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NOISE ASSESSMENT & ACOUSTIC TREATMENT

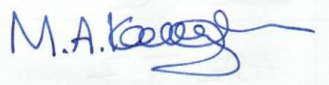
AL RAZA FOUNDATION

8-16 PARK GROVE

LONGSIGHT M19 3AQ

Report Date: 8th September 2015
Revised: 22nd April 2020 [Client details & typos]
Revised: 24th September 2020
Ref.: 20200924 7501 Longsight Mosque-2.docx
Site Visited: 6th August 2015
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1.0 INTRODUCTION

At the request of ML Design, Martec Environmental Consultants Ltd revised our earlier report which undertook an assessment of noise that would be produced inside a proposed replacement building for the Al Raza Foundation religious building at 8-16 Park Grove, Longsight, Manchester M19 3AQ. These instructions stemmed from a request by the local authority in connection with a recent application for planning consent for the development:

"The submitted Martec Noise Assessment, Ref.: 20150908 7501.Longsight Mosque, Date: 8th September 2015, appears to have been submitted for a previous application and it should be confirmed that the assessment is relevant for the current application, with particular reference to the assumptions in section 5.0, before we review it further. It is also noted that the report also does not contain hours of use for the development, which are required."

Given the above, this report is based on the latest plans and considers the measurements previously made on site, current national guidance, and any recommendations which are considered necessary.

Acoustic terminology is explained at Appendix 1 of this report and the author's qualifications and experience are described in Appendix 2.

2.0 DESCRIPTION OF SITE, PROPOSALS AND AREA

The site is currently occupied by what appears to be a former industrial building where religious ceremonies and teaching take place; this would be replaced with a purpose-built building. See Figure 1 below:



Figure 1; Area around existing facility with Measurement Locations Shown

Outline planning consent was granted for the development [Ref.110589/OO/2015/N2] subject to the following condition:

“CONDITION 8:

The premises shall be acoustically insulated and treated to limit the break out of noise in accordance with a noise study of the premises and

a scheme of acoustic treatment that has been submitted to and approved in writing by the City Council as local planning authority, prior to first use of the development and thereafter retained and maintained.

Where entertainment noise is proposed the LAeq (entertainment noise) should be controlled to 10dB below the LA90 (without entertainment noise) at the facade of the nearest noise sensitive location, and internal noise levels at structurally adjoined residential properties in the 63Hz and 125Hz octave frequency bands should be controlled so as not to exceed (in habitable rooms) 42dB and 36dB, respectively.

Reason - To safeguard the amenities of the occupiers of nearby residential accommodation, pursuant to saved policy DC26 of the Manchester City Council Unitary Development Plan, policies DM1 and SP1 of the Manchester Core Strategy."

The proposals are described in greater detail elsewhere but would see the existing buildings replaced with a purpose-built mosque, catering for a similar number of worshippers as the existing facility. The new building would be a similar distance from the garden of nearest dwelling (to the west); the new building would be slightly closer than the existing to properties located to the north and south

We are instructed that the hours of use would be as follows:

- The proposed activities are religious based and involve speeches

and seminars delivered by qualified Muslim scholars to the members. These meetings predominantly take place at weekends, between 7pm and 10pm. On rare occasions some meetings are arranged during the daytime and would generally occur between 10am to 3pm.

- The frequency of the meetings revolves around the Islamic calendar. There would usually be around 2 to 4 meetings a month, however this may increase to 10 to 12 during the peak religious season which occur twice a year during Eid celebrations.
- This centre only caters for evening prayers once a week on Thursdays at 8.00 pm.

3.0 NOISE CRITERIA

The author is not aware of any objective noise criteria covering the prayer, even after an extensive internet search covering several hours.

For example the latest version of BS8233:2014 'Guidance on Sound Insulation and Noise Reduction for Buildings' sets out acceptable noise levels for dwellings in its Section 7.7 and particularly in its Table 4; however, it states at its Section 7.7.1 *"Occupants are usually more tolerant of noise without a specific character than, for example, that from neighbours which can trigger complex emotional reactions. For simplicity, only noise without character is considered in Table 4."* No

guidance is offered in the standard on the human voice as a noise which means this standard cannot be used in relation to this case.

Similarly, BS4142:2014+A1:2019 “Methods for Rating and Assessing Industrial and Commercial Sound” specifically excludes itself from the assessment of nuisance, music and other entertainment noise, as well as noise from people and “public address systems for speech”.

Given the above, it is proposed to compare the predicted noise levels against the background noise levels in the area. It should be noted that the background noise levels were measured five years ago, and it is considered that background levels would only have risen since then; consequently, using these measurements is likely to be a conservative assumption.

4.0 OBSERVATIONS AND RESULTS

A colleague [S B Mellor] attended an evening meeting at the existing facility, which it is understood the level of activity was representative of typical weekday prayers and made measurements of internal activities [reverberant levels] and external [free field background] noise levels as follows:

Date & end time	Duration	Condition	LAeq	L10	L50	L90
06/08/2015 18:37	00:12.0	Calibration	94	94.9	94.5	94.1
06/08/2015 18:40	10:01.0	Position A - Car Park Boundary	55	57.6	51.9	47.3
06/08/2015 18:50	15:01.0	Position B - Rear House	56.2	59.4	50	45.8
06/08/2015 19:06	15:01.0	Position C - Houses 11 & 13	55	57.5	52.2	46.5
06/08/2015 19:22	15:01.0	Position D - House 18	55.6	58.2	50.1	46.2
06/08/2015 19:37	24:55.0	Position C - Arrival of worshippers	55.1	57.5	52.3	47.6
06/08/2015 20:05	05:02.0	Worshipping inside main room - call and response (16 people)	69.9	73.9	66.4	54.7
06/08/2015 20:19	02:39.0	Position C - Doors open at Building and 1 x shutter open (not audible at C)	51.2	55.8	49.7	45.7
06/08/2015 20:39	03:15.0	Worshipping inside main room again (27 people)	75	79.5	62.1	50.4
06/08/2015 20:47	13:15.0	Position C - Chanting inside (not audible) but audible at 2m from closed window	57.9	58.6	49.8	45.3
06/08/2015 21:07	00:15.0	1m from open window - chanting inside (just about (barely) audible at C briefly - traffic)	63.9	67.6	60	54.1
06/08/2015 21:17	04:37.0	Position B - rear of building (chanting not audible)	52.5	51	45.5	42.2
06/08/2015 21:22		End Calibration	93.9	93.9	93.5	93.1

Table 1: Measured Levels [dBA]

In Table 1 above, those measurements essentially unaffected by noise from activities within the existing facility have been "blocked in" green; it can be seen that the typical level in the area was in the mid to high forties LA90, say 46 LA90, and that the lowest measured level occurred after the end of the evening meeting at 21:17hrs and was 42 LA90.

Date & end time	Duration	Condition	Octave Band Centre Frequency				
			125 Hz	250 Hz	500 Hz	1000 Hz	2000 Hz
06/08/2015 18:37	00:12.0	Calibration	38.1	37.1	43.1	94	60.9
06/08/2015 18:40	10:01.0	Position A - Car Park Boundary	42.3	44.4	47.9	50.9	48.4
06/08/2015 18:50	15:01.0	Position B - Rear House	39.9	45.6	50.8	51.9	48.9
06/08/2015 19:06	15:01.0	Position C - Houses 11 & 13	39.9	43.4	48.5	51.1	48.3
06/08/2015 19:22	15:01.0	Position D - House 18	39.7	44.1	48.9	51.4	50
06/08/2015 19:37	24:55.0	Position C - Arrival of worshippers	39.5	43.7	48.5	51.4	48.1
06/08/2015 20:05	05:02.0	Worshipping inside main room - call and response (16 people)	50	56.8	67.4	65.2	56.5
06/08/2015 20:19	02:39.0	Position C - Doors open at Building and 1 x shutter open (not audible at C)	40.5	41.4	44.6	46.8	42.6
06/08/2015 20:39	03:15.0	Worshipping inside main room again (27 people)	49.9	59.4	71.8	71.5	62.1
06/08/2015 20:47	13:15.0	Position C - Chanting inside (not audible) but audible at 2m from closed window	42.3	44	48	54.3	53.4
06/08/2015 21:07	00:15.0	1m from open window - chanting inside (just about (barely) audible at C briefly - traffic)	41.3	50.3	60.6	59.9	53.2
06/08/2015 21:17	04:37.0	Position B - rear of building (chanting not audible)	31.2	37.4	44.7	48.7	47.6
06/08/2015 21:22		End Calibration	42	52	55.4	94	60.9

Table 2: Octave Band Levels [dB Lin]

From Table 1, it can be seen that the highest internal level occurred worshipping and "call and response" with the internal reverberant level of approximately 70 LAeq [69.9].

The instrumentation was a SVAN 977 [s/n 36870] purchased from the manufacturer within the proceeding two years and a Cirrus 511E

calibrator [s/n 39816]. Both instruments had been laboratory calibrated within the preceding 12 months. The meter calibrated correctly before and after the measurements and was fitted with a standard wind muff; internally it was hand-held, externally it was mounted on a tripod.

In addition to the above measurements, the author has previously visited congregational prayers at other similar facilities in Greater Manchester and considers that 75 to 80 dBA would be the loudest likely levels inside a mosque during Friday lunchtime prayers.

5.0 EXTERNAL NOISE LEVELS

The highest internal reverberant level in Table 2 can be used with the prediction methodology of "Noise & Noise Control 2nd Ed" Smith, Peters & Owen -Sn 8.22 Method.

The representative separation distances to garden areas at the nearest properties have been taken as:

South - 12m

West - 3m

North - 3m

From Drawing 1144/0200/A the Library is on North façade, and is unlikely to generate significant noise, so no predictions have been performed for this façade.

Noise Assessment

Building Breakout Calcs		Octave Band Centre Frequency [Hz]					dBA
Version 3 © 2017 Martec Environmental Consultants Ltd "Noise & Noise Control 2nd Ed" Sn 8.22 Method							
		Internal Reverberant Spectrum (dBLin)					
		Adjustment to a Given Level if required 70.0					
		Adjusted Internal Spectrum					
		51.8	58.6	69.2	67.0	58.3	70.0
Element		Addntnl	Dimension	Area	Dist	Element Sound Reduction Index [SRI]	
		Attntnl	Lgr	Smlr	If Diff		Contrib
Lower Wall							
	BS8233 Brick & Block External Wall	0.0	20.6	2.8	53.7	12.0	2.1
Upper Wall							
	None						0.0
Windows							
	4 (20) 4	0.0	2.0	1.0	2.0	12.0	5.4
Rooflights							
	None						0.0
Doorway							
	Solid core wood door, no seals around perimeter	0.0	2.0	1.0	2.0	12.0	10.9
Roof							
	None						0.0
Vents							
	None						0.0
		External SPL/dBLin					Tot dBA
		0.9	6.5	12.0	8.9	0.9	12.4

Table 3: Prayer Hall - Predictions for Boundary of Properties to South

Building Breakout Calcs		Octave Band Centre Frequency [Hz]					dBA
Version 3 © 2017 Martec Environmental Consultants Ltd "Noise & Noise Control 2nd Ed" Sn 8.22 Method							
		Internal Reverberant Spectrum (dBLin)					
		Adjustment to a Given Level if required 70.0					
		Adjusted Internal Spectrum					
		51.8	58.6	69.2	67.0	58.3	70.0
Element		Addntnl	Dimension	Area	Dist	Element Sound Reduction Index [SRI]	
		Attntnl	Lgr	Smlr	If Diff		Contrib
Lower Wall							
	BS8233 Brick & Block External Wall	0.0	20.6	2.8	47.7	3.0	10.3
Upper Wall							
	None						0.0
Windows							
	4 (20) 4	0.0	4.0	2.0	8.0	3.0	23.5
Rooflights							
	None						0.0
Doorway							
	Solid core wood door, no seals around perimeter	0.0	2.0	1.0	2.0	3.0	23.0
Roof							
	None						0.0
Vents							
	None						0.0
		External SPL/dBLin					Tot dBA
		15.9	22.8	27.1	21.3	13.1	26.4

Table 4: Prayer Hall - Predictions for Boundary of Properties to West

It can be seen that the highest predicted level is for the garden of the property to the West and the measured **internal** level of 70 dBA equates to a free field noise level of approximately 26 dBA, which is some 16 dBA below the lowest measured external background level in the area of 42 LA90.

As discussed above, from experience elsewhere, the highest likely internal level [during Friday lunchtime prayers] is estimated at 80 LAeq. on the same basis as above this would equate to a level of around 36 dBA in the nearest [west] garden which is some 6 dBA below the lowest measured background noise level of 42 LA90 [Thursday late evening]; clearly Friday lunchtime background levels are likely to be higher.

6.0 CONCLUSIONS

- 6.1 There are no objective assessment criteria that relate to noise such as this.
- 6.2 Predictions have been performed, and the worst-case calculated levels of 36 LAeq are low and significantly less than general urban background noise levels which were above 40 LA90 even on late Thursday evening.
- 6.3 Based on the above assessment, and assumptions regarding glazing [standard thermal], wall construction [standard cavity] and alternative ventilation for the prayer hall, and classrooms above, so that windows and doors are kept closed, the noise impact should be acceptable.
- 6.4 The predictions in this report are based on the current latest building plans and the background noise levels are only likely to have risen since the measurements were made. Consequently, this assessment is considered to be relevant to the current application.

7.0 ACOUSTIC TREATMENT

Based on the assessment above the construction of the building should be as follows:

1. Walls – Standard cavity masonry construction
2. Glazing – Standard thermal glazing - no vents
3. Doors to North, West and South facades – Solid Core doors well-fitting but perimeter seals preferred but not required.
4. Ventilation system to Prayer Hall, Classrooms, Dining Room and Kitchen such that windows and doors can remain closed, this could be a ducted system or alternatively either of the following systems conform to the ANC 'Acoustics Ventilation and Overheating residential Design Guide – January 2020':
 - i. An EnviroVent Positive Input Ventilation (PIV) system. We understand that with the proposed ventilation system there is no requirement for ventilation grilles.
 - ii. A Nuaire MEV Ecosmart Continuous Mechanical Extract Ventilation Unit system. We understand that with the proposed ventilation system, whilst the ductwork is ducted directly to grilles in the building façade, there is no requirement for ventilation grilles.

APPENDIX 1

EXPLANATION OF ACOUSTIC TERMS

The dB or the decibel, is the unit of noise. The number of decibels or the level, is measured using a sound level meter. It is common for the sound level meter to filter or 'weight' the incoming sound so as to mimic the frequency response of the human ear. Such measurements are designated **dB(A)**.

A doubling of the sound is perceived, by most people, when the level has increased by 10 dB(A). The least discernible difference is 2 dB(A). Thus, most people cannot distinguish between, say 30 and 31 dB(A).

The Background level of noise is most commonly represented by the level which is exceeded for 90% of the time i.e. the LA90.

If a noise varies over time then the **equivalent continuous level, or LAeq**, is the notional constant level of noise which would contain the same amount of acoustic energy as the time varying noise.

The following table gives an approximate indication of the comparative loudness of various noises expressed in terms of the A weighted scale:

Source of noise	dB(A)	Nature of Noise
Inside Quiet bedroom at night	25-30	Very Quiet
Quiet office	40-45	
Rural background noise	35-45	
Normal conversational level	55-65	
Busy restaurant	65-75	
Inside suburban electric train	70-80	
Hand clap @ 1m	75-85	
HGV accelerating @ 5m away	85-90	Very Loud

APPENDIX 2

QUALIFICATIONS AND EXPERIENCE OF M. A. KENYON

My full name is Melville Alexander Kenyon. I am the principal of the firm of Martec Environmental Consultants Ltd, a consultancy company that specialises in environmental noise assessment and control. I graduated in 1982 with a Bachelor's degree in Engineering and subsequently a Master's degree in Environmental Acoustics. I have been a corporate member of the professional body for noise and vibration specialists, the Institute of Acoustics, since 1988, and have sat on the British Standards Committee dealing with noise in buildings [BS.8233:1999].

I have lectured at Liverpool John Moores University on the Diploma of Acoustics course and at Manchester Metropolitan University on their Environmental Health degree course.

The firm of Martec Environmental Engineering was formed in the 1970's and joined The Association of Noise Consultants in 1996. It is now known as Martec Environmental Consultants Ltd.

Since its formation, Martec has advised many groups of both residents and developers about the problems of noise and vibration in the environment.

QUALIFICATIONS OF S. MELLOR

Master's degree in Health, Safety and Environmental Law, British Occupational Health Society (BOHS) M104 certificate in Noise and Vibration and Institute of Acoustics Certificate of Competence in Environmental Noise Measurement (Derby University) plus Diploma in Acoustics and Noise Control (Bristol University). Member of the professional body for noise and vibration specialists, the Institute of Acoustics - MIOA.