

Noise Assessment



Proposed creation of new teaching rooms, new 2 storey extension and alterations to Al Quba Education Trust, Rochdale.

Project No: P2103
Project Address: 1 Copenhagen Street
Wardleworth
Rochdale
OL16 2HD
Date: July 2022

Revision

Rev.	Date.	Description.	Page.	Auth.
A	19.04.2023	Added details for proposed mechanical ventilation and heat recovery units. Appendix E1 – proposed rooftop AC plant Manufacturer's Data Sheets. Appendix E2 – proposed internal mechanical fresh air ventilation Manufacturer's Data Sheets.	9 , 10	MJA
			21	MJA

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1.0 INTRODUCTION

1.1 This Noise Assessment Statement has been prepared by MJA on behalf of the applicant Mr Mohammed Shabir; Al Quba Education Trust located at 1 Copenhagen Street, Wardleworth, Rochdale, OL16 2HD. The mosque is a registered Trust holding not-for-profit charity status, charity number 1183972.

1.2 The noise assessment has included:

- Measuring existing noise levels outside the proposed development and nearest dwellings to the proposed education centre during representative periods;
- Measuring existing noise levels within some areas of the building;
- Evaluating the potential noise impact on the development from external noise;
- Evaluating the potential noise impact of the development on nearby dwellings;
- Recommending appropriate noise limits for external items of building services plant;
- Recommending noise mitigation measures to control noise break-in and break-out where appropriate.

1.3 At this stage, advice on internal building acoustics (such as controlling reverberations, and sound insulation between the various spaces within the development) has not been requested, but should be considered at the detailed design stage for rooms such as the lecture theatre, as good acoustic conditions are required for speakers and listeners.

1.4 The various noise units and indices cited in this report are described in **Appendix C**. All results described within this report are rounded to the nearest decibel as fractions of decibels are imperceptible.

2.0 SITE AND SURROUNDINGS

2.1 The application relates to a mixed height building located at 1 Copenhagen Street, Rochdale, OL16 2HD. The property is currently used for religious worshipping, registered as Al Quba Education Trust and holds charity status, charity number 1183972.

2.2 The building is of steel frame construction with concrete floors and external masonry walls. The roof is hipped construction and finished with plain concrete tiles. All existing windows on the ground floor and first floor are white upvc with double glazing units and all entrance / exit doors are aluminium powder coated, double swing.

2.3 The building occupies a rectangular plot approximately 978m² between Entwistle road and Ramsey Street with access from Copenhagen Street as well as access from Aboukir Street. The building is bound on all sides by traditional Victorian terrace residential homes and businesses, ranging from 2 storeys to 3 storeys in nature with outbuildings and loft conversions. The application site is located at the rear of a row of terraced properties along Ramsey Street which are predominantly commercial businesses (Butchers, travel agents and convenience store respectively).

2.4 Entwistle Road is located approximately 20m south from the site entrance. Rochdale Leisure Centre and a small number of commercial units are located along Entwistle Road as well as residential accommodation.

2.5 The proposed development includes the refurbishment and extension of the ground floor to include a mortuary & prep room, male prayer room, male wc and ablution room and a lift; office, staff rooms, meeting room, female prayer room, female wc and ablution room, sensory room, classrooms, lecture theatre and an open gathering space.

2.6 All existing glazing at the proposed development site is double glazing consisting of 6mm glass: 12mm cavity: 6mm glass housed in white upvc frames.

2.7 An existing PA system will continue to be used in the ground floor male prayer room and first floor female prayer rooms, and will be used infrequently external to the building for the call to prayer. The client has confirmed that an agreement is in place with the Local Authority to use the PA system externally only for the purposes to call the 'Adhaan' to signify the start of prayer time.

2.8 The existing mechanical ventilation to the ground floor male prayer room and first floor female prayer room will continue to be used. Mechanical ventilation is proposed for the first floor open gathering space (adjacent to the library) and the library and computer room. All other rooms are to be naturally ventilated by window frame vents and openable windows.

2.9 The existing car park to the front of the building will be retained and refurbished. The existing car park at the rear of the building underneath the proposed rooms on the first floor is to be retained and refurbished. The Local Authority owned car park located along Aboukir Street adjacent to the application site is to be retained and refurbished.

2.10 The proposed multicultural education centre will be used daily, i.e. Monday through Sunday, throughout the day from 09:00 hrs until 21:00 hrs.

3.0 NOISE SURVEY

3.1 An attended noise measurement survey has been carried out by MJA in order to determine the prevailing noise climate of the area. The noise surveys were carried out using a Brüel and Kjær 2260 'Type 1' sound level meter. Calibration checks were carried out both before and after the measurement periods with no variance in levels noted. The noise measurements were taken in 'free-field' conditions and at a microphone height of approximately 1.5 metres above the ground. Noise measurements included octave-band analysis.

3.2 Noise levels were measured at three locations, as shown in **Appendix A** and as described below:-

- Location 1: On Aboukir Street, representative of the easternmost building elevation most exposed to road traffic noise along Ramsey Street and Entwistle Road;
- Location 2: Adjacent to the local Builders Merchant and residential dwellings on Entwistle Road to the southeast of the application site;
- Location 3: Adjacent to the residential dwellings and small businesses along Ramsey Street.

3.3 The noise surveys were carried out on Thursday, 7th July, 2022. The daytime noise survey (09:15-13:15) included noise measurements at Locations 1-3, in order to establish the worst-case noise levels outside the proposed development, and existing daytime noise levels outside nearby dwellings. The evening noise survey (19:30-21:30) was carried out at Locations 2 and 3 only to determine the lowest background noise levels at the nearest dwellings to the proposed development site. No items of building services plant will operate at night.

3.4 Noise measurements were also carried out in the first floor female prayer room and the first floor kitchen area overlooking the car park to the front of the building.

3.5 The full results of the noise surveys and details of the prevailing weather conditions are shown in **Appendix B**.

3.6 The results of the noise survey are summarised in Table 1.

Table 1: Summary of Measured Noise Levels – Location 1:

Location	Daytime			Evening		
	L _A MAX	L _A eq	L _A 90	L _A MAX	L _A eq	L _A 90
1	82-83	64-66	46-54	-	-	-
2	65-69	54-56	51-52	63-69	52-57	49-51
3	66-75	53-57	49-52	57-65	48-51	45-46

Daytime

3.7 The main source of noise at all noise measurement locations during the daytime was road traffic and background construction noise arising from the town centre development of the high

rise apartments. Noise from the Lewis Builders Merchants adjacent to the site was infrequent and low level, and will not give rise to a significant noise impact on the development.

3.8 The lowest measured ambient and background noise levels at outside Arif Cash & Carry and dwellings closest to Location 2 during the daytime were 54 dB $L_{Aeq,15min}$ and 49dB $L_{Aeq,90}$ respectively.

3.9 The lowest measured ambient and background noise levels at outside builders merchant and dwellings adjacent to Location 3 during the daytime were 53 dB $L_{Aeq,15min}$ and 45dB $L_{Aeq,90}$ respectively.

3.10 At Location 2, members of the public were also heard talking / congregating outside Arif Cash & Carry during shopping visits to the site.

3.11 Impact noise from Lewis Builders Merchant to the southeast of the proposed development site was audible during the daytime only (up to 69dB L_{Amax} at Location 3).

3.12 The measured ambient noise level within the ground floor male prayer room was 22dB L_{Aeq} .

3.13 Noise measurements were also taken in the first floor female prayer room and kitchen overlooking the car park to the front of the building. The measured ambient noise level within these rooms with windows open was 39dB $L_{Aeq, 10 min}$ in the daytime.

Evening

3.14 During the evening noise survey, road traffic and noise from Entwistle Road was the main source of noise. In lulls of noise from Arif cash & Carry, background road traffic was the main source of noise. Busses to the south and west were also occasionally heard.

3.15 The lowest measured ambient and background noise levels during the evening noise survey in the absence of the town centre construction / development, were 48dB $L_{Aeq,15min}$ and 45dB $L_{Aeq,90}$ respectively, and were measured at Location 2.

4.0 NOISE ASSESSMENT

Road Traffic Noise Impact on the Development

4.1 Although Planning Policy Guidance 24 (PPG 24) is superseded by NPPF and NPSE to assess noise impact of road traffic on noise-sensitive developments, data derived from PPG 24 continues to guideline Local Authorities on determining planning applications both for noise-sensitive developments and for those activities which will generate noise. The respective policy guidance contain Noise Exposure Categories (NEC's) for proposed sites that will be exposed to traffic noise, and they are shown in Table 2 below, although they are generally only applied to developments containing habitable rooms.

Table 2 – Road Traffic Noise Exposure Categories.

	Noise exposure Category (dB L _{Aeq})			
Road Traffic	A	B	C	D
Daytime(07.00 – 23.00hrs)	<55	55 – 63	63 – 72	>72

Category A - Noise need not be considered as a determining factor in granting planning permission.

Category B - Noise should be taken into account and steps taken to ensure an adequate level of protection against noise.

Category C - Planning permission should not normally be granted. Where development is permitted, steps should be taken to ensure a commensurate level of protection against noise.

Category D - Planning permission should normally be refused.

4.2 As the main noise source at the site was road traffic, daytime noise levels have been calculated in accordance with the shortened measurement method described in the Department of Transport document 'Calculation of Road Traffic Noise' (CRTN), 1988. The memorandum was prepared to enable entitlement under the Noise Insulation Regulations 1975 to be determined, but it is stated in the document, that the guidance is equally appropriate to the evaluation of traffic noise for land use planning purposes.

4.3 The CRTN shortened measurement method involves taking traffic noise measurements (LA10) over representative time periods within any three consecutive hours between 10:00 hours and 17:00 hours. By using the LA10 (3 hour), as the arithmetic mean of the measured LA10 values, the LA10 (18 hour) value can then be calculated. The LA10 (18 hour) values have then been converted into the equivalent LAeq (16 hour) values (in accordance with paragraph 9, Annex 1, of Department of the Environment, PPG 24 'Planning and Noise' HMSO, 1994).

4.4 The calculated ambient free-field daytime road traffic noise level on the site boundary with Aboukir Street is 66dB L_{Aeq, 18hr}. Therefore the areas of the development exposed to road traffic noise fall into NEC C during the daytime. The NPPF states that residential use would be approved subject to a suitable noise condition for mitigation measures. Acceptable noise levels can be achieved within the building for the proposed uses, and recommendations to control noise ingress to these rooms are given in Section 5.

Noise Break-out

4.5 Planning Guidance requires noise of a non-industrial nature, i.e. potential noise impact from this development not to exceed World Health Organisation (WHO) Guidelines. Values taken from **Table 1** of Guidance Note's for various external environments are reproduced in **Table 3**.

Table 3: Adopted Noise Criteria for Noise Break Out.

Specific Environment	Upper Noise Level
Outdoor Living Area	≤55 dB L _{A eq} , 30 min.
Commercial / Business use	≤55 dB L _{A eq} , 30 min.

4.6 The main potential sources of noise break-out from the development are the existing PA system in the ground floor Prayer Room, first floor female Prayer Room and the first floor 'Break Out' space located adjacent to the library.

4.7 From information provided by the client, it is understood that the PA system used will only be used within the Prayer rooms and externally, infrequently only for the purposes to call the 'Adhaan' to signify the start of prayer time. This space is on the east (ground floor) and west (first floor) elevations, and will not result in any noise impact at nearby dwellings.

4.8 Therefore, noise break out from the building will not result in noise impact at nearby noise sensitive receivers.

Proposed Building Services Fixed Plant

4.9 Planning Guidance states that 'British Standard 4142: 1997 – Rating industrial noise affecting mixed residential and industrial areas' should be used to assess the likely impact of noise from commercial noise sources which are industrial in nature, i.e; noise from refrigeration and building services plant at the proposed development.

4.10 In BS4142 the noise from the proposed new equipment (in L_{Aeq}) is assessed at the nearest noise sensitive location. A 5 dB 'acoustic feature' penalty is added for equipment which gives rise to intermittent peaks of noise or discrete tones that may be discernible at the residential locations. This corrected noise level is referred to as the rating level.

4.11 BS 4142 states that if the rating noise level exceeds the L_{A90} background noise level by 10 dB or more then complaints would be likely. An excess of around 5 dB over the background noise level is viewed as being 'of marginal significance'. A rated noise level more than 10 dB below the background noise level is regarded as a positive indication that complaints are unlikely.

4.12 Local Authority requirements express the rating level from all building services plant combined to be at least 10dB(A) below the existing background noise level at noise sensitive premises. Where this is not achievable, the achievable level must be identified.

4.13 Therefore, the rating level of all mechanical services equipment associated with the development, rated in accordance with BS4142, should be designed and installed so as not to exceed 35dB L_{Aeq} (1 hour) outside the nearest noise sensitive properties.

4.14 Given the distances to nearby residential locations in all directions, and the possibility to locate building services plant on the northern section of the rooftop of the building (such that they will be shielded from nearby noise sensitive properties by the building) this should not be onerous to achieve.

4.15 The preliminary design details Toshiba RAV-GM1601ATP-E roof top air conditioning units to be installed as associated building services equipment. As this is a matter for the detailed design (i.e. post planning approval) stage, the Mechanical & Electrical services design engineer may provide an alternative specification subject to a detailed design study of heat and ventilation requirements for the proposed development. Sound levels in **Table 4** are extracted from the operational data sheets of the proposed plant.

Table 4 – Toshiba RAV-GM1601ATP-E Operational Data.

Sound	Pressure High Cooling / Heating	dB(A)	53 - 55
	Power High Cooling / Heating	dB(A)	70 - 72

Please refer to Appendix E1 for manufacturer's data sheets.

5.0 RECOMENDED NOISE AND MITIGATION MEASURES

Internal Ambient Noise Criteria

5.1 Ambient noise levels are taken as being the level experienced in the completed unoccupied, unfurnished spaces. The noise limit applies to the break-in of external noise and noise from building services, but noise from teaching activities or equipment within the room is excluded.

5.2 British Standard BS 8233: 1999: 'Code of Practice for Sound Insulation and Noise Reduction for Buildings' provides information on the design of internal acoustics of buildings, including Churches, and recommends an internal noise limit of 30-35 dB L_{Aeq} , the upper limit of which is considered a reasonable standard. As such, a target internal noise level of 35dB L_{Aeq} for the prayer rooms for this development is adopted.

5.3 Additionally, in Building Bulletin 93, 'Acoustic Design of Schools' (BB93), a school is defined as being an educational institution outside the further education and the higher education sectors, and is an institution for providing primary education, secondary education, or both. Although the proposed development would not be designated a school under this context, guideline internal ambient noise levels for schools from BB93 are considered suitable in the absence of any other relevant guidance.

5.4 The adopted limits for ambient noise levels are shown in **Table 5**.

Table 5 – Adopted Internal Noise Criteria.

Room Type	Internal Ambient Noise Level
Prayer Rooms	≤ 35 dB L_{Aeq} , 30 min.
Art Galleries, Classrooms, Crèche, computer Lab, Lecture Room, Library, Studio, Workshop.	≤ 35 dB L_{Aeq} , 30 min.
Common room, Drop-in Centre, Guest Rooms, Meeting Rooms, Multi Purpose Hall, Gym, Offices.	≤ 40 dB L_{Aeq} , 30 min.
Canteen, Café.	≤ 45 dB L_{Aeq} , 30 min.

5.5 Toilets and store rooms are considered ancillary to the use of the building, and as such, no internal noise criteria have been adopted for these rooms.

Noise Break-in: North and East Facing Elevations (i.e: Rooms facing Ramsey Street & Aboukir Street)

5.6 The highest measured daytime ambient noise level at Location 1 has been used to calculate the noise ingress into rooms facing Aboukir Street and the adjacent carriageway B6266, Entwistle Road (corrected for distance where appropriate). These results have been used in order to calculate the required level of sound insulation required for each room to ensure that the adopted internal noise criteria for rooms inside the proposed multicultural education centre will be achieved.

5.7 The highest measured ambient daytime road traffic noise level at Location 1 was 66dB $L_{Aeq,15min}$, and the resultant calculated internal noise level in the first floor rooms adjacent to and

overlooking the front car park (Female Prayer Room, Office Room, and Kitchen) is 30dB L_{Aeq} . These calculations assume the use of standard double glazing with windows closed.

5.8 Therefore, in order to meet the adopted internal noise criteria for noise sensitive rooms inside the proposed multicultural education centre, it will not be necessary to install a higher specification of glazing to that proposed i.e. 6mm glass : 12 cavity : 6mm glass with the use of standard window frame trickle vents.

5.9 However, the sound insulation performance of an open window is normally taken as between 10 and 15 dB (A), and therefore the adopted internal noise criteria will not be achieved with windows open.

5.10 The preliminary design details SAF250E7 and SAF500E7 internally ceiling mounted fresh air ventilation and heat exchange recovery units to be installed as associated building services equipment. As this is a matter for the detailed design (i.e. post planning approval) stage, the Mechanical & Electrical services design engineer may provide an alternative specification subject to a detailed design study of heat and ventilation requirements for the proposed development. Fresh air flow levels in **Table 6** are extracted from the operational data sheets of the proposed plant.

Table 6 – Fresh Air Flow Rate.

			SAF250E7	SAF500E7
Air Flow	High	M ³ /h	250	500
	Low	M ³ /h	190	440

Please refer to Appendix E2 for manufacturer's data sheets.

5.11 Ventilation requirements for the development are to be confirmed with the Local Authority Building Control Officer and the Environment Health Officer.

5.12 The northern elevation of the building is shielded by the Victorian terrace properties along Ramsey Street which will act as an acoustic barrier to noise from the premises further to the north.

Noise Break-in: Southern & Western Elevations (i.e.: Rooms facing towards Entwistle Road & Copenhagen Street)

5.12 The southern and western elevation of the building is shielded by the Victorian terrace properties along Entwistle Road & Copenhagen Street which will act as an acoustic barrier to noise from the premises further to the south and west.

5.13 Although measurements were taken outside the north, south and west elevations, they were very similar due to the terraced properties acting as an acoustic barrier. As such, a scheme of sound insulation measures will be developed at detailed design stage.

Prayer Rooms

5.14 The prayer rooms are internal spaces that are sensitive to noise from external sources (i.e. during times of prayer and peaceful worship). The ground floor male prayer room benefits from an acoustic buffer zone in the form of a small vestibule (Aboukir Street entrance) and a vestibule with

a staircase (Copenhagen Street entrance) that overlooks the front car park. The measured internal noise level within the prayer room was 22dB $L_{Aeq,10 \text{ min}}$ and as such the adopted internal noise criterion for the prayer rooms will be achieved.

Internal Rooms

5.15 The adopted internal noise criteria will be achieved in all other rooms with the installation of acoustic wall and ceiling / roof insulation, acoustic suspended ceiling tiles with acoustic insulation laid over suspended ceiling tiles and acoustic glazing, as required.

External AC Plant Noise Levels Consideration / Evaluation

5.16 Installation of the proposed rooftop ac plant will be subject to consideration of two situations that may arise from a noise level breakout perspective.

Situation One

5.17 All installed rooftop ac plant is operational at 100% - dependent upon noise levels, pre-assembled modular acoustic screens can be erected to surround the plant equipment, shielding noise between operating areas and noise-sensitive areas and noise breakout to the nearest opening window.

It is envisaged that on a rare occasion all the rooftop ac units will be operational at all times where upon the building will be fully occupied during days of excessive heat where room temperatures cannot be regulated through window openings, window trickle vents and the mechanical ventilation system. This includes the ground floor male prayer room with a capacity of approximately 600 worshipers and first floor female prayer room with a capacity of approximately 100 worshipers. This will last no longer than one hour as it is for the weekly Friday prayer and the two Eid prayers held once a year on two separate days.

Situation Two

5.18 All installed rooftop ac plant is operational at 50% - noise breakout from the ac units is significantly reduced as the rooftop ac units are operating as per the dictates of room occupancy. It is envisaged the first floor teaching rooms, library and lecture room with a capacity of approximately 120 young learners will be occupied for less than one hour and the plant will be operational during days of excessive heat where room temperatures cannot be regulated through window openings, window trickle vents and the mechanical ventilation system.

Mechanical Ventilation Systems

5.19 Within the design there is no proposal to fix any external mechanical ventilation plant on the rooftop. The design proposes the use of heat recovery ventilation modules to be housed within the ceiling voids of the areas they are serving. Installation will utilize correctly sized attenuators to reduce noise ingress into the conditioned space. A further reduction in internal noise levels will be achieved by attenuation & use of anti-vibration mounts on the installation fixings for the internally mounted ventilation modules.

Air in / air out will be achieved by installation of correctly sized weather proof louvers installed on the North elevation of the building at ceiling height level. Further reductions in noise levels will be achieved by installation of insulated ductwork to absorb and dampen any potential noise levels that may arise.

6.0 SUMMARY AND CONCLUSIONS

6.1 MJA has been commissioned by Al Quba Education Trust to carry out a noise impact assessment in connection with a planning application for a proposed Multicultural education centre at 1 Copenhagen Street, Wardleworth, Rochdale.

6.2 This has involved carrying out an attended noise survey outside the building elevations most exposed to noise from surrounding roads, and also outside nearby dwellings. Calculations of noise break-in and noise break-out from the proposed multicultural education centre have been carried out.

6.3 A scheme of glazing and ventilation has been recommended to ensure that the adopted internal noise criteria in rooms exposed to road traffic noise from Entwistle Road / Ramsey Street is achieved, and that noise from activities within the proposed development does not give rise to any significant noise impact at nearby dwellings.

6.4 Although measurements were taken outside the north, south and west elevations, they were very similar due to the terraced properties acting as an acoustic barrier. As such, a scheme of sound insulation measures will be developed at detailed design stage

6.5 Combined noise limits for any external fixed plant have also been recommended and are based on the lowest measured evening background noise levels, and take into account the requirements of the local authority for fixed plant noise.

6.6 In conclusion, providing that the sound insulation measures outlined in this report are fully implemented, the proposed multicultural education centre on Copenhagen Street, Wardleworth, Rochdale will not result in an adverse effect on residential amenity by way of noise impact.

APPENDIX A

Site Location Plan & Noise Measurement Locations.



APPENDIX B

Noise Level Survey Results.

Appendix B – Noise Level Survey Results

Date: Thursday 7th July 2022

Equipment: Brüel and Kjær 2260 'Type 1' sound level meter, calibrator & tripod.

Weather: Dry and warm, and calm

Location 1: On Aboukir Street, representative of the easternmost building elevation most exposed to road traffic noise on Aboukir Street adjacent to Entwistle Road.

Time		L _{Amax}	L _{A10}	L _{Aeq}	L _{A90}	Comments
09:15	09:30	82.9	69.8	66.2	48.2	Road traffic, distant road traffic, low level noise from town centre construction, occasional buses east & west and pedestrians.
11:46	12:01	81.6	68.0	64.2	46.0	Road traffic, distant road traffic, low level noise from town centre construction, occasional buses east & west and pedestrians.
12:58	13:17	81.6	69.0	65.3	53.8	Road traffic, distant road traffic, low level noise from town centre construction, occasional buses east & west and pedestrians.

Location 2: Adjacent to Arif Cash & Carry, and Dwellings on Ramsey Street.

Time		L _{Amax}	L _{A10}	L _{Aeq}	L _{A90}	Comments
09:39	09:54	65.3	56.4	54.1	51.0	Road traffic, distant road traffic, occasional HGV noise from deliveries to shopping store, impact noise from town centre construction (L _{Amax}), distant aircraft and pedestrians.
11:19	11:34	66.8	57.0	54.8	51.0	Road traffic, distant road traffic, impact noise from town centre construction (L _{Amax}), and noise from store shoppers.
12:27	12:54	69.4	57.2	55.5	51.4	Road traffic, distant road traffic, impact noise from town centre construction (L _{Amax}), noise from store shoppers and distant aircraft.
19:55	20:10	69.3	57.6	54.7	49.8	Road traffic, distant road traffic, occasional tyre squeals, noise from store shoppers and distant aircraft.
20:39	20:55	63.1	52.2	52.2	48.6	Road traffic, distant road traffic, occasional tyre squeals, noise from store shoppers and distant aircraft.
21:16	21:28	68.9	56.6	56.6	49.4	Occasional road traffic, distant road traffic and pedestrians.

Location 3: Adjacent to Lewis Builders Merchant and rear gardens of dwellings on Ramsey Street.

Time		L _{Amax}	L _{A10}	L _{Aeq}	L _{A90}	Comments
09:21	09:36	66.1	56.2	53.4	48.6	Road traffic, distant road traffic, occasional HGV noise from deliveries to builders merchant, impact noise from town centre construction (L _{Amax}), and distant aircraft.
10:59	11:14	71.5	58.2	55.7	50.8	Road traffic, distant road traffic, impact noise from town centre construction (L _{Amax}), distant aircraft and pedestrians.
12:05	12:20	74.9	60.2	57.4	52.0	Road traffic, distant road traffic, impact noise from town centre construction (L _{Amax}), occasional buses and pedestrians.
19:35	19:51	64.9	52.8	50.6	46.4	Occasional road traffic, distant road traffic, tyre squeals, and pedestrians. No noise from builders merchant.
20:19	20:36	63.0	52.4	49.8	46.0	Occasional road traffic, distant road traffic, distant low level reverse warning alarm to West and pedestrians. No noise from builders merchant.
20:58	21:13	57.1	50.0	47.6	45.4	Occasional road traffic, distant road traffic and pedestrians. No noise from builders merchant

APPENDIX C

Noise Units & Indices.

Appendix C – Noise Units and Indices

a) Sound Pressure Level and the decibel (dB)

A sound wave is a small fluctuation of atmospheric pressure. The human ear responds to these variations in pressure, producing the sensation of hearing. The ear can detect a very wide range of pressure variations. In order to cope with this wide range of pressure variations, a logarithmic scale is used to convert the values into manageable numbers. Although it might seem unusual to use a logarithmic scale to measure a physical phenomenon, it has been found that human hearing also responds to sound in an approximately logarithmic fashion. The dB (decibel) is the logarithmic unit used to describe sound (or noise) levels. The usual range of sound pressure levels is from 0 dB (threshold of hearing) to 120 dB (threshold of pain).

b) Frequency and hertz (Hz)

As well as the loudness of a sound, the frequency content of a sound is also very important. Frequency is a measure of the rate of fluctuation of a sound wave. The unit used is cycles per second, or hertz (Hz). Sometimes large frequency values are written as kilohertz (kHz), where 1 kHz = 1000 Hz. Young people with normal hearing can hear frequencies in the range 20 Hz to 20,000 Hz. However, the upper frequency limit gradually reduces as a person gets older.

c) Glossary of Terms

When a noise level is constant and does not fluctuate, it can be described adequately by measuring the dB level. However, when the noise level varies with time, the measured dB level will vary as well. In this case it is therefore not possible to represent the noise climate with a simple dB value. In order to describe noise where the level is continuously varying, a number of other indices can be used. The index used in this report is described below together with a glossary of terms.

L_{Aeq} This is the A-weighted 'equivalent continuous noise level' which is an average of the total sound energy measured over a specified time period. In other words, L_{Aeq} is the level of a continuous noise which has the same total (A-weighted) energy as the real fluctuating noise, measured over the same time period. It is increasingly being used as the preferred parameter for all forms of environmental noise.

L_{Amax} This is the maximum A-weighted noise level that was recorded during the monitoring period.

L_{A10} This the A-weighted noise level exceeded for 10% of the time period. LA10 is used as a measure of traffic noise.

L_{A90} This is the A-weighted noise level exceeded for 90% of the time period. LA90 is used as a measure of background noise.

APPENDIX D

Other Guidance.

Appendix D – Other Guidance

The National Planning Policy Framework (NPPF) 2021

The National Planning Policy Framework (NPPF) sets out the Government's economic, environmental and social planning policies for England. The policies set out in this framework apply to the preparation of local and neighbourhood plans and to decisions on planning applications. The revised Framework replaces the previous National Planning Policy Framework which was published in March 2012, revised in July 2018 and updated in February 2019.

Noise Policy Statement for England (NPSE)

The noise policy statement for England (NPSE) sets out the government's overall policy on noise. It aims to promote good health and a good quality of life by effective management of noise in the context of government policy on sustainable development.

Planning Policy Guidance 24 (PPG24)

PPG24 was withdrawn from official use in 2012 and replaced with the National Planning Policy Framework (NPPF) and Noise Policy Statement for England (NPSE). However, many Local authorities in England still refer to the content of PPG24 when determining planning applications for developments – in terms of noise generated or exposure to existing noise sources.

British Standard 7445-1:2003 and 7445-2:1991

BS 7445 'Description and measurement of environmental noise' (Ref 8-11) defines parameters, procedures and instrumentation required for noise measurement and analysis.

British Standard 5228:2009+A1:2014

BS 5228-1 'Code of practice for noise and vibration control on construction and open sites. Noise' (Ref 8-12) provides a 'best practice' guide for noise control, and includes Sound Power Level (L_w) data for individual plant as well as a calculation method for noise from construction activities. BS 5228-2 'Code of practice for noise and vibration control on construction and open sites. Vibration' (Ref 8-13) provides comparable 'best practice' for vibration control, including guidance on the human response to vibration.

British Standard 6472:2008

BS 6472-1 'Guide to evaluation of human exposure to vibration in buildings Part 1: Vibration sources other than blasting' (Ref 8-14) presents recommended frequency weighted vibration spectra (for continuous vibration) and vibration dose values (VDV) (for intermittent vibration) above which adverse comment is likely to occur in residential properties.

British Standard 7385:1993

BS 7385-2 'Evaluation and measurement for vibration in buildings. Guide to damage levels from groundborne vibration' (Ref 8-15) presents guide values for transient and continuous vibration, above which there is a likelihood of cosmetic damage. The standard establishes the basic principles for carrying out vibration measurements and processing the data, with regard to evaluating vibration effects on buildings.

British Standard 4142:2014

BS 4142 'Methods for rating and assessing industrial and commercial sound' (Ref 8-16) can be used for assessing the effect of noise of an industrial nature, including mechanical services plant noise. The method compares the difference between 'rating level' of the industrial noise, with the 'background level' at the receptor position.

World Health Organisation

The World Health Organisation's (WHO) 'Guidelines for Community Noise' (Ref 8-17) recommend external daytime and evening environmental noise limits, and internal night time limits to avoid sleep disturbance.

The WHO 'Night Noise Guidelines for Europe' (Ref 8-18) recommend updated guidelines on night-time noise limits to avoid sleep disturbance.

Calculation of Road Traffic Noise

Department of Transport (DfT)/ Welsh Office Memorandum 'Calculation of Road Traffic Noise' (CRTN)' (Ref 8-19) describes procedures for traffic noise calculation, and is suitable for environmental assessments of schemes where road traffic noise may have an effect.

APPENDIX E

1. Toshiba RAV-GM1601ATP-E roof top air conditioning units.
2. SAF ceiling mounted fresh air ventilation and heat recovery units.



Toshiba Air Conditioning Data Sheet

RAV-GM1601ATP-E
Digital Inverter 6 HP 1 Phase

Model Reference		RAV-GM1601ATP-E	
Operating Range	Cooling/Heating	°C	-15 to 46/-15 to 15
Air Flow	High	m ³ /h - l/s	6900 - 1917
Sound	Pressure High Cooling/Heating	dB(A)	53 - 55
	Power High Cooling/Heating	dB(A)	70 - 72
Unit	Height x Width x Depth	mm	1340 x 900 x 320
	Weight	kg	95
Pipe Connection	Flare Connections (gas - liquid)	inch	5/8 - 3/8
	Min.-Max. Length	m	5 - 50
	Maximum Height Difference	m	±30
	Drain Port Connection	mm	16
Refrigerant R32	Gas - Base Charge/Chargeless Length	kg/m	R32 - 2.4/30
	Additional Charge Liquid Side	g/m	35
Run Current	Maximum	Amps	21.71
Power Cable	Outdoor to Indoor		3 core + earth
Power Supply	Suggested Fuse Size	V/ph/Hz-A	220-240/1/50

* Waiting for published data

TOSHIBA

- Redesigned for use with refrigerant R32
- Wide operating range (cooling mode -15°C to +52°C)
- Auto-diagnostic function
- Flexible, can be utilised for single, twin, triple indoor applications
- Compact size

Fresh Air Ventilation and Heat Exchange unit SAF-E7

Model No.

SAF150E7
SAF250E7
SAF350E7
SAF500E7
SAF800E7
SAF1000E7



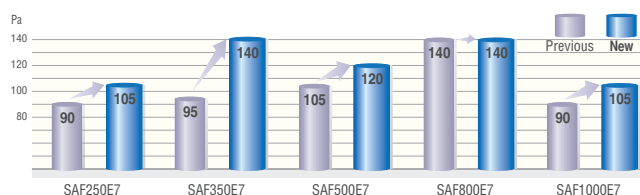
Energy Performance of Building Directive - EPBD

EPBD limit the amount of electrical/gas power to be used to provide heating or cooling in commercial buildings. Therefore the building designer needs to select energy efficient heating/cooling equipment, and to minimise energy losses through ventilation systems.

The SAF recovers heat energy which would otherwise be exhausted to atmosphere, and uses this energy to warm the air entering the building. The reverse happens in warmer climates, where the exhausted cool air is used to partially cool the incoming air.

Capturing this waste energy, means the heating/ cooling requirements of the building are reduced, so smaller size plant can be selected, savings can be made in long term energy consumption, and carbon emissions are reduced.

Increased external static pressure at UHi air flow



Switch box (option)



Remote control

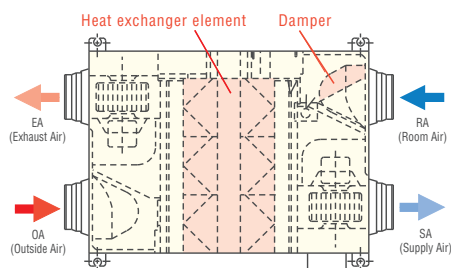
The following functions are newly available.

- ON/OFF Timer – The hour and minute of timer on/off can be set.
- Filter Sign – Announces the due time for cleaning the air filter.

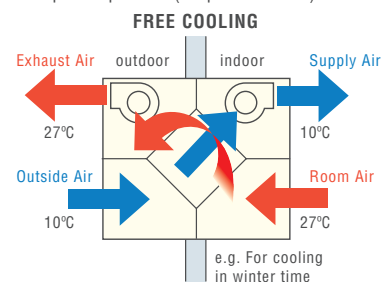
Specifications

Item				Model	SAF150E7	SAF250E7	SAF350E7	SAF500E7	SAF800E7	SAF1000E7	
Power source						1 Phase 220-240V, 50Hz					
Exterior dimensions Height x Width x Depth					mm	270x970x467	270x882x599	317x1050x804	317x1090x904	388x1322x884	388x1322x1134
Exterior appearance						Galvanized steel sheet					
Power input					W	92-107	108-123	178-185	204-225	360-378	416-432
Running current					A	0.42-0.45	0.49-0.51	0.81-0.77	0.93-0.94	1.64-1.58	1.89-1.80
Capacity	UHi	Enthalpy exchange efficiency	Cooling	%	63	63	66	62	65	65	
			Heating		70	70	69	67	71	71	
		Temperature exchange efficiency				75					
	Hi	Enthalpy exchange efficiency	Cooling		63	63	66	62	65	65	
			Heating		70	70	69	67	71	71	
		Temperature exchange efficiency				75					
	Lo	Enthalpy exchange efficiency	Cooling		66	65	71	64	68	70	
			Heating		73	72	73	69	74	76	
		Temperature exchange efficiency				77	77	78	76	76	79
Motor & Q'ty					W	10 x 2	20 x 2	40 x 2	70 x 2	180 x 2	180 x 2
Air handling equipment Fan type & Q'ty						Sirocco fan x 2					
Air flow			UHi	m³/h	150	250	350	500	800	1000	
			Hi		150	250	350	500	800	1000	
			Lo		120	190	240	440	630	700	
External static pressure			UHi	Pa	80	105	140	120	140	105	
			Hi		70	95	60	60	110	80	
			Lo		25	45	45	35	55	75	
Net weight					kg	25	29	49	57	71	83
Remote control						Included					
Air filter	Supply air				Protection for element (Washable) PS400						
	Exhaust air										

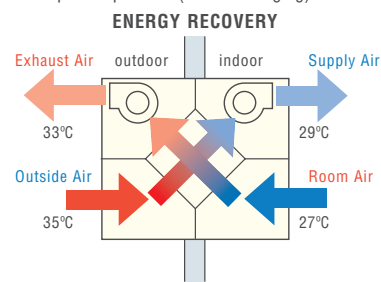
Structure (SAF800E7)



Principle of operation (simple ventilation)



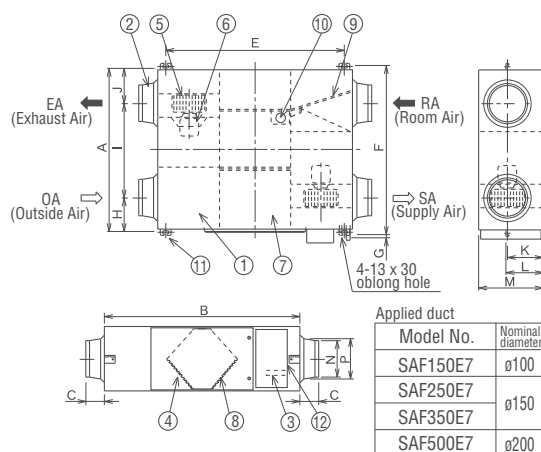
Principle of operation (heat exchanging)



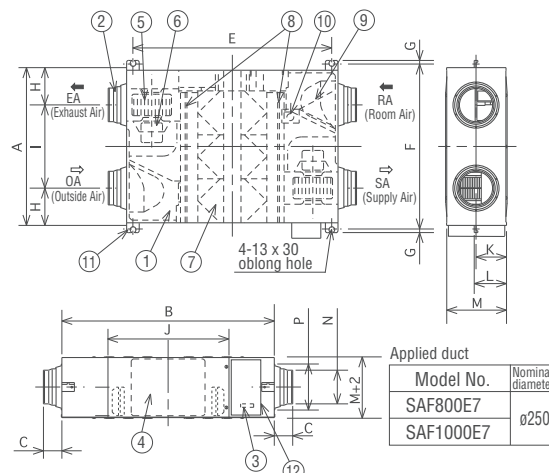
Dimensions

All measurements in mm.

SAF150E7, SAF250E7, SAF350E7, SAF500E7



SAF800E7, SAF1000E7



Dimension table

Model	A	B	C	E	F	G	H	I	J	K	L	M	N	P
SAF150E7	467	970	49	810	525	19	82	303	82	135	159	270	ø98	ø110
SAF250E7	599	882	95		655		142	315	142				ø144	ø164
SAF350E7	804	1050	70	978	860		112	580	112	159	182	317	ø144	ø164
SAF500E7	904	1090		1018	960		132	640	132				ø194	ø210

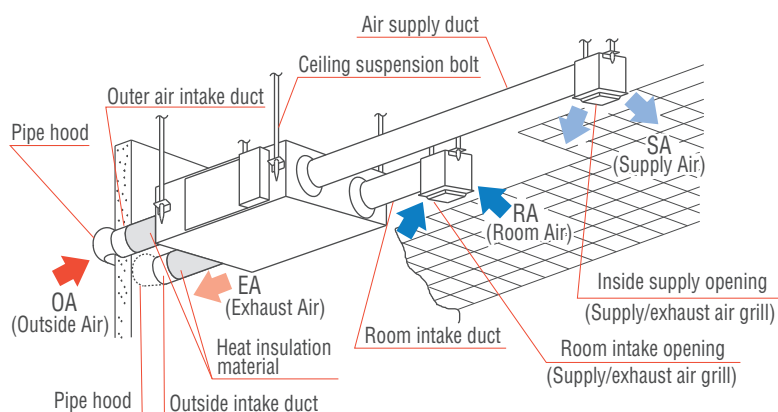
Dimension table

Model	A	B	C	E	F	G	H	I	J	K	L	M	N	P
SAF800E7	884	1322	85	1250	940	19	228	428	612	194	218	388	ø242	ø258
SAF1000E7	1134				1190			678						

NO.	Name	Qt'y
①	Frame	1
②	Adaptor	4
③	Terminal board	1
④	Inspection Cover	1
⑤	Fan	2 *
⑥	Motor	2 *
⑦	Heat Exchange Element	
	SAF150E7	1
	SAF250E7	1
	SAF350E7	2
	SAF500E7	2
	SAF800E7	3
	SAF1000E7	4
⑧	Filter	2
⑨	Damper	1
⑩	Damper Motor	1
⑪	Suspension fitting	4
⑫	Electrical components box	1

*Model SAF350E7, SAF500E7 have different fan and motor locations.

Installation reference



Note: An inspection port is needed for cleaning the heat exchanger and filter 1 or 2 times a year.