

Noise Impact Assessment

Site: Eagle and Child, Ramsbottom
Reference: 51-297-R1-4
Date: September 24





E3P

Taylor Road
Trafford Park
Urmston
Manchester
M41 7JQ

+ 44 (0) 161 707 9612
<https://e3p.co.uk>

Registered in England
CRN: 08725262

QUALITY ASSURANCE

Report reference	51-297-R1-4
-------------------------	-------------

REV REF:	DESCRIPTION	AUTHOR	CHECKED	AUTHORISED	DATE
R1-1	First issue	SB	LF	LF	06/08/24
R1-2	Second issue	SB	LF	LF	14/08/24
R1-3	Third issue	SB	LF	LF	28/08/24
R1-4	Final Issue	SB	LF	LF	03/09/24

This report has been prepared for the sole benefit, use, and information of the client. The liability of Environmental Engineering Partnership Limited T/A E3P with respect to the information contained in the report will not extend to any third party. This report has been prepared by the qualified persons as listed below.

WRITTEN BY	QUALIFICATIONS	POSITION
Scott Boughton	BEng (Hons), MIOA	Senior Consultant

REVIEWED BY	QUALIFICATIONS	POSITION
Lee Faulkner	BSc (Hons) MEnvSci MIOA	Associate Director

AUTHORISED BY	QUALIFICATIONS	POSITION
Lee Faulkner	BSc (Hons) MEnvSci MIOA	Associate Director



EXECUTIVE SUMMARY

Site Address	3 Whalley Rd, Ramsbottom, Bury BL0 0DL
National Grid Reference	E 380005, N 416901
Proposed Development	Retrospective Planning application for the erection and use of a Tipi and associated heater within an existing beer garden at The Eagle and Child, Ramsbottom.
Surveys Completed	E3P have undertaken a combination of attended and unattended background and ambient sound surveys in a position considered representative of the closest existing receptors over a 3-day period including for a weekend. These surveys captured a range of events within the tipi and a weekend period where the beer garden was in use without a planned event. A further survey was undertaken for the heater that is used in the colder months to heat the Tipi.
Assessments Completed	A 3D noise model has been constructed to assess sound from the Tipi when in operation. The assessment determined that the specific noise levels at receptors would exceed the absolute and change in ambient noise level criterion within the existing receptors external garden areas. Furthermore, when the heater was in operation adverse impact is expected at the receptors. As such, mitigation measures are required to protect the surrounding residential receptors.
Mitigation Recommendations	Mitigation measures in the form of acoustic barriers at a height of 2.5 m are required. Furthermore, an acoustic enclosure that provides at least 10 dB of attenuation is required to reduce noise levels from the heater.
Conclusion and Discussion	This assessment has shown that, with mitigation measures in place, no adverse impact is predicted during the day at the receptors due to the proposed development. As such, sufficient information has been provided in order to consider potential noise impact and found no adverse impact is expected.



TABLE OF CONTENTS

EXECUTIVE SUMMARY	2
1. INTRODUCTION	4
1.1. Background	4
1.2. Report Objectives	4
1.3. Proposed Development.....	4
2. ASSESSMENT METHODOLOGY	5
2.1. National Planning Policy Framework	5
2.2. National Planning Practice Guidance.....	5
2.3. British Standard BS 4142: 2014+A1:2019 - Methods for rating and assessing industrial and commercial sound	7
2.4. British Standard BS 8233:2014+A1:2019 – Guidance on sound insulation and noise reduction for buildings	8
3. SURVEY RESULTS.....	10
3.1. Background and ambient sound level surveys	10
3.1.1. Attended and Unattended Event sound survey	11
3.2. Tipi Heater sound surveys	14
4. NOISE IMPACT ASSESSMENT – PATRON AND EVENT NOISE.....	15
4.1. Absolute and Change in ambient Noise Level Assessment	15
5. NOISE IMPACT ASSESSMENT – TIPI HEATER.....	16
5.1. Daytime Assessment	17
6. MITIGATION	18
6.1. Acoustic Barriers	18
6.2. Acoustic Enclosure.....	19
7. CONCLUSIONS AND DISCUSSION.....	20
APPENDIX I LIMITATIONS.....	21
APPENDIX II GLOSSARY	23
APPENDIX III HOURLY MEASURED SOUND LEVELS	26
APPENDIX III FIGURES	30

Figure List

- Figure 1 – Snapshot of the Development
- Figure 2 – Noise Measurement Positions Plan
- Figure 3 – Daytime Noise levels (No event in Tipi)
- Figure 4 – Daytime Noise levels (Event in Tipi)
- Figure 5 – Daytime Noise levels (Heater in Operation)
- Figure 6 – Daytime Noise levels with Mitigation (Event in Tipi)
- Figure 7 – Daytime Noise levels with Mitigation (Heater in Operation)



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

Table 1 Noise Exposure Hierarchy

Perception	Examples of outcomes	Increasing effect level	Action
Not Applicable	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. BRITISH STANDARD 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.

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

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.



Table 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:

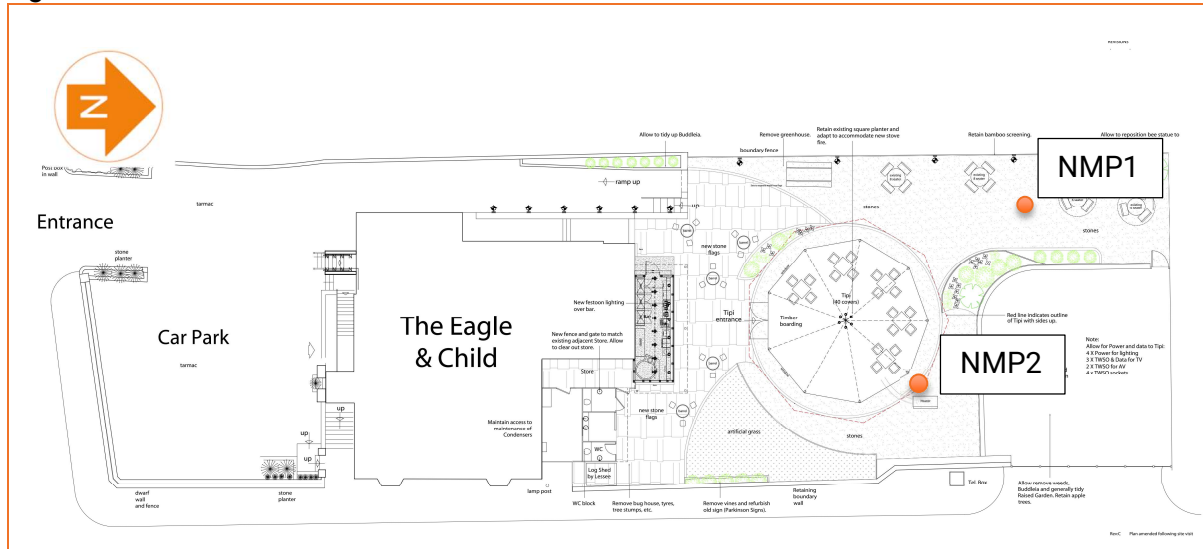
In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited.



3. SURVEY RESULTS

Figure 2 indicates the measurement locations for each of the surveys carried out.

Figure 2 Noise Measurement Positions



3.1. BACKGROUND AND AMBIENT SOUND LEVEL SURVEYS

E3P have undertaken two attended/unattended background and ambient sound survey in a position considered representative of the existing residential receptors when the Tipi is in use for an event and when the Tipi is not in use for an event. The surveys were carried out over the following periods:

- 📍 15:00 Friday 19th July to 07:00 Monday 22nd July 2024.
- 📍 14:00 Friday 26th July to 07:00 Monday 29th July 2024.

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

- 📍 **Noise Measurement Position 1 (NMP1):** Located in the northwestern area of the external area associated with the public house, close to the boundary of the existing receptors on Cheshire Court. The microphone was installed in free-field conditions and at a height of 1.5 m. The sound climate was dominated by patron noise when the beer garden and Tipi were in use, while music was present during events and non-event periods it was not dominant over patrons talking. When the beer garden was not in use road traffic sound was the dominant noise source.

Table 3 and 4 detail the average measured values across the daytime period when the external seating area is in use, between the dates of 19th July to 22nd July and 26th July to 29th July. Hourly data is shown in Appendix III. The following section will detail measured noise levels relevant for the assessment of beer garden and event noise.



Table 3 Statistical Values for Each Time period – 19th to 22nd July 2024

Date	Assessment Period	Average Measured Ambient Sound Level, $L_{Aeq,T}$ (dB)	Range of Measured Ambient Sound Levels, $L_{Aeq,T}$ (dB)
Friday 19th July 2024	Daytime (15:00 to 23:00)	52.6	42.4-55.3
Saturday 20th July 2024	Daytime (07:00 to 23:00)	50.8	45.1-61.4
Sunday 21st July 2024	Daytime (07:00 to 23:00)	51.4	40.9-59.2

Table 4 Statistical Values for Each Time period – 26th to 29th July 2024

Date	Assessment Period	Average Measured Ambient Sound Level, $L_{Aeq,T}$ (dB)	Range of Measured Ambient Sound Levels, $L_{Aeq,T}$ (dB)
Friday 26th July 2024	Daytime (14:00 to 23:00)	58.7	43.2-60.4
Saturday 27th July 2024	Daytime (07:00 to 23:00)	50.6	43.8-56.6
Sunday 28th July 2024	Daytime (07:00 to 23:00)	50.9	42.4-55.1

The full set of hourly data can be found within the appendix of the report. From analysis of the data set it has been determined that the representative background sound level for the surrounding receptors would be 44 dB. This has been derived from looking at the hours before and after operation (11:00 and 23:00) on each day surveyed, the median value of these hours is 44 dB. This value is representative of the background sound level when the external seating area is not in operation.

3.1.1. ATTENDED AND UNATTENDED EVENT SOUND SURVEY

From the previous section, E3P have extracted the hourly data across each day where the beer garden was in operation. Tables 5 and 6 below detail the hour noise levels across this time period with written commentary of the activity occurring at the site.

The surveys produce a highest hourly noise level for a planned event within the Tipi and also a highest hourly noise level when the external area is being utilised, but no planned event is taking place.



Table 5 Hourly Measured Ambient Noise Levels – 19th July to 20th July

Measurement Start Time	Ambient Noise Level L_{Aeq} (dB)	Commentary
Friday 19th July 2024		
19/07/2024 15:00	55.2	Surveyor attended 15:00 while 22:30
19/07/2024 16:00	55.0	
19/07/2024 17:00	57.9	No Event taking place within the Tipi– surveyor noted that the beer garden was at full capacity with all seats taken. Background music present but not dominant over the sounds of patrons talking with loud voices.
19/07/2024 18:00	58.2	
19/07/2024 19:00	59.1	
19/07/2024 20:00	58.8	
19/07/2024 21:00	59.4	Beer garden emptied out at 22:00.
19/07/2024 22:00	55.2	
Saturday 20th July 2024		
20/07/2024 15:00	57.0	Unattended survey Event taking place noted by the venue as a 50th Birthday Party within the Tipi.
20/07/2024 16:00	62.1	
20/07/2024 17:00	62.1	
20/07/2024 18:00	62.4	
20/07/2024 19:00	66.3	
20/07/2024 20:00	65.9	
20/07/2024 21:00	65.2	
20/07/2024 22:00	57.0	
Sunday 21st July 2024		
21/07/2024 15:00	61.8	Unattended survey Event taking place noted by the venue as a 30th Birthday Party within the Tipi.
21/07/2024 16:00	61.5	
21/07/2024 17:00	60.9	
21/07/2024 18:00	64.8	
21/07/2024 19:00	66.2	
21/07/2024 20:00	59.9	
21/07/2024 21:00	55.2	
21/07/2024 22:00	47.2	



Table 6 Hourly Measured Ambient Noise Levels – 26th July to 28th

Measurement Start Time	Ambient Noise Level L_{Aeq} (dB)	Commentary
Friday 26th July 2024		
26/07/2024 15:00	59.0	Surveyor attended 14:00 while 22:30 Wedding event with live music taking place within the Tipi—surveyor noted that the beer garden was at full capacity all seats taken. Live music in the form of an amplified acoustic guitar and singer and background music in between the performances present but not dominant over the sounds of patrons talking with loud voices. Beer garden emptied out at 22:00.
26/07/2024 16:00	59.7	
26/07/2024 17:00	62.0	
26/07/2024 18:00	64.5	
26/07/2024 19:00	64.5	
26/07/2024 20:00	66.1	
26/07/2024 21:00	65.8	
26/07/2024 22:00	52.7	
Saturday 27th July 2024		
27/07/2024 15:00	57.8	Unattended survey Event taking place noted by the venue as a Hen Party within the Tipi.
27/07/2024 16:00	61.4	
27/07/2024 17:00	61.9	
27/07/2024 18:00	57.5	
27/07/2024 19:00	61.3	
27/07/2024 20:00	61.5	
27/07/2024 21:00	57.6	
27/07/2024 22:00	50.1	
Sunday 28th July 2024		
28/07/2024 15:00	57.6	Unattended survey Event taking place noted by the venue as a Graduation Party within the Tipi.
28/07/2024 16:00	58.0	
28/07/2024 17:00	58.8	
28/07/2024 18:00	57.4	
28/07/2024 19:00	57.8	
28/07/2024 20:00	58.0	
28/07/2024 21:00	56.1	
28/07/2024 22:00	48.6	



3.2. TIPI HEATER SOUND SURVEYS

E3P have conducted attended ambient sound measurements of the heater that is used for heating the Tipi in colder months. The survey was carried out over the following time period:

📅 09:06-09:16 Wednesday 31st July 2024.

The following noise measurement position was chosen for the Survey:

📍 Noise Measurement Position 2 (NMP2): Located in 1 m from the heater exhaust/fan. The microphone was installed in free-field conditions and at a height of 1.5 m. The heater was steady state in nature and the dominant noise source throughout the survey.

Table 7 details the measured sound pressure level from the heater.

Table 7 Attended Ambient Noise Levels of Heater

Measurement Position	Measurement Start Time	Measured Sound Pressure Levels (dB)		Commentary
		L _{Aeq,T}	L _{A90,T}	
NMP2	09:06-09:16	82.4	82.2	Steady State sound from exhaust and fan associated with the heater

The equipment outlined in Table 8 below was used for the noise surveys. Weather conditions were monitored throughout with dry conditions observed.

Table 8 Noise Measurement Equipment and Calibration Dates

Measurement position	Equipment description	Manufacturer & type number	Serial number	Calibration due date
NMP1	Sound Level Meter	01dB Fusion	14616	10/07/2026
	Pre-amplifier	01dB Pre22	20951	
	Microphone	GRAS 40CD	494264	
	Calibrator	Cirrus CR 515	99206	09/07/2025
NMP2	Sound Level Meter	Norsonic	Nor 145	13/06/2025
	Pre Amp	Norsonic	Nor 1209	
	Microphone	Norsonic	Nor 1227	
	Calibrator	Norsonic	Nor 1255	20/06/2025

The sound level meters were field calibrated before and after measurements with no significant drift witnessed.



4. NOISE IMPACT ASSESSMENT – PATRON AND EVENT NOISE

For the purposes of this assessment, E3P has used noise modelling software, CadnaA 2024 MR2, to determine the impact of noise from the proposed site, specifically, users of the Tipi within the external seating area. While music was present, both recorded and live music, these sources were not dominant over noise generated from patrons talking.

The following inputs have been included in the model:

- ✳ The highest hour for both the beer garden in typical use (without a planned event within the Tipi) and for a planned event within the Tipi, have been input within the model as area sources.
- ✳ 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.
- ✳ Existing buildings have been included in the model and assumed to have a structured façade.
- ✳ Existing stone walls at their respective heights have also been included within the model. Any wooden fencing associated with the residential properties has been assumed acoustically transparent given the nature of its construction not being significant enough to provide any real attenuation.
- ✳ Soft ground proportion is set at 0 within the model to inform a worst-case assessment.
- ✳ 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.

Figure 3 and Figure 4 in the appendix of the report shows the predicted daytime levels with and without a planned event in operation within the Tipi, respectively.

4.1. ABSOLUTE AND CHANGE IN AMBIENT NOISE LEVEL ASSESSMENT

The model has been used to predict the specific noise level of the above source at each of the receptors, both within rear garden edges and upon façades. Table 9 below details the comparison between the noise levels at the worst affected receptor with and without a planned event within the Tipi.

Table 9 Comparison of Noise Levels at worst affected receptor with and without Tipi Event

Receptor	No Planned Event, $L_{Aeq,T}$ (dB)	Planned Event in Tipi, $L_{A,r}$ (dB)	Difference +/- (Db)
10 Cheshire Court (Garden Edge)	62.9	69.3	+6.4
10 Cheshire Court (rear façade)	51.2	58.2	+7.0

The highest predicted specific noise level in rear gardens is noted to be 69.3 dB. This is above the upper criterion of 55 dB as stipulated in BS 8233. As such, adverse impact is predicted in rear gardens of the surrounding existing noise sensitive receptors.



Furthermore, levels incident upon the façade of the worst affected receptor is 58.2 dB. Assuming an open window this would result in internal noise levels of 45 dB. This is 10 dB above the daytime criterion within BS 8233: 2014. As such, adverse impact is predicted, and mitigation measures will be required. These will be discussed in Section 6.

5. NOISE IMPACT ASSESSMENT – TIPI HEATER

For the purposes of this assessment, E3P has used noise modelling software, CadnaA 2024, to determine the impact of noise from the heater unit associated with the Tipi. As the Tipi will only be used in colder months it is likely that the external seating area will be empty with the exception of people using the Tipi itself. As such, noise from patrons is likely to be significantly reduced leading to the heater becoming more dominant within the sound scape. As such, the heater has been assessed separately to ensure that sufficient mitigation is applied. The heater will only operate during the daytime period and as such the night-time period is not assessed.

The following inputs have been included in the model:

- ✳ The above heater is inputted into the noise model as a point source and calibrated to the noise level measured on site at NMP2.
- ✳ 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.
- ✳ Existing buildings have been included in the model and assumed to have a structured façade.
- ✳ Existing stone walls at their respective heights have also been included within the model. Any wooden fencing associated with the residential properties has been assumed acoustically transparent given the nature of its construction not being significant enough to provide any real attenuation.
- ✳ Soft ground proportion is set at 0 within the model to assume a worst-case assessment.
- ✳ 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.

Figure 5 in the appendix of the report shows the predicted daytime rating levels with the heater in operation.

For the BS 4142:2014 assessments, penalties are applied to the specific sound level to provide the rating level. These penalties relate to the acoustic features of the sound source. Accordingly, the following objective and subjective features have been accounted for in the assessment, in accordance with the subjective method detailed in BS 4142:2014, for the Site as a whole operation.

Table 10 **Acoustic features**

Acoustic Feature	Applicable?	Attributable Penalty	Comment
Tonality	No	-	No tonality was detected
Intermittency	No	-	No intermittency was detected
Impulsivity	No	-	No impulsivity was detected
Other	Yes	+3 dB	Source is to be readily distinctive against the existing sound climate.



5.1. DAYTIME ASSESSMENT

Figure 5 should be used to view the daytime specific noise levels, at the existing receptors. The derived representative background sound level of 44 dB has been used for this assessment.

The worst affected noise sensitive receptor, along Cheshire Court is considered here. Table 11 below details the assessment.

Table 11 Calculation of Rating Level and Comparison with Background Sound Level - Daytime

Receptor	Calculated Specific Noise Level, $L_{aeq,T}$ (dB)	Calculated Rating Level, $L_{a,R}$ (dB)	Background Sound Level, $L_{a,901hr}$ (dB)	Difference +/- (dB)
10 Cheshire Court	61	64	44	+20

The above details façade noise levels at receptors. As can be seen, exceedances are noted up to 20 dB for the surrounding existing noise sensitive receptors.

As such, mitigation measures are required to control noise levels at the surrounding noise sensitive receptors. Section 6 will detail the required mitigation measures.



6. MITIGATION

6.1. ACOUSTIC BARRIERS

Given the exceedances noted at the surrounding receptors due to patron noise an acoustic barrier will be required. E3P are aware that a fence is already present between the beer garden and the neighbouring residential receptors. However, acoustically, the existing fence is not sufficient given its construction type.

E3P recommend an acoustic barrier of 2.5 m in height along the boundary with the residential receptors. The exact location of this barrier can be seen in Figure 6 in the appendix of this report.

Table 12 indicates the noise levels from the Tipi in use with the acoustic barrier in place.

Table 12 Noise Levels at worst affected receptor with Tipi Event and acoustic barrier

Receptor	Planned event in Tipi (no mitigation), L _{Aeq,T} (dB)	Planned event in Tipi (with mitigation), L _{Aeq,T} (dB)
10 Cheshire Court (Garden Edge)	69.3	53.4
10 Cheshire Court (rear façade)	58.2	48.1

As shown above the absolute noise levels at the worst affected receptor has been reduced to at most 53 dB in garden areas and 48 dB at worst affected facades.

This achieves the absolute noise levels for external garden areas and is 2 dB below the upper criterion stipulated within BS 8233: 2014.

Furthermore, it should be noted the receptors were already subject to the existing beer garden sound of patrons talking, the highest hour with external seating area in use but no event within the Tipi, at the worst affected garden was 62.9 dB. With the acoustic barrier in place noise levels would now be 53.4 dB with an event taking place, as shown in Table 12. Therefore, a betterment of approximately 9 dB is expected when the acoustic barrier is in place.

Similarly, noise levels at the worst affected facades have been reduced, with the worst affected façade having associated noise levels of 48 dB. Assuming an open window internal noise levels would be 35 dB, this achieves the internal daytime criterion stipulated within BS 8233: 2014.

As such with the acoustic barrier in place no adverse impact is expected. Indeed, there is a betterment of the acoustic environment with noise levels being significantly reduced at the surrounding receptors to achieve the absolute noise levels stipulated in BS 8233.

The barriers can be of wooden fence or brick wall construction but must be free from holes, be sealed at the base and have a minimum mass of 10kg/m².



6.2. ACOUSTIC ENCLOSURE

Given that the heater associated with the Tipi will be used during colder months when the external seating area is likely to be empty, with only patrons within the heated Tipi present, noise levels from patrons will be significantly reduced. It is likely the heater will then become the dominant noise source.

Given the outcomes of the assessment within section 5.1 E3P recommend an acoustic enclosure be installed over the heating unit that provides attenuation of a minimum 10 dB. With a minimum of 10 dB attenuation from an acoustic enclosure and in conjunction with the acoustic barrier recommended in Section 6.1 being in place, noise levels are sufficiently controlled. Figure 7 in the appendix of the report shows noise levels with mitigation measures in place.

Table 13 details the assessment with both the acoustic enclosure and acoustic barrier in place.

Table 13 Daytime Assessment at The Worst Affected Receptors with Mitigation Measures

Receptor	Calculated Specific Noise Level, $L_{aeq,T}$ (dB)	Calculated Rating Level, $L_{a,R}$ (dB)	Background Sound Level, $L_{a,901hr}$ (dB)	Difference +/- (dB)
10 Cheshire Court	41	44	44	0

As shown above with the acoustic enclosure and the recommended acoustic barrier in place noise from the heater achieves the background sound level at the worst affected receptor.

The acoustic enclosure should be designed by a suitably qualified consultant to provide a minimum of 10 dB attenuation. The design of this enclosure is likely to be bespoke as sufficient ventilation will likely be needed for the heater to operate correctly. This is beyond the scope of this NIA and the expertise of E3P. A suitable qualified person or company should be sought to aid in the design and installation of the enclosure.



7. CONCLUSIONS AND DISCUSSION

E3P were commissioned by Daniel Thwaites PLC to undertake a Noise Impact Assessment for a retrospective Planning application for the erection and use of a Tipi and associated heater within an existing beer garden at The Eagle and Child, Ramsbottom.

E3P have undertaken a combination of attended and unattended background and ambient sound surveys in a position considered representative of the closest existing receptors over a 3-day period including for weekend.

These surveys captured a range of events within the tipi and a weekend period where the beer garden was in use without a planned event. A further survey was undertaken for the heater that is used in the colder month to heat the Tipi.

A 3D noise model has been constructed to assess sound from the Tipi when in operation. The assessment determined that the specific noise levels at receptors would exceed the absolute and change in ambient noise level criterion within the existing receptors external garden areas.

Furthermore, when the heater was in operation adverse impact is expected at the receptors. As such, mitigation measures are required to protect the surrounding residential receptors.

Mitigation measures in the form of acoustic barriers at a height of 2.5 m are required. Furthermore, an acoustic enclosure that provides at least 10 dB of attenuation is required to reduce noise levels from the heater.

This assessment has shown that, with mitigation measures in place, no adverse impact is predicted during the day at the receptors due to the proposed development.

As such, sufficient information has been provided in order to consider potential noise impact and found no adverse impact is expected.

END OF REPORT

APPENDIX I

LIMITATIONS





GENERAL

1. This report and any associated works (together comprising the "Services") were compiled and carried out by E3P for the client (as present in Section 1) under the E3P "Terms of Business" or with those parties with whom a warranty agreement has been executed, or with whom an assignment has been agreed and outlined in the body of the report.
2. Unless explicitly agreed otherwise, in writing, this report has been prepared under E3P Standard Terms and Business as included within our proposal to the Client.
3. Project-specific appointment documents may be agreed upon at our discretion and a charge may be levied for both the time to review and finalise appointment documents and also for associated changes to the appointment terms. E3P reserves the right to amend the fee should any changes to the appointment terms create an increased risk to E3P.
4. The report needs to be considered in light of the proposal and associated limitations of scope. The report needs to be read in full and isolated sections cannot be used without full reference to other elements of the report and any previous works referenced within the report.

NOISE AND VIBRATION IMPACT ASSESSMENTS

5. 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.
6. 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.
7. The works undertaken to prepare this report comprised a study of available and easily documented information from a variety of sources (including the Client), together with (where appropriate) a brief walkover inspection of the Site and correspondence with relevant authorities and other interested parties. Due to the short timescales associated with these projects responses may not have been received from all parties. E3P cannot be held responsible for any disclosures that are provided post-production of our report and will not automatically update our report.
8. The opinions given in this report have been dictated by the finite data on which they are based and are relevant only for the purpose for which the report was commissioned. The information reviewed should not be considered exhaustive and has been accepted in good faith as providing true and representative data pertaining to site conditions. Should additional information become available which may affect the opinions expressed in this report, E3P reserves the right to review such information and, if warranted, to modify the opinions accordingly.
9. E3P does not warrant work/data undertaken/provided by others.

APPENDIX II

GLOSSARY





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 LAeq, LA90 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 14 **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 15 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.
LAeq, T	LAeq 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.
LAmx	LAmx is the maximum A-weighted sound pressure level recorded over the period stated. LAmx is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall Leq 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 Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L10 is the level exceeded for 10% of the time and as such can be regarded as the "average maximum level". Similarly, L90 is the "average minimum level" and is often used to describe the background noise. It is common practice to use the L10 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.
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.

APPENDIX III

HOURLY MEASURED SOUND LEVELS





Table 16 **Hourly Measured Data from NMP1**

Measurement start time	Measured ambient sound level, $L_{\text{aeq},1\text{hr}}$ (dB)	Measured background sound level, $L_{\text{a90},1\text{hr}}$ (dB)
19/07/2024 15:00	55.2	52.0
19/07/2024 16:00	55.0	51.9
19/07/2024 17:00	57.9	54.0
19/07/2024 18:00	58.2	54.8
19/07/2024 19:00	59.1	55.3
19/07/2024 20:00	58.8	53.1
19/07/2024 21:00	59.4	51.5
19/07/2024 22:00	48.8	44.3
19/07/2024 23:00	47.8	42.4
20/07/2024 00:00	46.8	39.7
20/07/2024 01:00	44.9	37.7
20/07/2024 02:00	44.9	38.3
20/07/2024 03:00	43.6	38.7
20/07/2024 04:00	44.6	38.3
20/07/2024 05:00	44.1	38.4
20/07/2024 06:00	47.9	39.6
20/07/2024 07:00	51.5	42.2
20/07/2024 08:00	52.4	46.5
20/07/2024 09:00	52.1	46.7
20/07/2024 10:00	52.9	47.9
20/07/2024 11:00	53.6	49.7
20/07/2024 12:00	54.0	50.2
20/07/2024 13:00	54.1	50.8
20/07/2024 14:00	53.6	50.1
20/07/2024 15:00	57.0	53.2
20/07/2024 16:00	62.1	56.9
20/07/2024 17:00	62.1	57.5
20/07/2024 18:00	62.4	58.0
20/07/2024 19:00	66.3	59.1
20/07/2024 20:00	65.9	61.4
20/07/2024 21:00	65.2	54.7
20/07/2024 22:00	50.9	45.1
20/07/2024 23:00	48.4	42.6
21/07/2024 00:00	48.9	44.2
21/07/2024 01:00	47.8	41.4
21/07/2024 02:00	46.8	41.5
21/07/2024 03:00	46.0	39.7
21/07/2024 04:00	45.9	38.9
21/07/2024 05:00	49.1	41.1
21/07/2024 06:00	47.6	41.0
21/07/2024 07:00	49.3	43.1
21/07/2024 08:00	50.3	45.7
21/07/2024 09:00	53.2	47.3
21/07/2024 10:00	52.8	48.4
21/07/2024 11:00	53.7	50.6
21/07/2024 12:00	54.4	51.2
21/07/2024 13:00	54.8	51.4
21/07/2024 14:00	56.3	52.6
21/07/2024 15:00	61.8	58.1



Measurement start time	Measured ambient sound level, $L_{\text{aeq},1\text{hr}}$ (dB)	Measured background sound level, $L_{\text{a90},1\text{hr}}$ (dB)
21/07/2024 16:00	61.5	58.4
21/07/2024 17:00	60.9	57.5
21/07/2024 18:00	64.8	59.2
21/07/2024 19:00	66.2	59.2
21/07/2024 20:00	59.9	55.9
21/07/2024 21:00	55.2	43.7
21/07/2024 22:00	47.2	40.9
21/07/2024 23:00	44.8	37.9
22/07/2024 00:00	44.2	37.0
22/07/2024 01:00	42.9	35.6
22/07/2024 02:00	43.1	34.7
22/07/2024 03:00	43.2	36.6
22/07/2024 04:00	44.5	37.8
22/07/2024 05:00	49.5	42.2
22/07/2024 06:00	53.0	48.0

Table 17 Hourly Measured Data from NMP1

Measurement start time	Measured ambient sound level, $L_{\text{aeq},1\text{hr}}$ (dB)	Measured background sound level, $L_{\text{a90},1\text{hr}}$ (dB)
26/07/2024 14:00	60.3	55.5
26/07/2024 15:00	59.0	55.3
26/07/2024 16:00	59.7	54.8
26/07/2024 17:00	62.0	58.1
26/07/2024 18:00	64.5	59.2
26/07/2024 19:00	64.5	59.3
26/07/2024 20:00	66.1	60.4
26/07/2024 21:00	65.8	60.0
26/07/2024 22:00	52.7	43.2
26/07/2024 23:00	47.6	41.8
27/07/2024 00:00	46.6	39.5
27/07/2024 01:00	44.1	36.4
27/07/2024 02:00	48.1	36.5
27/07/2024 03:00	40.0	32.9
27/07/2024 04:00	42.8	36.4
27/07/2024 05:00	45.4	38.4
27/07/2024 06:00	47.7	40.2
27/07/2024 07:00	49.6	42.5
27/07/2024 08:00	50.7	45.2
27/07/2024 09:00	51.4	46.0
27/07/2024 10:00	52.3	47.4
27/07/2024 11:00	53.5	48.5
27/07/2024 12:00	54.3	50.2
27/07/2024 13:00	54.2	50.6
27/07/2024 14:00	55.4	52.4
27/07/2024 15:00	57.8	53.8
27/07/2024 16:00	61.4	54.0
27/07/2024 17:00	61.9	55.1
27/07/2024 18:00	57.5	54.3
27/07/2024 19:00	61.3	55.3



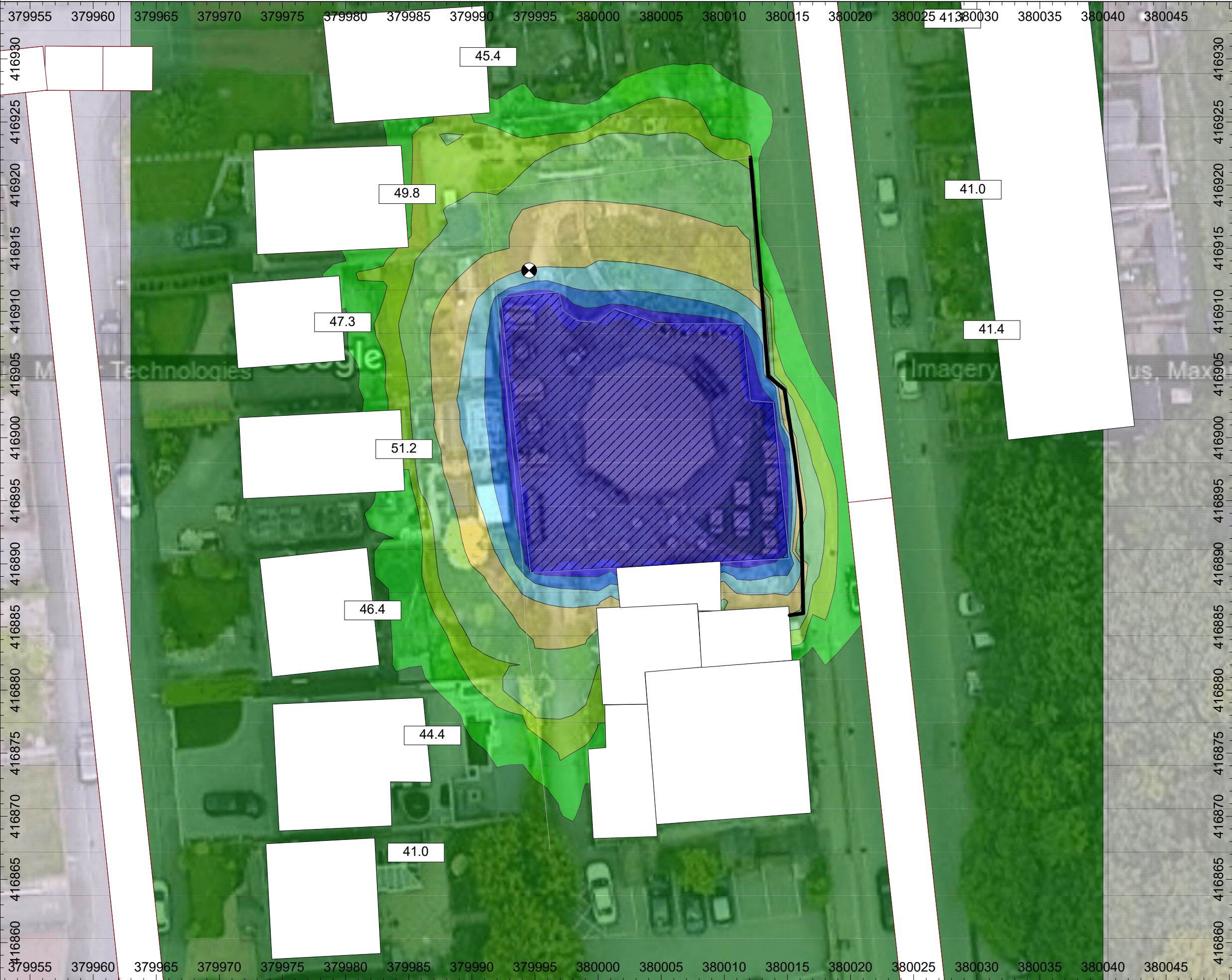
Measurement start time	Measured ambient sound level, $L_{\text{aeq},1\text{hr}}$ (dB)	Measured background sound level, $L_{\text{a90},1\text{hr}}$ (dB)
27/07/2024 20:00	61.5	56.6
27/07/2024 21:00	57.6	50.2
27/07/2024 22:00	50.1	43.8
27/07/2024 23:00	48.1	42.5
28/07/2024 00:00	46.7	41.2
28/07/2024 01:00	45.2	37.9
28/07/2024 02:00	43.5	37.3
28/07/2024 03:00	43.9	38.0
28/07/2024 04:00	43.5	36.8
28/07/2024 05:00	45.7	38.4
28/07/2024 06:00	45.9	39.6
28/07/2024 07:00	46.5	39.1
28/07/2024 08:00	49.2	42.4
28/07/2024 09:00	49.9	42.7
28/07/2024 10:00	50.6	44.6
28/07/2024 11:00	52.1	46.4
28/07/2024 12:00	53.1	49.0
28/07/2024 13:00	55.1	50.9
28/07/2024 14:00	56.0	52.4
28/07/2024 15:00	57.6	53.9
28/07/2024 16:00	58.0	55.1
28/07/2024 17:00	58.8	54.9
28/07/2024 18:00	57.4	54.4
28/07/2024 19:00	57.8	54.5
28/07/2024 20:00	58.0	53.3
28/07/2024 21:00	56.1	48.9
28/07/2024 22:00	48.6	44.4
28/07/2024 23:00	46.3	41.6
29/07/2024 00:00	45.6	38.1
29/07/2024 01:00	41.8	35.7
29/07/2024 02:00	39.1	34.3
29/07/2024 03:00	42.0	35.1
29/07/2024 04:00	44.1	38.2
29/07/2024 05:00	49.9	42.9
29/07/2024 06:00	51.7	46.3

APPENDIX III

FIGURES



Figure 3 - Daytime Grid Noise Map (No Planned Event - Parton Noise & Background Music Only) - Calculation at 1.5m above ground level



Project:
Eagle and Child,
Ramsbottom

Project-No:
51-297

Client:
Daniel Thwaites PLC

**Daytime Noise Level,
LAeq (dB)**

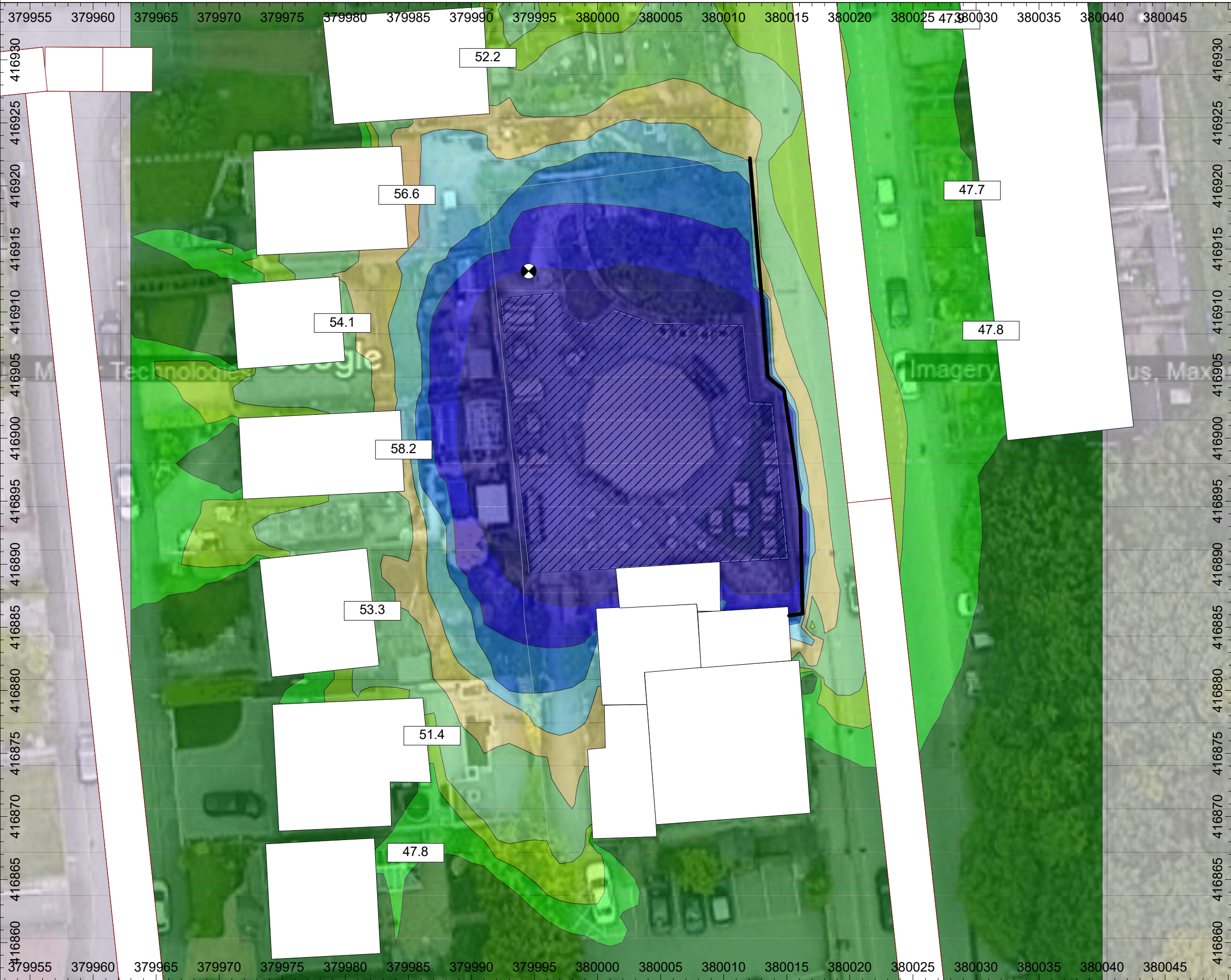
...	<= 48
48 < ...	<= 50
50 < ...	<= 52
52 < ...	<= 56
56 < ...	<= 58
58 < ...	<= 60
60 < ...	<= 62
62 < ...	<= 65
65 < ...	

Noise Map Objects

	Area Source
	Road
	Building
	Barrier
	Receiver
	Calculation Area

Project Engineer: Scott Boughton
Date: 30/07/2024

Figure 4 - Daytime Grid Noise Map (Planned Event - Highest Hour) - Calculation at 1.5m above ground level



Project:
Eagle and Child,
Ramsbottom

Project-No:
51-297

Client:
Daniel Thwaites PLC

Daytime Noise Level, LAeq (dB)

...	<= 48
48 < ...	<= 50
50 < ...	<= 52
52 < ...	<= 56
56 < ...	<= 58
58 < ...	<= 60
60 < ...	<= 62
62 < ...	<= 65
65 < ...	

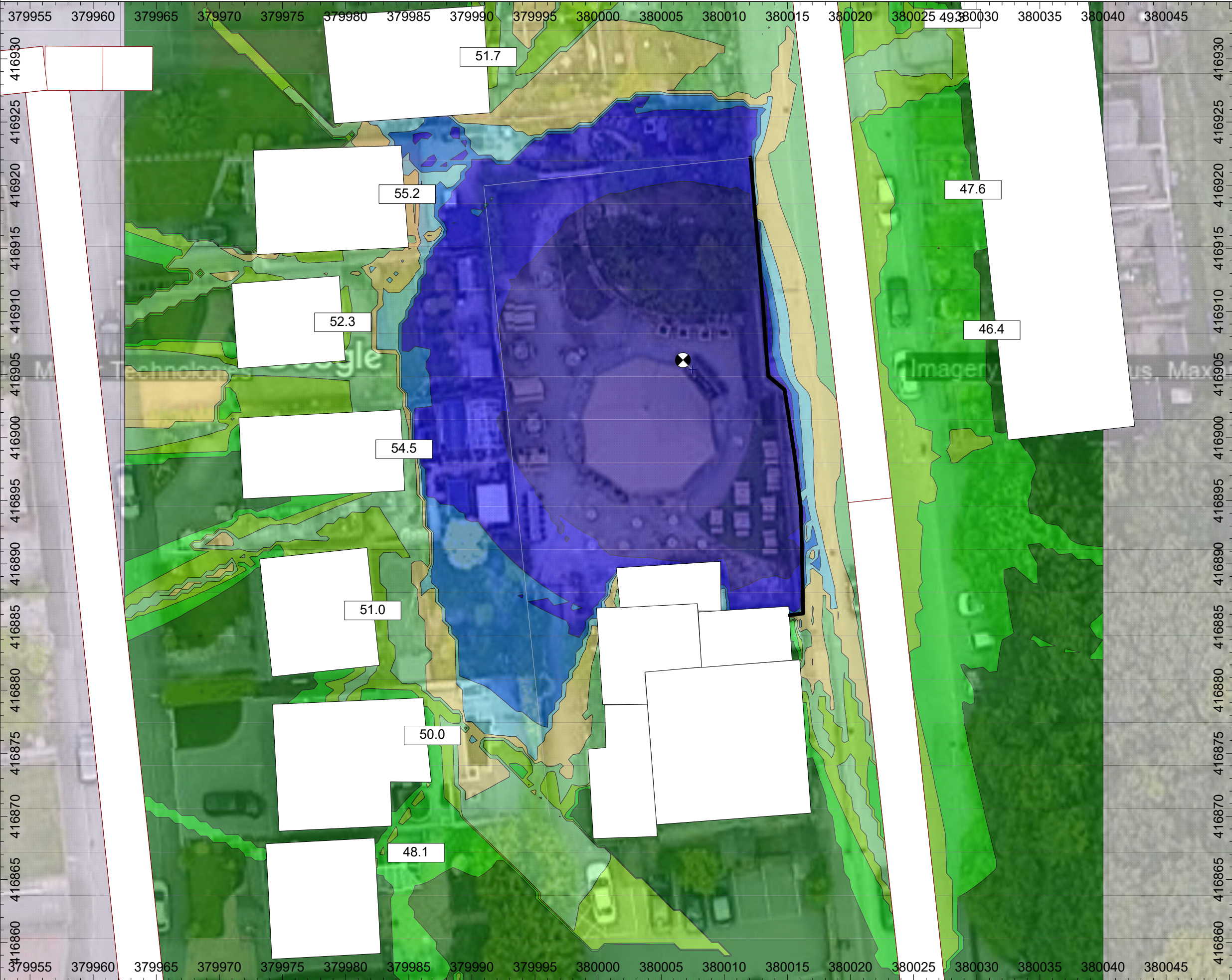
Noise Map Objects

- Area Source
- Road
- Building
- Barrier
- Receiver
- Calculation Area

e3p

Project Engineer: Scott Boughton
Date: 30/07/2024

Figure 5- Daytime Grid Noise Map (BS 4142 - Heater in operation) - Calculation at 1.5m above ground level



Project:
Eagle and Child,
Ramsbottom

Project-No:
51-297

Client:
Daniel Thwaites PLC

Daytime Rating Noise Level, LAr (dB)

... ≤ 48
48 < ... ≤ 50
50 < ... ≤ 52
52 < ... ≤ 56
56 < ... ≤ 58
58 < ... ≤ 60
60 < ... ≤ 62
62 < ... ≤ 65
65 < ...

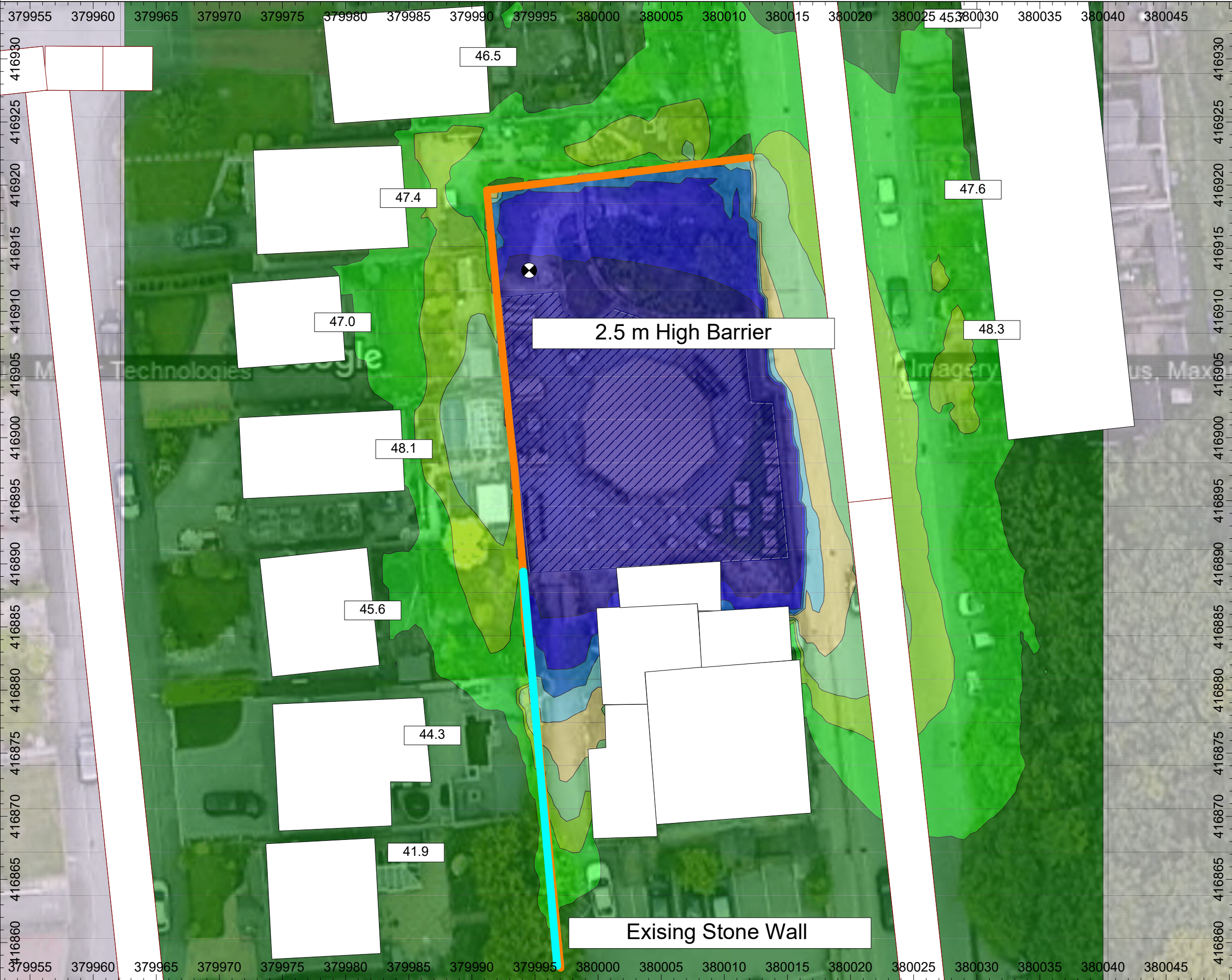
Noise Map Objects

+	Point Source
□	Road
□	Building
—	Barrier
⊗	Receiver
□	Calculation Area



Project Engineer: Scott Boughton
Date: 30/07/2024

Figure 6 - Daytime Grid Noise Map Mitigation (Highest Hour) - Calculation at 1.5m above ground level



Project:
Eagle and Child,
Ramsbottom

Project-No:
51-297

Client:
Daniel Thwaites PLC

**Daytime Noise Level,
LAeq (dB)**

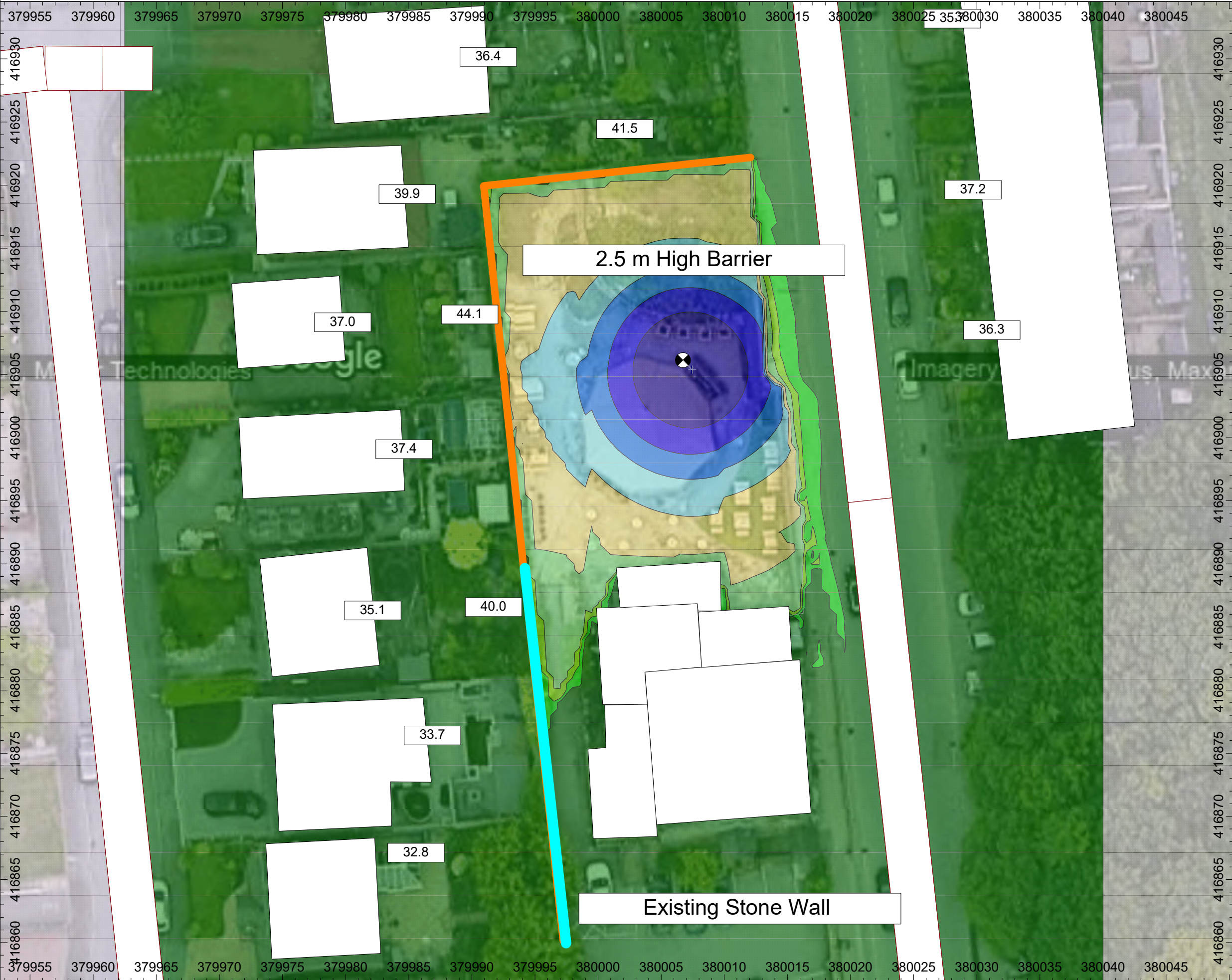
...	<= 48
48 < ...	<= 50
50 < ...	<= 52
52 < ...	<= 56
56 < ...	<= 58
58 < ...	<= 60
60 < ...	<= 62
62 < ...	<= 65
65 < ...	

Noise Map Objects

	Area Source
	Road
	Building
	Barrier
	Receiver
	Calculation Area

Project Engineer: Scott Boughton
Date: 30/07/2024

Figure 7 - Daytime Grid Noise Map with mitigation (BS 4142 - Heater in operation, with enclosure and barrier) - Calculation at 1.5m above ground level



Project:
Eagle and Child,
Ramsbottom

Project-No:
51-297

Client:
Daniel Thwaites PLC

**Daytime Rating
Noise Level,
LAr (dB)**

...	<= 48
48 < ...	<= 50
50 < ...	<= 52
52 < ...	<= 56
56 < ...	<= 58
58 < ...	<= 60
60 < ...	<= 62
62 < ...	<= 65
65 < ...	

Noise Map Objects

- Point Source
- Road
- Building
- Barrier
- Receiver
- Calculation Area

e3p

Project Engineer: Scott Boughton
Date: 30/07/2024