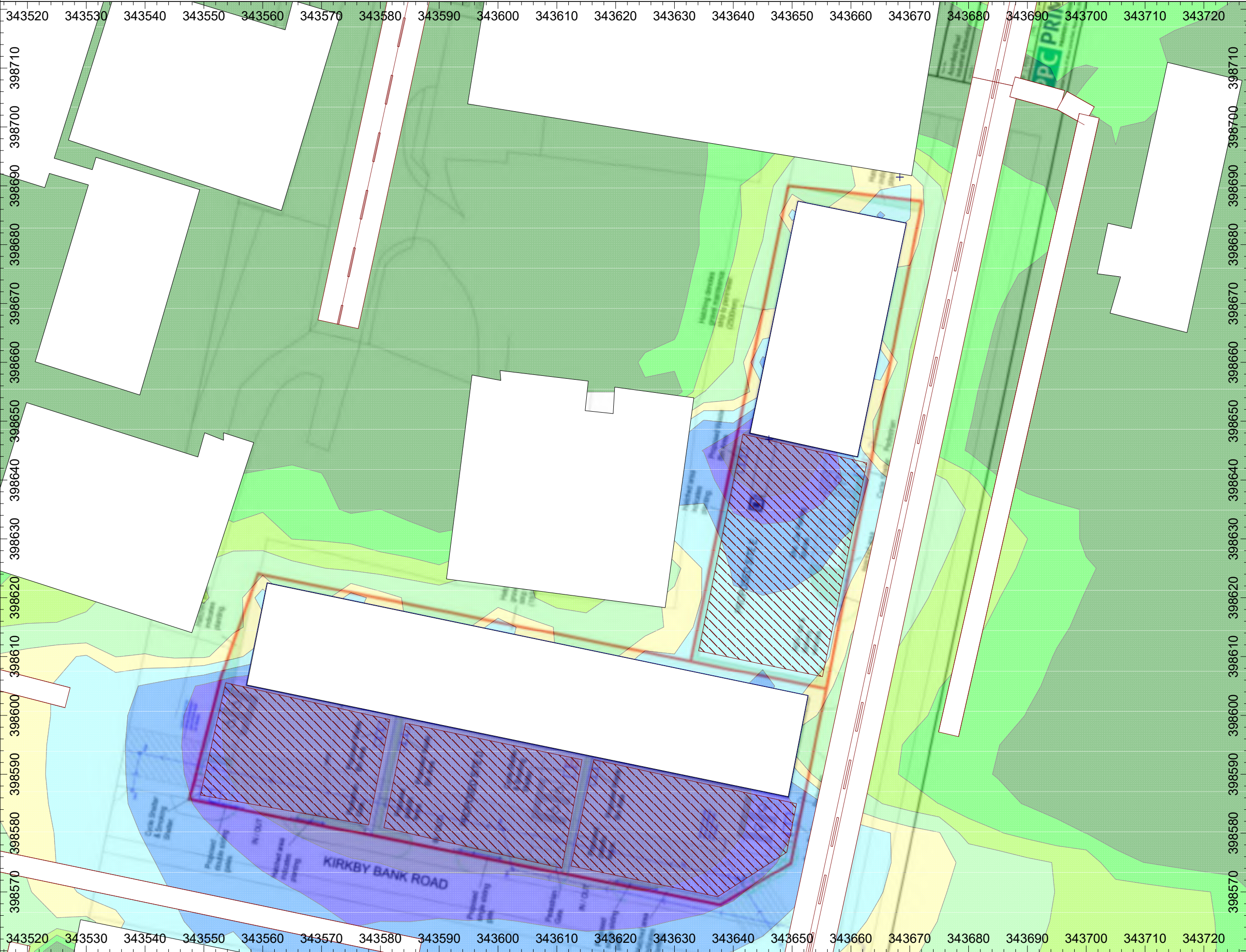
Noise Map Objects

- Point Source
- Line Source
- Road
- Parking Lot
- Building
- Foliage
- Ground Absorption
- Receiver
- Calculation Area



Project Engineer: S Boughton
Date: 3/10/2023

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



Project:
Acornfield Phase 2,
Knowsley

Project-No:
50-910

Client:
Prime Property
Consultancy Ltd

**Specific Noise Level,
LAeq,1hr (dB)**

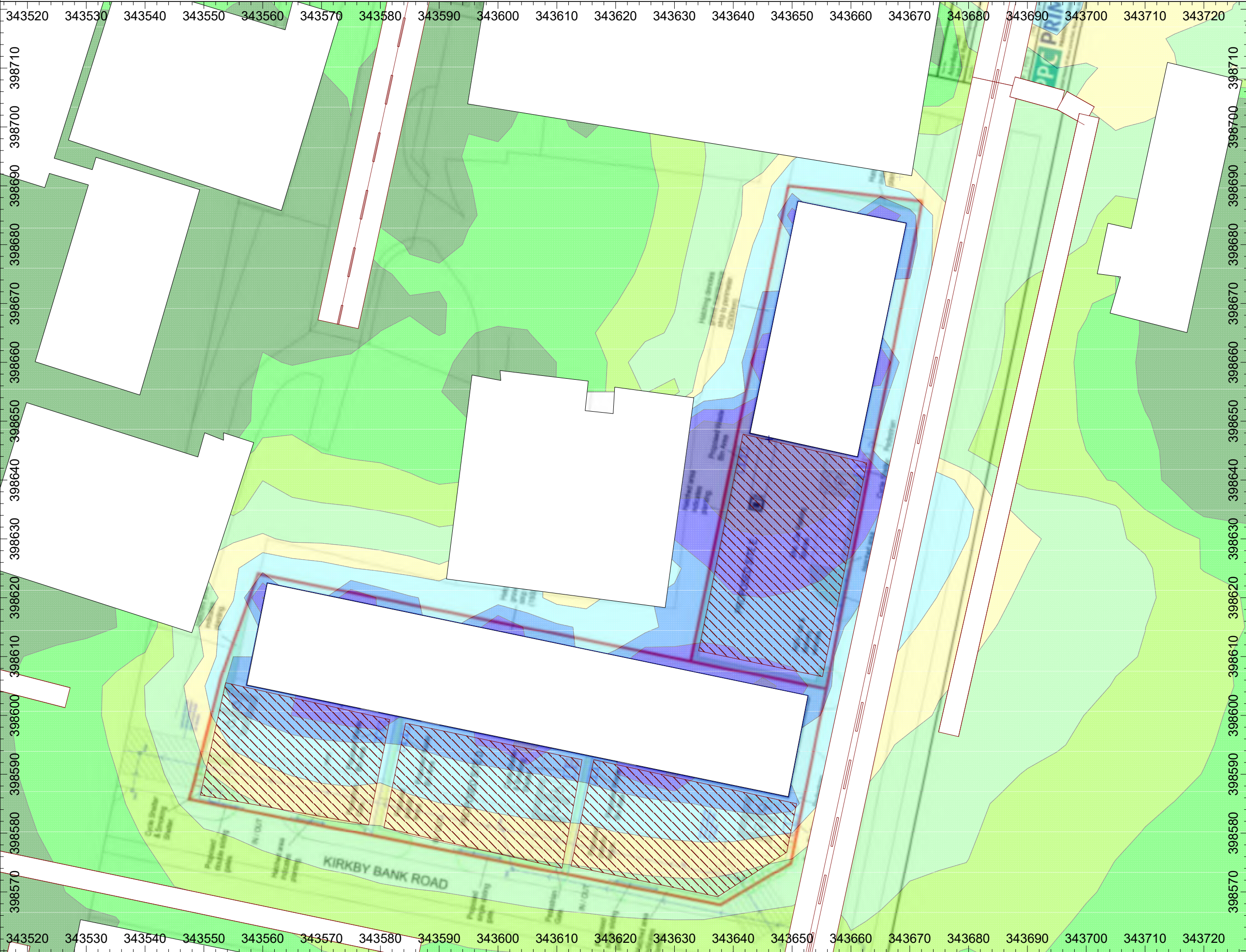
...	≤ 38
38 < ...	≤ 40
40 < ...	≤ 42
42 < ...	≤ 45
45 < ...	≤ 48
48 < ...	≤ 50
50 < ...	≤ 52
52 < ...	≤ 55
55 < ...	

Noise Map Objects

- + Point Source
- vert. Area Source
- Road
- ▨ Parking Lot
- Building
- Foliage
- ⊗ Receiver
- Calculation Area

Project Engineer: S Boughton
Date: 03/10/2023

Figure 3 - Night-time Grid Noise Map - Calculation at 4.5m above ground level



Project:
Acornfield Phase 2,
Knowsley

Project-No:
50-910

Client:
Prime Property
Consultancy Ltd

**Specific Noise Level,
LAeq,15min (dB)**

...	≤ 32
32 < ...	≤ 35
35 < ...	≤ 38
38 < ...	≤ 40
40 < ...	≤ 42
42 < ...	≤ 45
45 < ...	≤ 48
48 < ...	≤ 50
50 < ...	

Noise Map Objects

- + Point Source
- vert. Area Source
- Road
- ▨ Parking Lot
- Building
- Foliage
- ⊗ Receiver
- Calculation Area

Project Engineer: S Boughton
Date: 03/10/2023