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Huddersfield Bus Depot, Old Fieldhouse Lane, Huddersfield, HD2 1AG

Noise Impact Assessment

For:
First Group

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Ref: NIA/12589/26/12906/v1/Old Fieldhouse Lane, Huddersfield
Issue: First
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Contents

1 Introduction

1.1 Overview

Environmental Noise Solutions Ltd (ENS) has been commissioned by First Group (hereafter referred to as 'the client') to undertake a noise impact assessment for new bus depot charging infrastructure at the clients existing bus depot at Old Fieldhouse Lane, Huddersfield, HD1 1AG (hereafter referred to as 'the site').

This report presents:

- The methodology and results of a noise survey conducted at the site
- The assessment of potential impact of noise emission from the proposals on existing noise sensitive receptors

This report has been prepared on behalf of the client for the sole purpose described above and no extended duty of care to any third party is implied or offered. Third parties referring to the report should consult the client and ENS as to the extent to which the findings may be appropriate for their use.

A glossary of acoustic terms used in the main body of the text is contained in Appendix A.

1.2 Site Description and Proposals

The site is located within First Group's existing bus depot off Old Fieldhouse Lane, Huddersfield, approximately centred on grid reference: 415892,418678, in an area of mixed commercial and residential land uses.

The proposed site location is presented on Figure 1.1 below.

Figure 1.1: Development Site Boundary

The proposals are for the demolition of parts of the existing depot and the installation of new charging points, allowing the client's existing conventional fossil fuel powered buses to be replaced with electric and hybrid buses.

The site presently provides parking and maintenance space for the client's fleet of conventional buses, and it is understood that the proposals do not represent an intensification of use on the site, which is presently used by similar numbers of conventional buses.

2 Noise Criteria

2.1 Assessment Guidance

British Standard 4142: 2014 +A1:2019 "Methods for rating and assessing industrial and commercial sound"

BS 4142[1] presents methods for rating and assessing the potential impact of commercial and industrial sound upon noise sensitive receptors. The Standard is appropriate for the consideration of industrial and manufacturing processes, fixed installations which comprise mechanical and electrical plant and equipment and mobile plant / vehicles that form an intrinsic part of the industrial/commercial including the loading and unloading of goods and materials at the premises.

The noise impact magnitude is derived from the numerical subtraction of the representative[2] background noise level from the measured or calculated rating level of the specific sound under consideration. Typically, the greater this difference, the greater the magnitude of the 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
- 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

The 'rating level' must be determined considering the need for any 'character corrections' to the specific industrial/commercial noise level to account for tonal qualities, impulsive qualities, other sound characteristics and/or intermittency. This can be done using a subjective, objective or reference methods. Where multiple features are present the corrections should be added in a linear fashion to the specific level.

The subjective method is based on the corrections presented in Table 2.1.

Table 2.1: BS4142 Subjective Method 'Acoustic Feature' / Rating Corrections

Level of Perceptibility	Tonal Correction	Impulsivity Correction	Intermittency Correction	Other
None	0 dB	0 dB	+3 dB Where intermittency is readily identifiable	+3 dB Where neither tonal nor impulsive but clearly identifiable against prevailing soundscape
Just Perceptible	+ 2 dB	+ 3 dB		
Clearly Perceptible	+ 4 dB	+ 6 dB		
Highly Perceptible	+ 6 dB	+ 9 dB		

BS 4142 requires separate analysis for day and night time periods, evaluating the Rating level over an appropriate reference time interval (T_r) of:

- 1 hr during the day (between 07:00 – 23:00 hrs)
- 15 min during the night (between 23:00 – 07:00 hrs)

[1] British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound. British Standards Institution (2019)

[2] 'Representative' is generally considered to be 'typical' (e.g. formed by analysis of modal / mean average values) rather than the lowest measured

2.2 Noise Sensitive Receptors

The closest noise sensitive receptors are dwellings to the north of the Site boundary, as indicated on the site location plan included as Appendix B, and described in Table 2.4 below.

Table 2.4: Noise Sensitive Receptors

NSR	Description	Direction	Approximate minimum distance of facade to site boundary (m)
A	Residential dwellings on Leeds Road	South	300
B	Residential dwellings on Riddings Road	North	350

The closest existing residential dwellings to the proposed development location are located approximately 350m to the north on Riddings Road, and approximately 300m to the south on Leeds Road.

3 Noise Survey and Results

Noise monitoring was undertaken on Wednesday 25th and Thursday 26th March 2026 to assess noise levels in the vicinity of nearby noise sensitive receptors.

The following measurement positions were selected:

- Position 1 – in the vicinity of receptors on Leeds Road to the south of the site
- Position – in the vicinity of receptors to the north of the site on Riddings Road

The noise climate at each of the monitoring positions was controlled by local and distant road traffic noise.

All measurements were undertaken using Brüel & Kjaer 2250 Type 1 integrating sound level meter. The sound level meter was connected to a windshield covered microphone at a height of approximately 4 metres above ground level. Measurements were undertaken in free-field conditions.

The calibration of the measurement system was verified immediately before and after the survey period using a Brüel & Kjaer Type 4231 calibrator. No drift in calibration levels greater than 0.5 dB was noted.

Measurements consisted of A–weighted broadband parameters including $L_{Aeq,\,T}$, $L_{A10,}$ and L_{A90} together with linear octave band data.

Weather conditions throughout the survey were considered appropriate for noise monitoring with an absence of precipitation and average wind speeds ≤ 5ms^{-1}.

3.1 Summary of Results

Table 3.1 presents a summary of the noise data for each measurement period, rounded to the nearest decibel.

Table 3.1: Summary of Noise Measurement Data

Position	Date	Time (hh:mm)	$L_{Aeq,T}$ (dB)	$L_{A10,T}$ (dB)	$L_{A90,T}$ (dB)
1	25/03/26	23:01-23:31	59	59	48
	26/03/26	00:2-00:54	53	55	46
		01:55-02:25	51	54	45
2	25/03/26-26/03/26	23:44-00:14	50	44	34
	26/03/26	01:14-01:44	40	40	34
		02:32-02:47	44	39	33

3.2 Plant Noise Limits

BS 4142 rating noise limits for new items of fixed plant have been proposed. With reference to the guidance set out in Section 2, rating noise limits have been set at a level not exceeding 5 dB above the existing background noise level.

Representative background noise levels at each of the NSRs are derived from the lowest measured 15-minute period at each location.

Table 3.2 below presents the proposed rating noise limits.

Table 3.2: Rating Noise limits

NSR	Period	Representative background noise level (dB $L_{A90,T}$)	Proposed fixed plant rating noise limit (dB $L_{Ar,Tr}$)
A	Night Time (23:00-07:00)	45	≤ 50
B	Night Time (23:00-07:00)	33	≤ 38

4 Commercial Noise Assessment

4.1 Specific Noise Levels

To calculate specific noise levels at the nearest noise sensitive receptors, a three-dimensional Cadna-A noise model has been developed. Noise model geometry is based on Ordnance Survey mapping and terrain data and drawings supplied by the client.

Propagation of noise has been calculated in single figure broadband terms, at a height of 4m above ground level representative of first floor bedroom. All buildings within the model are assumed to be acoustically reflective, and first order reflections have been considered. The noise model assumes hard ground for propagation corrections. All buildings outside the site boundary have an assumed height of 8m.

The proposed fixed plant items and the associated calculated sound power levels based on manufacturer's data is presented below:

- 67 no. Heliox battery charger units – 73 dB L_{wA}
- 2 no. mains transformers – 62 dB L_{wA}

All plant is assumed to operate continuously and concurrently therefore the loudest 1-hour noise level is numerically equivalent to the loudest 15 minute night time value for the purposes of this assessment. In reality, it is unlikely that all chargers would be in use concurrently, and noise levels are expected to be lower than those presented in this assessment.

The noise model does not include for the effect of acoustic screening from buses on-site, to present the most onerous assessment. In reality, noise levels are likely to be lower than those presented.

A noise contour plot is presented as Figure C1 in Appendix C, with the calculated highest specific noise levels at the NSRs presented in Table 4.1 below.

Table 4.1: Calculated Specific Noise Levels at NSRs

Noise Sensitive Receptor	Specific plant noise Level [dB $L_{Aeq,T}$] at Receptor
A	25
B	25

With regard to potential 'acoustic feature' corrections, the following is considered:

- Whilst the plant is expected to operate 'on demand', it is expected to operate continuously for several hours. On this basis, it is not considered intermittent.
- Noise from the site is expected to result primarily from the operation of the fans used to cool the equipment during charging, which is unlikely to result in impulsive noise audible at nearby NSRs.
- The source noise levels used in this assessment are single figure broadband values, therefore an assessment of tonality is not possible. To ensure a robust assessment, a +4 dB correction has been applied representing 'clearly perceptible' tonality.

The calculated specific noise levels have been assessed in accordance with the methodology set out in BS 4142, including corrections for acoustic character discussed above. The results of the assessment are presented in Tables 4.2 and 4.3 for day and night, respectively.

Table 4.2: BS4142 Assessment – Night

Parameter	A	B
Typical background sound level (dB $L_{A90,15min}$)	45	33
Specific noise level (dB $L_{Aeq,15min}$) (See Table 4.1)	25	25
Acoustic feature correction (dB)	+4	+4
Rating level (dB $L_{Ar,Tr}$)	29	29
Excess of rating over background sound level (dB)	-16	-4

The BS 4142 assessment presented in table 4.2 indicates that the Rating noise level from all items of plant operating continuously and concurrently would not exceed the background noise level at the receptors during either the day or night time periods.

According to BS 4142, the predicted rating noise levels are below the level at which adverse impacts are expected.

5 Summary and Conclusions

A noise impact assessment has been undertaken for the installation of new electric bus battery chargers and battery storage units at the existing First Group bus depot at Old Fieldhouse Lane, Huddersfield, HD1 1AG

A noise survey has been undertaken to assess noise levels in the vicinity of nearby noise-sensitive receptors, where the noise climate was found to be controlled by noise from distant road traffic noise on the surrounding road network.

Rating noise limits for new items of plant derived from the measured background noise levels are presented in Section 3 of this report.

Noise emission from the site has been calculated using three-dimensional noise modelling, based on information provided by the client.

An assessment of potential noise impacts from the proposals has been undertaken with reference to the guidance set out in BS 4142.

The results of the assessment indicate that noise from the proposals is below the level at which adverse impacts are likely according to BS 4142.

On this basis, the proposals are considered suitable for the development location.

Appendix A – Abbreviations and Definitions

Sound Pressure Level (L_p)
The basic unit of sound measurement is the sound pressure level. As the pressures to which the human ear responds can range from 20 μPa to 200 Pa, a linear measurement of sound levels would involve many orders of magnitude. Consequently, the pressures are converted to a logarithmic scale and expressed in decibels (dB) as follows:

$L_p = 20 \log_{10}(p/p_o)$

Where L_p = sound pressure level in dB; p = rms sound pressure in Pa; and p_o = reference sound pressure (20 μPa).

A-weighting
A frequency filtering system in a sound level meter, which approximates under defined conditions the frequency response of the human ear. The A-weighted sound pressure level, expressed in dB(A), has been shown to correlate well with subjective response to noise.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,\,T}$
The value of the A-weighted sound pressure level in decibels of continuous steady sound that within a specified time interval, *T*, has the same mean-square sound pressure as a sound that varies with time. $L_{Aeq,\,16h}$ (07:00 to 23:00 hours) and $L_{Aeq,\,8h}$ (23:00 to 07:00 hours) are used to qualify daytime and night time noise levels.

$L_{A10,\,T}$
The A-weighted sound pressure level in decibels exceeded for 10% of the measurement period, T. $L_{A10,\,18h}$ is the arithmetic mean of the 18 hourly values from 06:00 to 24:00 hours.

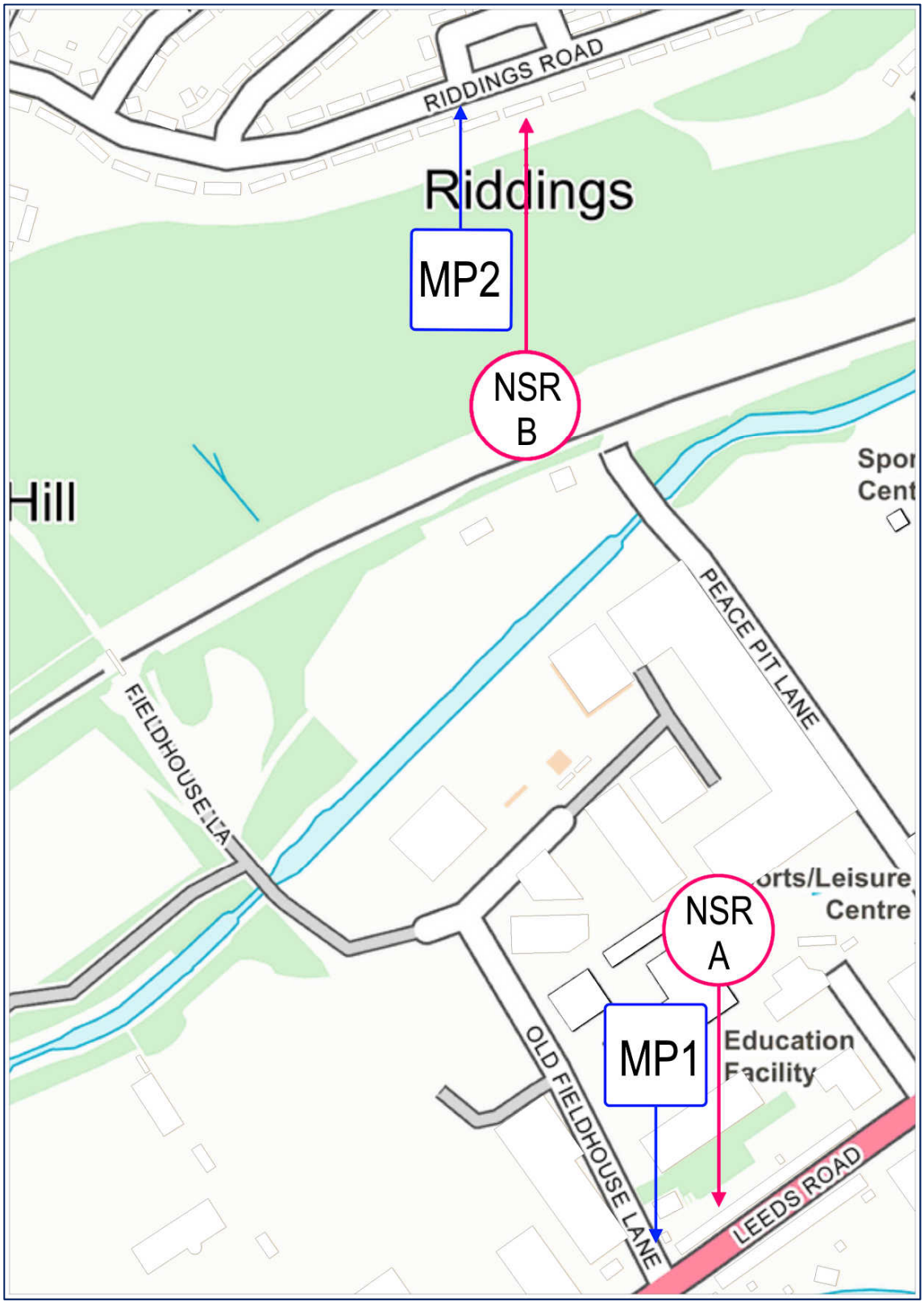
$L_{A90,\,T}$
The A-weighted sound pressure level of the residual noise in decibels exceeded 90% of a given time interval, T. L_{A90} is typically taken as representative of background noise.

$L_{Amax,F}$
The maximum A-weighted noise level recorded during the measurement period. The subscript 'F' denotes fast time weighting, slow time weighting 'S' is also used.

Single Event Level / Sound Exposure Level (SEL or L_{AE})
The energy produced by a discrete noise event averaged over one second, regardless of the event duration. This allows for comparison between different noise events which occur over different lengths of time.

Weighted Sound Reduction Index (R_W)
Single number quantity which characterises the airborne sound insulation properties of a material or building element over a defined range of frequencies (R_W is used to characterise the insulation of a material or product that has been measured in a laboratory).

Appendix B –Site Location Plan and Monitoring Positions



Appendix C –Figures

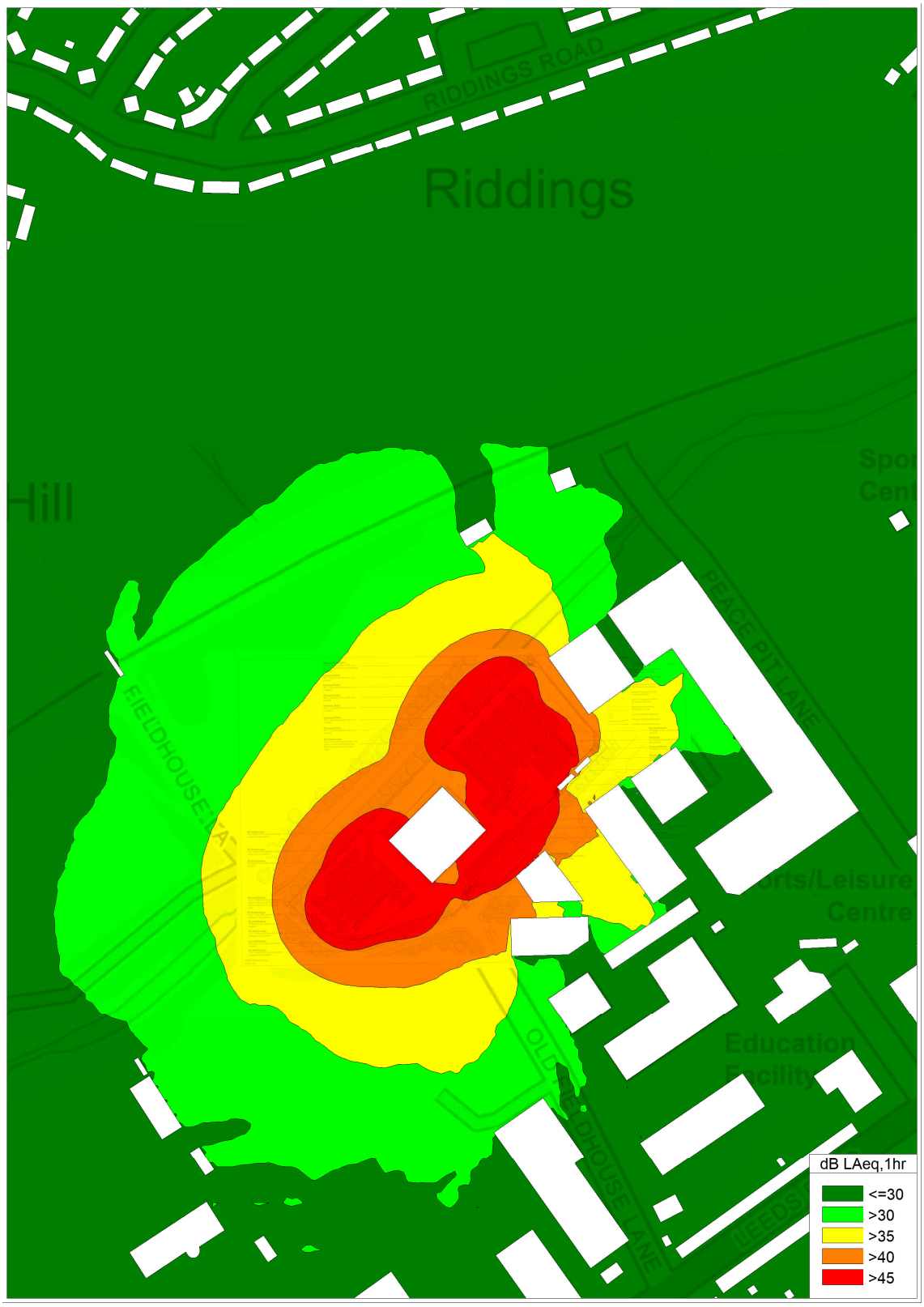


Figure C1: Noise Contour Plot