Technical Letter

Site Address:	Roundhouse Showroom, 380 Richmond Road, Twickenham, TW1 2DX
Project Reference No:	NP-012056
Subject:	Validation Testing of 2 No. External Digital Inverters
Client:	Roundhouse Design Ltd
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Date:	16/01/2025

Introduction

NOVA Acoustics has previously carried out a retrospective noise impact assessment for the installation of 2no. external digital inverters at the above address. The report advised that both units should be housed within an acoustic enclosure to reduce the BS4142 assessment rating of '*Significant adverse impact, dependent on context*' at the most affected NSR.

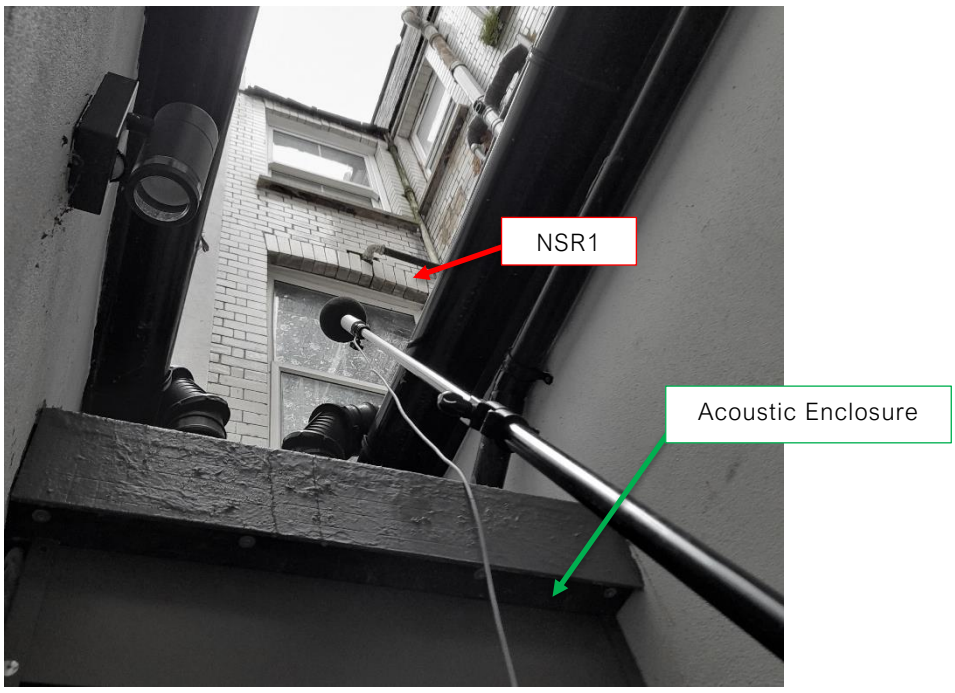
Since the installation of a bespoke acoustic enclosure, an additional site visit was undertaken on 12/01/2025 to assess the subsequent noise emissions. The purpose of this technical letter is to assess the level of noise impact at the closest noise-sensitive receptors ('NSRs') since the implementation of the enclosure to date.

Survey Methodology

Short-term attended measurements were taken at 2no. locations, each at differing distances from the enclosure currently housing the inverter units.

During the survey, the weather conditions were deemed suitable for the measurement of environmental noise in accordance with BS7445 'Description and Measurement of Environmental Noise'.

The figures overleaf outline the measurement locations.



Measurement at 1 m above enclosure / 2.5 m from NSR1

Measurement at 2.5 from acoustic enclosure / 1.5m from NSR2

Subjective Impression

During the attended monitoring it was noted that an occasional hum would emanate from the enclosure, however, this was not always perceptible due to frequent plane passings from the nearby Heathrow Airport and occasional vehicle movement from Morley Road.

In comparison to the previous site visit, it was noted that the ambient noise climate within the lightwell was subjectively much quieter with the units housed within the new acoustic enclosure.

Measurement Result Summary and Analysis

The table below shows the results for measurements taken at MP1 and MP2.

Description	(hh:mm)	1/1 Octave Frequency Band (L_{eq}, Hz, dB)								Overall (dBA)
		63	125	250	500	1k	2k	4k	8k	
Measurement Position 1 – 1m Above Acoustic Enclosure										
Ambient [1]	10:19 – 10:33	64	55	54	47	42	36	29	26	50
Residual	10:38 – 10:42	58	51	48	43	39	33	26	22	45
Specific	10:19 – 10:33	62	53	53	44	39	33	27	25	48
Measurement Position 2 – 2.5m From Acoustic Enclosure										
Ambient [2]	09:39 – 10:10	65	57	55	46	42	35	29	22	50
Residual	10:04 – 10:09	57	49	48	44	39	32	24	18	45
Specific	09:39 – 10:10	65	56	54	43	38	32	27	20	48

Note [1] *This measurement was conducted approximately 2.5m away from the closest NSR window.*
Note [2] *This measurement was conducted approximately 1.5m away from the closest NSR window.*

Table 1 – Short-term Measurement Summary – MP1 & MP2

Although it would be expected for measurements conducted at 2.5m away from the enclosure to be lower than measured at 1m, additional surface reflections are present at this location in comparison to NSR1.

Due to access restrictions, measurements could not be undertaken at exactly 1m from each of the closest NSRs. To replicate the received noise levels at the closest NSR window, a correction has been applied to the above specific sound levels relative to the closest NSR. The correction assumes point source propagation from the enclosure using the following formula:

$$LAeq(2) = LAeq(1) + 20.log[{}^{r1}/_{r2}]$$

Where r1 and r2 are the distances in meters from the assessment location and the noise source.

Background Sound Level Criterion

As per the previous NOVA Acoustics report (ref: NP-011234), the 'lowest typical' $L_{A90,15min}$ measurement of 48dB was set at the baseline for the daytime BS4142 assessment.

BS4142 Noise Impact Assessment

The calculations and BS4142 noise impact assessments at the most affected NSRs are presented in the following tables. All plant is assumed to operate continuously.

Calculations & BS4142 Noise Impact Assessment at NSR1									
Description	1/1 Octave Frequency Band (Hz, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Specific Sound Level at NSR1	59	49	49	41	36	30	23	21	44
BS4142 Subjective Acoustic Feature Correction	A +2dB penalty has been applied for a 'faint hum' that was subjectively perceptible at times.								+2
Rating Sound Level ($L_{Ar,Tr}$)	Specific sound level + rating penalties								46
Background Sound Level	As per '*Background Sound Level Criterion*' section.								48
Exceedance	$L_{Ar,Tr} - L_{A90,15min}$								-2
BS4142 Assessment Outcome	'Low impact, dependent on context'.								
NPPF & NPSE Outcome`	'No Observed Adverse Effect Level ('NOAEL').								

Table 2 – BS4142 Noise Impact Assessment – NSR1

Calculations & BS4142 Noise Impact Assessment at NSR2									
Description	1/1 Octave Frequency Band (Hz, dB)								Overall (dBA)
	63	125	250	500	1k	2k	4k	8k	
Specific Sound Level at NSR2	63	55	52	42	36	30	25	19	47
BS4142 Subjective Acoustic Feature Correction	A +2dB penalty has been applied for a 'faint hum' that was subjectively perceptible at times.								+2
Rating Sound Level ($L_{Ar,Tr}$)	Specific sound level + rating penalties								49
Background Sound Level	As per '*Background Sound Level Criterion*' section.								48
Exceedance	$L_{Ar,Tr} - L_{A90,15min}$								+1
BS4142 Assessment Outcome	A low likelihood of 'adverse impact, dependent on context'.								
NPPF & NPSE Outcome`	'No Observed Adverse Effect Level ('NOAEL').								

Table 3 – BS4142 Noise Impact Assessment – NSR2

Although the rating sound level is marginally above the criteria by 1dB, the 'Health Technical Memorandum 08-01: Acoustics' document compiled by the Department of Health, "*1 dB or 2 dB is considered negligible in acoustic terms, as this difference is undetectable to normal human hearing*". As such, it is thought that this exceedance is likely to be acceptable.

Furthermore, the specific sound level breaking through a partially open window (approximately -13dB) at NSR2 would be below the daytime BS8233 internal ambient noise level criterion (35dBA).

Conclusion

The development has been assessed against the requirements of BS414. The BS4142 assessments have indicated 'low impact' at NSR1 and a low likelihood of 'adverse impact' at NSR2; the latter is marginal by 1dB.

The noise impacts in line with the NPSE and NPPF are deemed a NOAEL. It is stated that at NOAEL, *"noise can be heard, but does not cause any change in behaviour, attitude or other physiological response". In addition, noise at this level "can slightly affect the acoustic character of the area but not such that there is a change in the quality of life".*

Appendix A – Surveying Equipment

Piece of Equipment	Serial No.	Calibration Deviation
Svantek SV971A Class 1 Sound Level Meter	141417	≤0.1
Cesva CB006	901955	

Table 4 – Surveying Equipment

All equipment used during the survey was field calibrated at the start and end of the measurement period with a negligible deviation of ≤0.1 dB. All sound level meters are calibrated every 24 months, and all calibrators are calibrated every 12 months, by a third-party calibration laboratory. All microphones were fitted with a protective windshield for the entire measurements period. Calibration certificates can be provided upon request.

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