17 St Edwards Street, Leek

Planning Noise Assessment

Report 16/0438/R1

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17 St Edward Street
Leek
ST13 5DR

Revision	Description	Date	Prepared	Approved
0	1st issue	2nd December 2016	Ben Harper	Johnny Berrill

Cole Jarman Limited Reg. in England and Wales No. 7102436
Head Office +44 (0)1932 829007
John Cree House, 24B High Street, Addlestone, Surrey, KT15 1TN

info@colejarman.com www.colejarman.com
Manchester Office +44 (0)161 2093644
Peter House, 1 Oxford Street, Manchester, M1 5AN

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Planning Noise Assessment

1 Introduction

1.1 It is proposed to convert the existing premises at 17 St Edwards Street, Leek, ST13 5DR from A3 (restaurant) use to A5 (hot takeaway) use. As part of this conversion, new mechanical services plant will be installed at the rear of the site.

1.2 The site falls within the jurisdiction of Staffordshire Moorland District Council.

1.3 Cole Jarman has been instructed to undertake a noise assessment of both the plant noise equipment and the impact from the delivery vehicles in order to quantify and, if necessary, mitigate the impact on amenity.

1.4 As part of these assessments Cole Jarman have completed noise surveys on site. The details of these surveys along with the assessments and any mitigation measures are also included within this report.

2 Site Description

2.1 The full site address is 17 St Edward Street, Leek, ST13 5DR. The site is illustrated on the attached site plan 16/0438/F1.

2.2 The hot food takeaway will be occupying the ground floor and basement of a mixed use terraced property, with residential flats on the upper floors. The unit fronts directly onto St Edward Street and is part of a mixed use retail and residential parade.

2.3 The site had previously been trading as a restaurant with an ancillary takeaway element on a mixed use parade. The site is surrounded by mixed use properties, both residential and retail units. Running north and south is St Edwards Street, to the west of the site is High Street, with some on street parking where delivery drivers will park.

2.4 To the east of the unit is a one-way street to which traffic is forbidden except for loading, all other curb sides next to the unit are marked with double yellow lines.

3 Environmental Noise Survey

3.1 **Methodology and Instrumentation**

3.1.1 An unattended noise survey was undertaken on site commencing at 15h45 on the 24th November 2016 and continuing until 10h35 on the 25th of November 2016 in order to represent the quietest period of the daytime and the full night time period.

3.1.2 The measurements were undertaken at two locations, MP1 located to the rear of the unit and MP2 located at the front of the unit. The two locations are described below, and are also marked up on the attached site plan 16/0438/F1.

- MP1 – At the rear of the site in a free field location at first floor level, representative of the nearest residential receiver to the plant items.
- MP2 – At the front of site 1m from the façade, at a height representative of the residential windows opposite the unit relevant to the delivery noise assessment.

3.1.3 Measurements of the L_{Aeq}, L_{Amax}, and L_{A90} indices were taken over consecutive 15 minute periods (see Glossary of Acoustic Terms for an explanation of the noise units used).

3.1.4 Noise measurements were made using the equipment listed in tableT1 below:

Item	Manufacturer	Type
Sound Level Analyser x2	Rion	NL-52
Acoustic Calibrator x2	Rion	NC-74
Weatherproof windshield x2	Rion	WS-15

T1 Equipment used during attended noise survey.

3.1.5 All microphones were fitted with weather proof windshields and were calibrated before and after the survey to ensure a consistent and acceptable level of accuracy was maintained throughout. No significant drift was observed.

3.1.6 The weather conditions when setting up and collecting the noise monitoring equipment were bright and cool with no rain and a slight breeze.

3.2 Results

3.2.1 The noise levels measured during the survey are presented in the attached time history figure 16/0438/TH01.

3.2.2 The prevailing noise climate at MP1 comprised primarily existing plant noise. At MP2 the noise climate was dominated by road traffic noise on St Edwards street and other surrounding roads. Other smaller contributions to the noise climate were caused by distant aircraft and passing pedestrians.

3.2.3 Representative background noise levels as measured during the survey have been displayed in table T2:

Location	Representative Background Noise, L_{A90} (dB)	
	Day Time (07h00-23h00)	Night-time (24-hour)
MP1 – Rear of the property	47	34

T2 Representative background noise levels at MP1

3.2.4 The noise indices measured at MP2 during the most sensitive time period for deliveries are displayed in table T3 below:

Representative Hourly Time Period	Measured Noise Indices at MP2 (dB)		
	$L_{Aeq,1hr}$	L_{Amax}	$L_{A90,1hr}$
18h00-19h00	56.8	86.6	51.6
19h00-20h00	58.5	78.1	54.1
20h00-21h00	58.7	78.9	53.9
21h00-22h00	57.6	75.9	55.6
22h00-23h00	57.4	80.1	55.5

T3 Noise indices measured at MP2 during attended survey.

4 Assessment Criteria

4.1 Plant Noise Emission Criteria

4.1.1 BS 4142:2014 states that, when comparing the predicted rating level of the proposed noise generating development with the existing background level in order to assess the likelihood of complaints:

b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

d) 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 or a significant 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, depending on the context.

NOTE 2 Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact

4.1.2 Based on this it is expected that mechanical service plant items with a rating level of no greater than the existing background level would not result in an indication of an adverse impact and hence would be considered acceptable. This approach has been confirmed with Environmental Health.

4.1.3 Based on the survey results, the position of the plant and the Local Authority requirements, the following plant noise limits are to apply:

Location	**Noise Emission Limit, dB**	
	Daytime (0700-2300 only)	**Night time (24-hour)**
Closest residential receivers	47	34

T4 Plant noise emission limits at the nearest residential properties.

4.1.4 The noise limits are to apply at 1m from the outside of nearby residential windows. Plant noise limits must be met with all relevant plant operating simultaneously at full duty.

4.1.5 If any items of plant exhibit characteristic acoustic features such as tonality, intermittency, or impulsivity corrections must be applied in line with the guidance provided in BS 4142:2014.

Criteria Relevant to Delivery Noise Assessment

4.2 National Planning Policy Framework

4.2.1 National planning guidance has been issued superseding various Planning Policy Guidance and Planning Policy Statements including PPG24 Planning and Noise.

4.2.2 In the National Planning Policy Framework (NPPF) specifically on the subject of noise, paragraph 123 states:

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 business 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, and

Identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for the recreational and amenity value for this reason.

4.2.3 While the NPPF does not provide any technical guidance on noise, the intention is the planning system should seek to deter development that will give rise to significant adverse noise effects, but not stand in the way of reasonable development, with predicted noise impacts being mitigated as necessary and practicable.

4.3 Ambient Noise Levels

Absolute Noise Level Criteria - World Health Organisation

4.3.1 WHO Guidelines for Community Noise and BS8233[1]. provide guidance correlating to annoyance to external absolute daytime noise levels. Thresholds of 55dB $L_{Aeq,16h}$ and 50dB $L_{Aeq,16h}$ are quoted within WHO guidelines, referring to "serious" and "moderate" annoyance respectively.

4.3.2 WHO document 'Guidelines for Community Noise' provides relevant guidance. Table 4.1 states the following aspirational criteria:

[1] BS 8233:2014 – Guidance on sound insulation and noise reduction for buildings

Specific Environment	Critical Health effect(s)	L_{Aeq} (dB)	Time Base (h)
Outdoor Living Area	Serious annoyance, daytime and evening	55	16
Outdoor Living Area	Moderate annoyance, daytime and evening	50	16
Outside Bedrooms	Sleep disturbance, window open (outdoor values)	45	8

T5 Partial replication of table 4.1 from WHO Guidelines for Community Noise

4.3.3 The time base period is related to the day or night time assessment periods. The levels for outdoor living areas apply to the 16 hour daytime period (0700-2300h). The levels for outside bedrooms only apply to the 8 hour night time period (2300-0700h).

4.3.4 BS 8233 reflects WHO guidelines in section 7.7.3.2 where the following is stated:

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 recognized that these guideline values are not achievable in all circumstances where development might be desirable.

4.3.5 Although the outdoor living criteria are for open spaces (i.e. gardens), it also applies to outside the façade of the building during the day. This is in line with the criteria for internal levels, as achieving 50dBA at the façade will give the required 35dBA internally via a partially open window (which gives around 15dB reduction).

4.3.6 The same approach can also be taken with noise level during the night time period where achieving 45dBA at the façade will give the required 30dBA internally via a partially open window.

4.3.7 In summary therefore, achieving absolute noise levels, taking into account contributions from existing and new sources, below 50 dB $L_{Aeq,T}$ during the daytime and 45 dB $L_{Aeq,T}$ during the night time would be considered at worst a Minor impact.

Noise Level Change Criteria

4.3.8 In addition to absolute noise levels, it is appropriate to assess the impact of noise level change due to a proposed development. In determining the correct procedures for assessing the potential noise impact of a development on nearby residents, there are various key documents to which one should refer for guidance.

4.3.9 The assessment criteria proposed is based upon guidance contained within DMRB[2], *Guidelines for Environmental Noise Impact Assessment* (2014).

4.3.10 Vehicle movements are likely to vary significantly over the course of a day and night time, for example during rush hours. It is therefore not appropriate to only consider noise levels in terms of $L_{Aeq,16\ hour}$ and $L_{Aeq,8\ hour}$ for full day and night time periods respectively, as these indices have the potential to not properly reflect the variable nature of road traffic on such low flow roads. Instead, changes in noise level are assessed in terms of $L_{Aeq,1\ hour}$ for each hour within a 24 hour day. The significance of the change in a given period can then be determined.

4.3.11 Based on the information above, Table T2 shows proposed criteria by which noise impact from the proposed access road will be assessed in relation to the nearby noise sensitive receptors. As noted above, the change in $L_{Aeq,1\ hour}$ for each period within a 24 hour should be considered.

Noise Change	**Magnitude of Impact**	
dB(A)	**Short Term**	**Long Term**
0	No change	No change
0.1 to 0.9	Negligible	Negligible
1.0 to 2.9	Minor	Negligible
3.0 to 4.9	Moderate	Minor
5.0 to 9.9	Major	Moderate
10+	Major	Major

T6 Noise impact descriptors

4.3.12 The new noise source will also be introduced to the existing noise climate over a relatively short period of time and traffic flows are not expected to vary between the long and short term after opening. Assessing the short term impact can therefore be considered to be the worst case.

Ambient Noise Levels Criteria Summary

4.3.13 The table below provides the proposed assessment criteria based on the guidance above for absolute noise levels and variations in the existing noise climate, considering the more pessimistic short term impacts:

[2] Design Manual for Roads and Bridges, Volume 11, Section 3, 2011

Free Field Absolute Noise Level	Noise Change dB(A)	Magnitude of Impact Short Term
Day Time (0700 – 2300h)		
$L_{Aeq,1h}$ < 50 dB	0	No change
	0.1 to 0.9	Negligible
	1+	Minor
50dB ≤ $L_{Aeq,1h}$ < 55dB	0	No change
	0.1 to 0.9	Negligible
	1.0 to 2.0	Minor
	3+	Moderate
$L_{Aeq,1h}$ ≥ 55 dB	0	No change
	0.1 to 0.9	Negligible
	1.0 to 2.9	Minor
	3.0 to 4.9	Moderate
	5.0 to 9.9	Major
	10+	Major
Night Time (2300 – 0700h)		
$L_{Aeq,1h}$ < 45 dB	0	No change
	0.1 to 0.9	Negligible
	1	Minor
$L_{Aeq,1h}$ ≥ 45 dB	0	No change
	0.1 to 0.9	Negligible
	1.0 to 2.9	Minor
	3.0 to 4.9	Moderate
	5.0 to 9.9	Major
	10+	Major

T7 Assessment Criteria, Ambient Noise Levels

4.3.14 When considering the noise impact above Negligible or Minor impacts would be expected to be consistent with the requirements of the NPPF, specifically paragraph 123, to avoid significant adverse impacts.

5 Plant Noise Assessment

5.1 Plant Items

5.1.1 The mechanical plant equipment installed on site is detailed in the attached plant noise schedule, as well as being listed below:

- Air conditioning unit: Mitsubishi Heavy Industries FDC 100VNX
- Cold Room Condenser: Karbox 2464
- Extract Fan: Vent Axia Black Sabre
- Intake Fan: Air Vent Tech Model 5

5.1.2 The plant is proposed to be located at basement level under an external staircase to the rear of the unit with the intake to terminate at a louvered wall grille within the alleyway to the south and the extract duct to terminate 1m above the eaves, on the rear façade.

5.1.3 It is proposed that the plant runs throughout the opening hours of the proposed hot food takeaway's, 1100-2300 daily with only the cold store condenser running 24 hours a day.

5.1.4 Our assessment is based on manufacturer's noise data for each plant item as shown in the attached schedule 16/0438/PNS1. The noise data suggests that no tonality correction need be applied.

5.1.5 The assessment has considered the nearest and most exposed receptor to the proposed plant, labelled on attached site plan 16/0438/F1 and described as follows:

- AP1 – Residence above the unit

5.1.6 The specific noise levels generated by the equipment at the assessment positions have been calculated by correcting the plant noise levels for distance and radiation losses, façade reflections and screening where appropriate.

5.2 Mitigation Measures

5.2.1 Calculations of noise propagation from the proposed plant equipment have been undertaken. Our calculations have accounted for distance and radiation losses, bend losses, duct breakout losses, façade reflections, and screening where appropriate.

5.2.2 The results of our assessment indicate that reduction of noise emissions from the proposed plant items will be required in order to meet the limits imposed by the local council.

5.2.3 The cold store and A/C condensers must be installed within an acoustic enclosure meeting the insertion loss shown in table T8 below. One company which produces such an enclosure which will achieve the insertion losses in Environ Technologies Ltd[3].

5.2.4 It will be necessary to mitigate emissions from the supply intake and kitchen extract fans. The minimum insertion loss requirement for these silencers can be found in table T8 below.

	Octave Band Centred Frequency (Hz)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Acoustic Enclosures	12	13	20	29	36	37	39	39
Supply Silencer	4	9	17	26	31	30	23	16
Extract Silencer	5	9	17	18	20	11	7	6

T8 Required insertion losses

5.2.5 The silencers should be located within the demise of the building, close to the fans so that noise breakout from the duct is also reduced. The kitchen extract fan silencer should be Melinex-faced to allow for cleaning. The insertion losses required for the intake duct is expected to be achieved with a silencer of 1200mm length and 40% free area, while the extract silencer requirement is likely to be achieved using a silencer of 900mm length and 43% free area.

5.2.6 The rating noise levels calculated with the mitigation measures specified above installed on site are shown in table T9. It can be seen that the plant noise limits are met at all locations.

Location	**Rating Noise Level, dB(A)** *(Limit)*	
	Daytime (0700-2300 only)	**Night time (24-hour)**
AP1 – Residence above the unit	43 *(47)*	22 *(34)*

T9 Plant noise emission levels at the nearest residential properties.

[3] www.Environ.co.uk

6 Delivery Impact Assessment

6.1 It is understood by Cole Jarman that deliveries will be taken from the front of the unit on St Edwards Street with only the front of the unit being used for deliveries.

6.2 Criteria for the assessment has been discussed in section 4 above.

6.3 The existing ambient noise levels at the assessment position have been quantified in the attended survey discussed above in section 3, with measured values at MP2 displayed in table T3 above.

6.4 It has been assumed that a mixture of mopeds and cars will be used for the delivery operations.

6.5 Typical delivery numbers have been used from a similar hot food takeaway, and were taken from a store already operating until 23h00 and which was assessed to provide representative delivery predictions for the store at St Edwards Street.

6.6 The figures used in calculations are average figures from Friday and Saturday nights which have been rounded up to the nearest integer. These delivery figures were then split equally between deliveries by car and deliveries by moped and yet again rounded up to the nearest integer. This approach provides typical worst case delivery figures and therefore make for the basis of a robust assessment.

6.7 The number of collections was also provided by a similar hot food takeaway and was taken from the same store as used for delivery figures. The average number of customer collections was rounded up to the nearest whole integer, and it was assumed that all collections were made by cars. This approach provides typical worst case collections figures. As no allowance has been made for collections on foot, which will typically make up a proportion of the collected figures, the impact value calculated can be considered worst case, and typically at night would be expected to be lower.

6.8 The table below summarises the values used in the calculations after all rounding.

Time	Moped Deliveries	Car Deliveries	Customer Collections
18h00-19h00	12	12	7
19h00-20h00	13	13	4
20h00-21h00	8	8	4
21h00-22h00	4	4	4
22h00-23h00	2	2	3

T10 Delivery and collection numbers used within ambient noise impact calculations

6.9 The noise impact assessment has been undertaken to a single assessment position, AP2, representing the worst case impact figures. The impact at any other receiver will be of a lower order magnitude than that calculated for AP2, because of angle of view, screening, and distance affects. Assessment position 2, AP2, is illustrated on the attached site plan 16/0438/F1 and is described below:

- AP2 – Residential first floor window opposite the unit on St Edwards Street

6.10 The calculations predict the worst case delivery paths of vehicles, and calculations have accounted for losses from distance, angle of view, screening and various other acoustic affects such as façade reflection.

6.11 Noise data used within calculations has been sourced by Cole Jarman and was measured on site at representative locations. The noise data used is displayed in table T11:

Activity	**Distance m**	**Measured Sound Level L_{SEL}**
Car pass	5	72
Car start up	5	70
Car door open/close	5	65
Moped pass	5	70
Moped start up	5	73

T11 Single event level, L_{SEL} noise values used within calculations

6.12 The change in existing noise level resulting from delivery operations at each position has been calculated from 18h00 to 23h00 when the unit is proposed to close. Noise impact figures were calculated from 18h00 onwards as the existing ambient noise levels tend to start falling at this time. However, it should also be noted that delivery numbers also reduce into the night, and therefore delivery operations are not operating at full capacity during the proposed hours.

6.13 The calculated ambient noise level impact values at AP2 are shown below in table T12:

Time Period	Existing Ambient Noise	Calculated Delivery Noise	AP1 Sum of Existing and Calculated	Change in Ambient Noise Level	Impact Criteria
	dB $L_{Aeq,\ 1h}$	dB $L_{Aeq,1hr}$	dB $L_{Aeq,1h}$	dB	
18h00-19h00	58.5	54.3	59.9	1.4	Minor
19h00-20h00	58.7	54.0	60.0	1.3	Minor
20h00-21h00	57.6	52.5	58.8	1.2	Minor
21h00-22h00	57.4	50.1	58.1	0.7	Negligible
22h00-23h00	56.8	48.3	57.4	0.6	Negligible

T12 Predicted noise impact associated with delivery operations at AP5

6.14 It can be seen that the calculated impact to the existing ambient noise climate falls within the 'Negligible', and 'Minor' impact criteria. Therefore, negative impact to amenity should not be expected from the hot food delivery operations at the proposed takeaway.

7 Conclusion

7.1 It has been found that with the specified mitigation measures in place the plant equipment installed on site will meet, or improve upon, criteria set in agreement with Staffordshire Moorland District Council. The details of the required mitigation measures are found in section 5.2. Measures include atmospheric side silencers on the extract and fresh air fan along with an acoustic environmental enclosure for the condensers. All mitigation measures must meet or exceed the minimum requirements set out within this report.

7.2 The delivery impact assessment has shown that the proposed delivery operations will fall within the 'Negligible', or 'Minor' impact criteria. As discussed in sections 4.2 and 4.3 impact of such magnitude should be seen as in line with the requirements of the National Planning Policy Framework, NPPF, and therefore the impact to residents, if any, are considered acceptable. This is the case as St Edwards Street already maintains traffic throughout the night, and therefore the comparatively small addition of several delivery vehicles does not have a significant influence on the existing noise environment.

End of Section

Glossary of Acoustic Terms

L_{Aeq}:

The notional steady sound level (in dB) which over a stated period of time, would have the same A-weighted acoustic energy as the A-weighted fluctuating noise measurement over that period. Values are sometimes written using the alternative expression dB(A) L_{eq}.

L_{Amax}:

The maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise when occasional loud noises occur, which may have little effect on the L_{Aeq} noise level. Unless described otherwise, L_{Amax} is measured using the "fast" sound level meter response.

L_{A10} & L_{A90}:

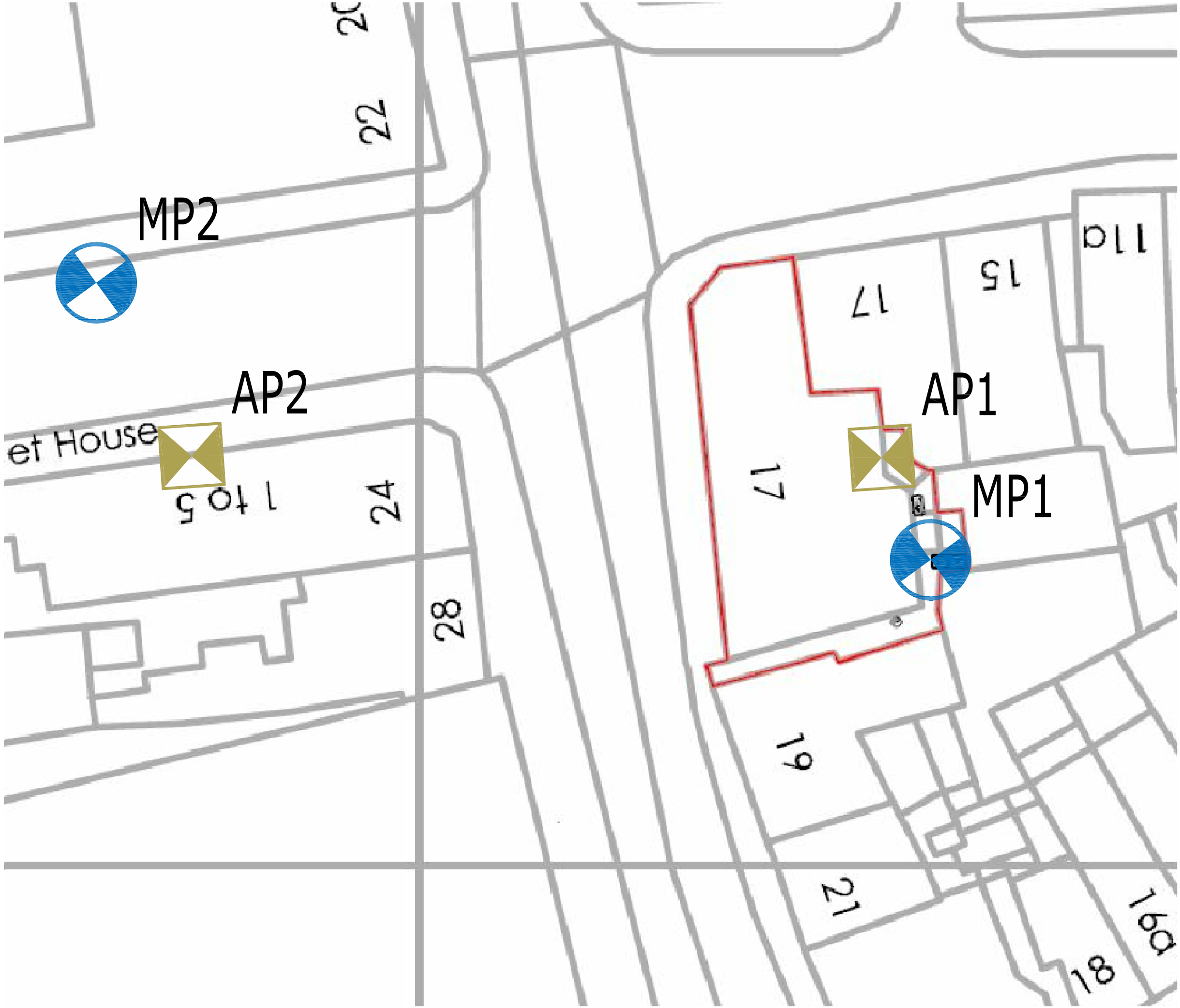
If non-steady noise is to be described, it is necessary to know both its level and degree of fluctuation. The L_{An} indices are used for this purpose. The term refers to the A-weighted level (in dB) exceeded for n% of the time specified. L_{A10} is the level exceeded for 10% of the time and as such gives an indication of the upper limit of fluctuating noise. Similarly L_{A90} gives an indication of the lower levels of fluctuating noise. It is often used to define the background noise.

L_{A10} is commonly used to describe traffic noise. Values of dB L_{An} are sometimes written using the alternative expression dB(A) L_{n}.

L_{AX}, L_{AE} or SEL

The single event noise exposure level which, when maintained for 1 second, contains the same quantity of sound energy as the actual time varying level of one noise event. L_{AX} values for contributing noise sources can be considered as individual building blocks in the construction of a calculated value of L_{Aeq} for the total noise. The L_{AX} term can sometimes be referred to as Exposure Level (L_{AE}) or Single Event Level (SEL).

End of Section



Cole Jarman

Figure 16/0438/F1

Title:

Site plan with measurement and assessment positions indicated

Measurement Position

Assessment Position

North

Project:

Hot Food Takeaway, Leek

Date: December 2016

Revision: -

Scale: Not to scale

Cole Jarman Limited
t +44 (0)1932 829007 **f** +44 (0)1932 829003

John Cree House, 24B High Street, Addlestone, Surrey KT15 1TN
e info@colejarman.com **w** www.colejarman.com

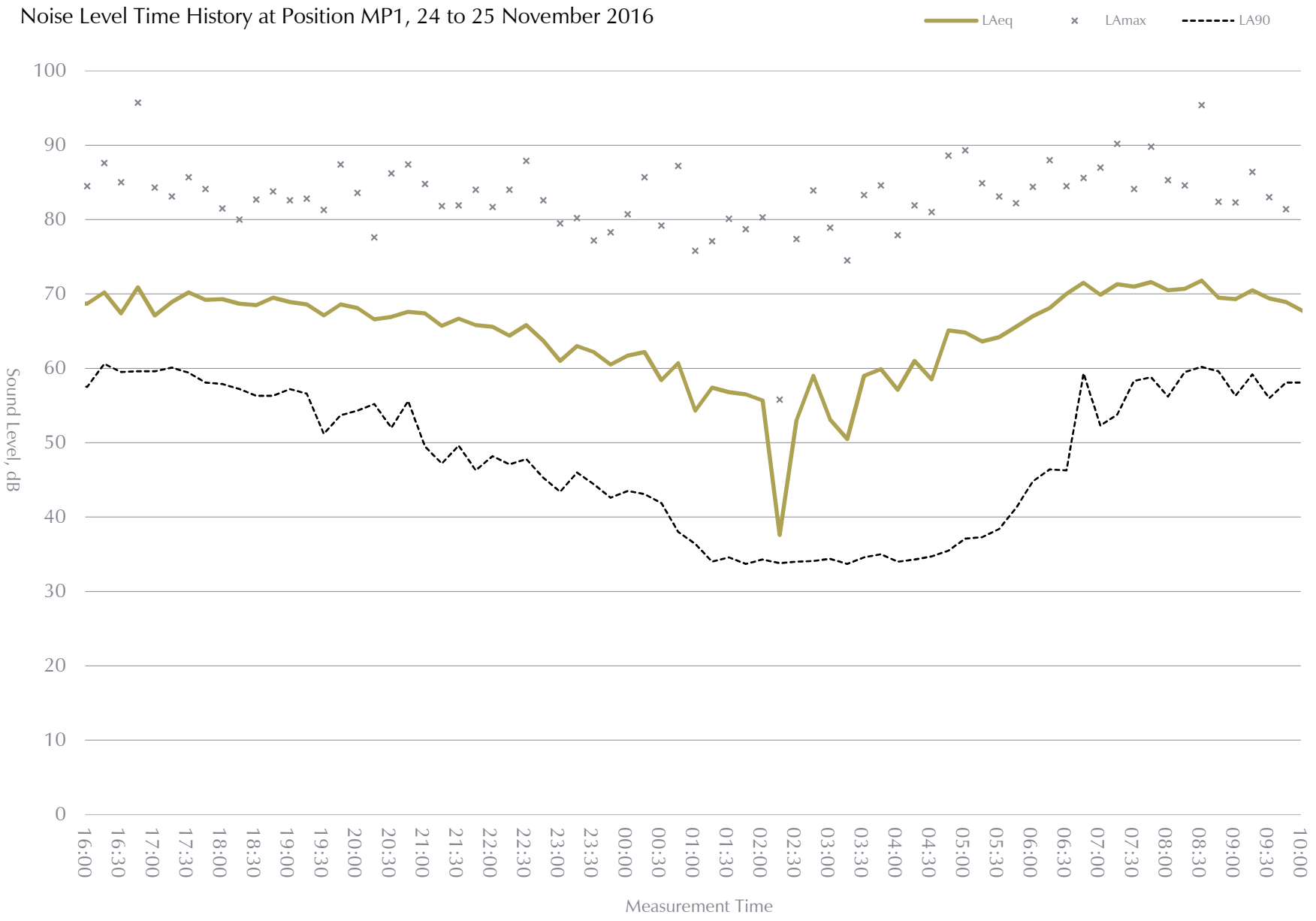


Figure 16/0438/TH01

Noise Level Time History at Position MP1, 24 to 25 November 2016

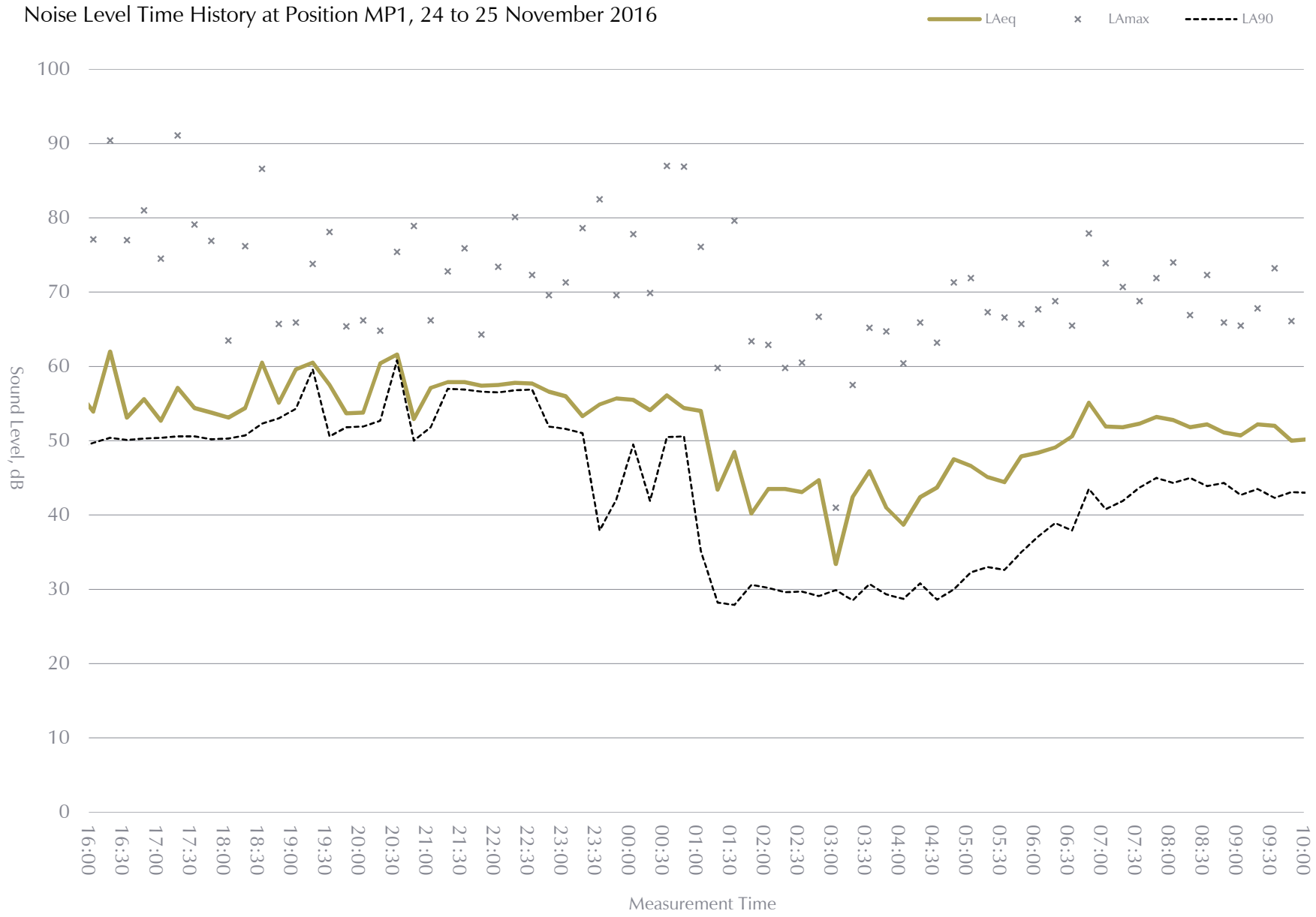


Figure 16/0438/TH02

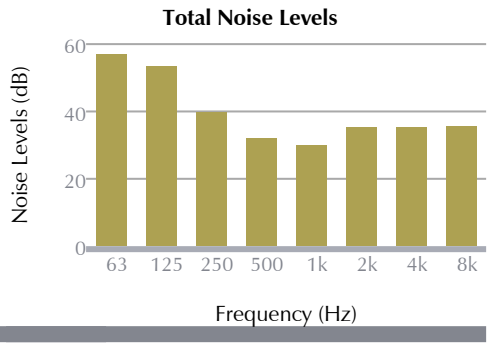
Schedule of Plant and Air Handling Equipment Sound Levels, dB

Reference	Description	Data Source[1]	Noise Level Type	Noise Levels (dB)							
				63	125	250	500	1k	2k	4k	8k
Supply Fan	Air Vent Tech Model 5	Man	Sound Power, Lw	77	79	73	74	77	77	74	69
Extract Fan	Vent Axia Black Sabre BSC500/4	Man	Sound Power, Lw	80	79	76	72	75	75	68	61
A/C Unit	Mitsubishi Heavy Industries FDC100VNX	Man	Sound Power, Lw	49	56	60	62	59	56	52	44
Cold Room Condenser	Karbox 2464	Man	Sound Power, Lw	64	61.5	61.5	63	59.4	57.3	54.1	46.9

Notes

1 - Man refers to data supplied by the equipment manufacturer or supplier, Emp refers to data calculated using empirical formulae, and Meas refers to data measured by Cole Jarman

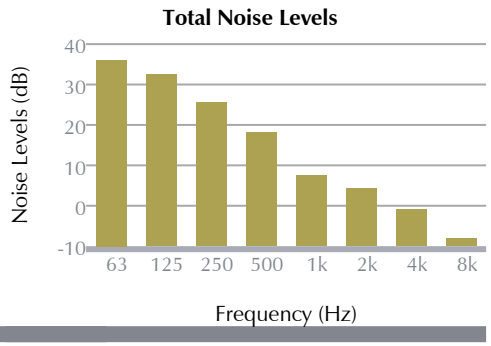
Project Name	17 St Edwards Street, Leek
Project Reference	16-0438
Receiver Reference	AP1 - Day
Description	Residential receiver above unit
Noise Limit	47
dBA	43.2



Reference	Noise Levels (dB)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Extract Fan	51.3	46.3	33.3	26.2	25.1	34.1	31.1	25.1
Cold Room Condenser	36	32.5	25.5	18	7.4	4.3	-0.9	-8.1
A/C Unit	19.5	25.5	22.5	15.5	5.5	1.5	-4.5	-12.5
Supply Fan	55.3	52.3	38.3	30.2	28.1	29.1	33.1	35.1

External Reciever Summary 16-0438/RS2

Project Name	17 St Edwards Street, Leek
Project Reference	16-0438
Receiver Reference	AP1 - Night
Description	Residential receiver above unit
Noise Limit	34
dBA	21.6



Reference	Noise Levels (dB)							
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
Cold Room Condenser	36	32.5	25.5	18	7.4	4.3	-0.9	-8.1

Cole Jarman Limited Reg. in England and Wales No. 7102436
Head Office +44 (0)1932 829007
John Cree House, 24B High Street, Addlestone, Surrey, KT15 1TN

info@colejarman.com www.colejarman.com
Manchester Office +44 (0)161 2093644
Peter House, 1 Oxford Street, Manchester, M1 5AN