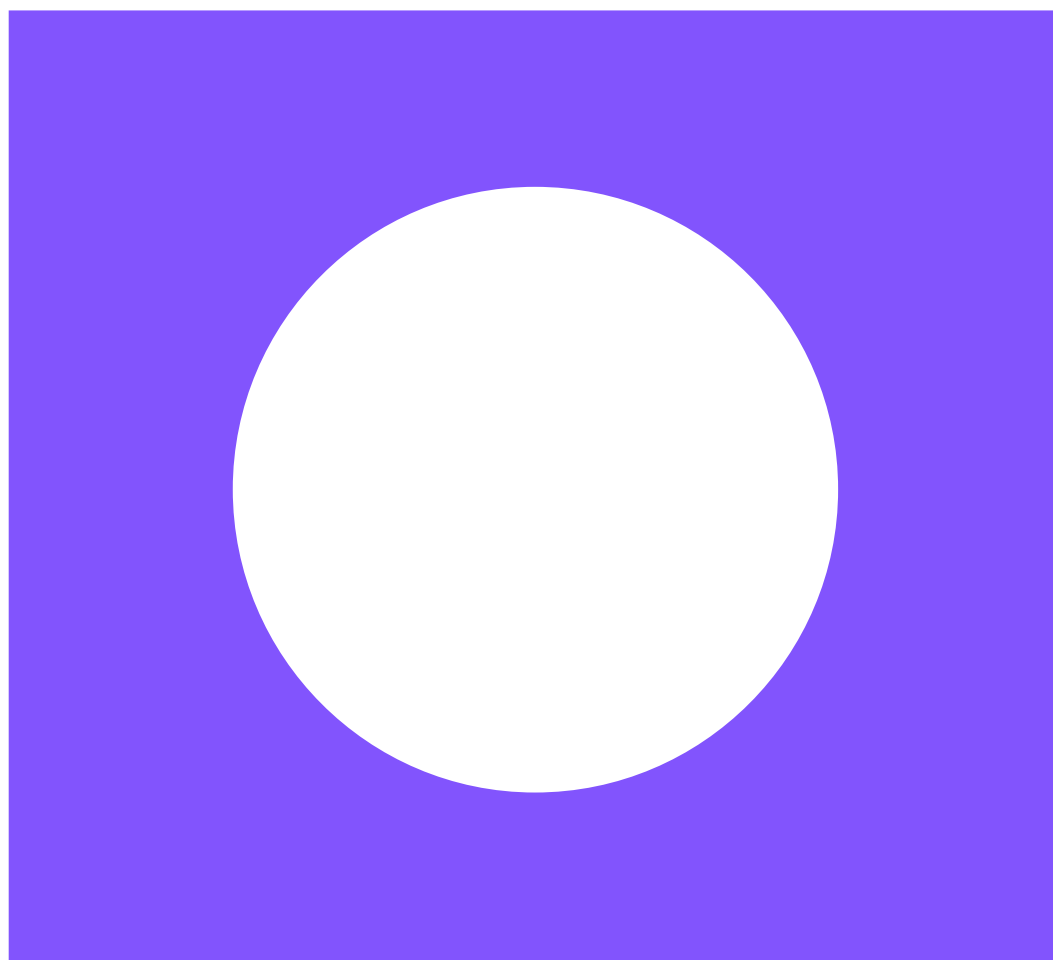




Salisbury Diagnostic and Surgical Hub

Noise Impact Assessment

September 2026

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Salisbury Diagnostic and Surgical Hub

Noise Impact Assessment

September 2026

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Executive summary

A noise assessment in relation to the design for the new DASH Salisbury District Hospital has been conducted.

Potential noise sources associated with the proposed DASH are considered to be:

- Noise from mechanical plant associated with the building services
- Noise from additional road traffic generated by the proposed DASH

Noise level limits for mechanical services noise have been set based on a background noise survey conducted around the site, the proposed planning requirements, and the BREEAM requirements for credit under POL05. Due to very low background noise levels during day-time and night, the requirements of BREEAM POL05 cannot be met and this credit is not being sought.

This assessment addresses potential noise impacts on: residential buildings, hospital buildings, and external hospital amenity areas. These are assessed separately to different criteria.

BS4142 provides a methodology for assessing the potential impact of mechanical plant noise at residences, based on background L_{A90} noise levels. A background noise survey was therefore conducted. This survey showed that background L_{A90} noise levels at the nearest off site residential receptors were:

- 27dB during daytime and 23dB at night.

These external sound level criteria are low.

With the proposed sound mitigation of a 3.5m sound barrier around the plant area, sound levels from the Air Source Heat Pumps would exceed the background L_{A90} sound levels by between 0dB and 2dB at offsite residential receptors during daytime and between 4dB and 6dB during night-time. Under BS4142 this would be considered an adverse impact “depending on context”.

When context is taken into account and absolute thresholds applied, no adverse impacts are expected.

At the onsite NHS Staff accommodation the predicted Rating Sound Level would be 34dBA. This would be 7dB and 12dB above the background L_{A90} . Under BS4142 this would be considered an adverse impact “depending on context”.

When context is taken into account and absolute thresholds applied, no adverse impacts are expected.

Noise produced by road traffic generated by the proposed DASH will be negligible on the surrounding road network due to the very low number of vehicle movements generated by the proposed DASH compared to the existing number of vehicle movements on Odstock Road.

1 Introduction

Mott MacDonald has been commissioned to conduct a noise impact assessment for the proposed Diagnostic and Surgical Hub (DASH) building at Salisbury District Hospital.

The proposed DASH is to be located within the area currently occupied by the car park, just north of the helicopter pad on the southeastern side of the hospital.

The new DASH will be a three-storey building and will include 5 operating theatres, and diagnostic facilities. The building will also house pre/post pods for the patients to rest and recover after treatment.

The DASH will inevitably require a certain amount of mechanical plant associated with air conditioning, the cooling of scanning equipment etc. The exterior components of this plant will be located in the plant compound to the south of the proposed building within the area currently occupied by the helicopter pad. All plant within the compound will be located at ground level.

These sound sources are discussed in more detail in Section 2.0 below:

2 Sound Sources

The main sound producing items of plant are understood to be:

- 3no. Air Source Heat Pumps (ASHPs) - Located on the ground, east of the emergency generator.
- A 1.5Kv Emergency diesel generators - Located within a packaged noise enclosure and will only be run during an emergency and during periodic testing.

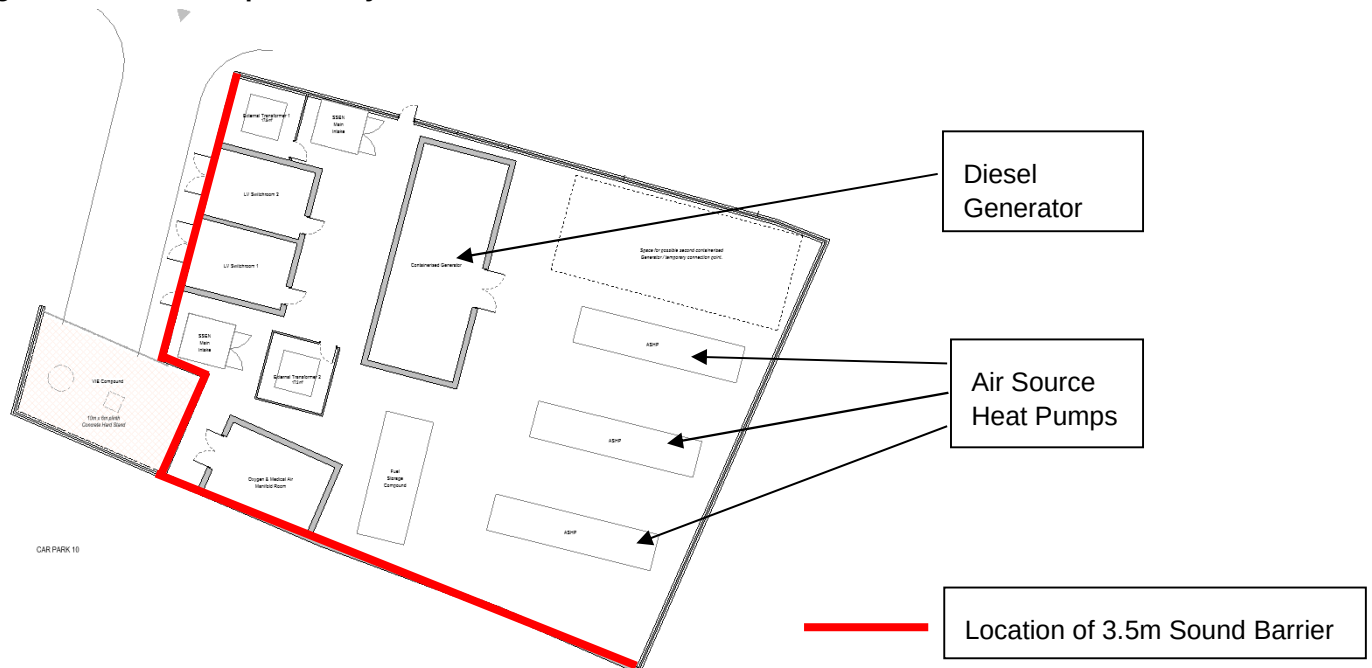
Transformers and other plant will also be housed within the plant compound, as shown in Figure 2.1 and DASH building but noise levels from these items will be negligible in comparison to the above plant.

The DASH Building will also require a certain amount of mechanical plant to be located within the first floor plant room. Noise from this plant will be controlled by tried and test means of sound control such that it does not contribute significantly to external sound levels at the nearest sensitive receptors.

Methods employed to control levels of mechanical plant sound will include:

- Selection of quiet versions of plant
- Duct attenuators
- Plant enclosures/Barriers
- Acoustic louvres
- Reverberation control

Figure 2.1: Plant Compound Layout



Source: Mott MacDonald

3 Acoustic criteria

3.1 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF)¹ was most recently updated in August 2026. It sets out the Government's planning policies for England and how these are expected to be applied.

Planning Policy P1: *Planning for clean and safe places* states

1. *To support efforts to avoid and mitigate risks from natural and man-made hazards, minimise levels of pollution and create clean, liveable and safe places for people to live, work and visit, development plans should:*

b. *Consider any wider opportunities to reduce air, water, soil, noise or other forms of pollution, and contribute to compliance with national and local environmental targets and objectives, through the spatial strategy and policies for specific parts of the plan area*

Planning Policy P3: *Living conditions and pollution* states:

2. *Within this context development proposals should:*

a. *Provide healthy living conditions for occupiers and users in terms of adequate access to light and avoiding exposure to levels of air, noise, artificial light or other sources of pollution which could have an unacceptable adverse effect on health and the quality of life. Where necessary suitable mitigation measures should be incorporated to secure acceptable living conditions;*

b. *Not give rise to, or contribute to, an unacceptable level of access to daylight and sunlight for neighbouring residents and occupiers, or unacceptable levels of air, noise, artificial light, water, soil or other forms of pollution on or beyond the site. Adverse impacts of this nature should be avoided where possible, or else mitigated to an acceptable degree. Where possible, opportunities should be taken to reduce pollution affecting the wider area (such as through traffic and travel management or improved external lighting);*

....

d. *Mitigate and reduce to a minimum potential adverse impacts resulting from noise, not result in levels of noise exposure which would have a significant observed adverse effect, and maintain the character of tranquil areas (those areas that have remained relatively undisturbed by noise from human sources and are prized for their recreational and amenity value for this reason);*

3.2 The Noise Policy Statement for England

The Noise Policy Statement for England (NPSE)² was issued by the DEFRA in 2010. Its purpose is to promote “good health and a good quality of life through the effective management of noise within the context of Government policy on sustainable development.” The three main aims are to:

- “avoid significant adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development;

¹ Ministry of Housing, Communities and Local Government, The National Planning Policy Framework, 2021.

² DEFRA, Noise Policy Statement for England, 2010

- *mitigate and minimise adverse impacts on health and quality of life from environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development; and,*
- *where possible, contribute to the improvement of health and quality of life through the effective management and control of environmental, neighbour and neighbourhood noise within the context of Government policy on sustainable development."*

3.3 Wiltshire Core Strategy

Core Policy 57 Ensuring high quality design and place shaping

A high standard of design is required in all new developments, including extensions, alterations, and changes of use of existing buildings. Development is expected to create a strong sense of place through drawing on the local context and being complementary to the locality. Applications for new development must be accompanied by appropriate information to demonstrate how the proposal will make a positive contribution to the character of Wiltshire through:

.....

vii. having regard to the compatibility of adjoining buildings and uses, the impact on the amenities of existing occupants, and ensuring that appropriate levels of amenity are achievable within the development itself, including the consideration of privacy, overshadowing, vibration, and pollution (e.g. light intrusion, noise, smoke, fumes, effluent, waste or litter).

3.4 British Standard BS4142:2014+A1:2019

British Standard BS 4142:2014+A1:2019, titled 'Methods for rating and assessing industrial and commercial sound', provides a method for assessing the impact of industrial sound sources on residential receivers. In this sense, industrial sound sources include mechanical plant associated with new buildings and developments. It will be applied to the sound created by mechanical plant associated with the DASH at the nearest sound sensitive receptors and inter-relates with BREEAM POL05 discussed below.

The relevant parameters are as follows.

- Background Sound Level in $L_{A90,T}$;
- Specific Sound Level, or Source Sound Level, in $L_{Aeq,T}$; and
- Rating Level in $L_{Ar,T}$ which is the specific sound level plus any penalties given for the characteristic features of the sound.

The rating method detailed within the standard is widely accepted as an effective means of assessing the significance of building plant sound. The level of sound from proposed new plant (the overall rating level) is predicted in terms of L_{Aeq} and compared to the existing background sound level, in terms of L_{A90} . The L_{A90} is to be representative of the period being assessed. If the specific sound includes tonal, impulsive or other features likely to attract attention, assessed at the off-site sound sensitive receptors (e.g. residential), a character penalty, from 2-18dB (although unlikely to exceed 10dB) is added to the specific sound level. Plant that contains these character features should therefore be avoided where practical.

The outcome of the assessment is defined in BS 4142:2014+A1:2019 with the following points that relate to the difference between the background sound level and the rating level:

- Typically, the greater this difference, the greater the magnitude of the impact
- A difference of around +10dB or more is likely to be an indication of a significant adverse impact, depending on the context
- A difference of around +5dB 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. This is the criteria being proposed for the scheme, which is consistent with local and national noise policy.

However, it is important to note that BS4142 states: *“Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.”*

In cases where background levels are very low, reference is often made to BS8233 or the World Health Organisation (WHO) guidelines.

3.5 British Standard BS7445

British Standard 7445: *Description and measurement of environmental noise —Part 1: Guide to quantities and procedures* defines the basic quantities to be used for the description of noise in community environments and describes basic procedures for the determination of these quantities.

The standard sets out the requirements for:

- Instrumentation;
- Calibration;
- Measurement positions;
- Meteorological effects;
- Mathematical derivation of noise parameters; and
- Information to be recorded.

3.6 Design Manual for Roads and Bridges - LA111 Noise and Vibration

LA111 Noise and Vibration provides a method for assessing the impact of changes in road traffic noise level associated with the construction and modification of new roads. Whilst the proposed DASH does not involve construction of new roads it does have the potential to generate additional traffic on existing roads. LA111 provides information useful in the assessment of this kind of potential noise impact.

For short-term changes in road traffic noise, the smallest change in road traffic noise level ($L_{A10,18h}$) that is considered perceptible is 1dB.

A change in $L_{A10,18h}$ of 1dB is equivalent to an increase in traffic flow of 25% or a decrease in traffic flow of 20% assuming all other factors such as speed and road surface etc remain the same.

3.7 British Standard BS 8233:2014

British Standard BS 8233:2014 titled ‘*Guidance on sound insulation and noise reduction for buildings*’, provides guidance for the control of sound in and around new or refurbished

buildings. Within the guidance, values for the internal ambient sound levels for different building uses are recommended. It states that it is 'desirable' that internal sound levels in dwellings do not exceed 35dB $L_{Aeq,16hr}$ in living rooms and bedrooms during the day, 40dB $L_{Aeq,16hr}$ in dining rooms during the day and 30dB $L_{Aeq,8hr}$ in bedrooms at night. These values are often used to inform the level of sound insulation required in the walls, glazing and ventilation at the detailed design stage of the proposed residential developments.

BS8233:2014 states: *If partially open windows were relied upon for background ventilation, the insulation would be reduced to approximately 15 dB.* Thus, the internal sound level limit of 30dB $L_{Aeq,T}$ corresponds to an external sound level limit of 45dB $L_{Aeq,T}$.

BS8233 provides some guidance on acceptable exterior sound levels within amenity spaces. It states: *"For traditional external areas that are used for amenity space, such as gardens and patios, 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."*

3.8 World Health Organization's 'Guidelines for Community Noise'

The World Health Organisation's 'Guidelines for Community Noise' sets out noise levels for typical situations above which critical health effects such as annoyance may be expected to occur. Table 3.1 below details these levels.

Table 3.1: Reproduction of WHO Table 4.1: Guideline Values for Community Noise in Specific Environments

Specific environment	Critical health effects	$L_{Aeq,T}$ dB	Time base (hours)	$L_{Amax,fast}$ dB
Outdoor living area	Serious annoyance	55	16	--
	Moderate annoyance	50	16	--
Outside bedrooms	Sleep disturbance	45*	8	60

Source: WHO, page xv

*WHO guidelines state the following regarding sleep disturbance.

"If negative effects on sleep are to be avoided the equivalent sound pressure level should not exceed 30 dBA indoors for continuous noise. If the noise is not continuous, sleep disturbance correlates best with L_{Amax} and effects have been observed at 45 dB or less. This is particularly true if the background level is low. Noise events exceeding 45 dBA should therefore be limited if possible. For sensitive people an even lower limit would be preferred. It should be noted that it should be possible to sleep with a bedroom window slightly open (reduction from outside to inside of 15 dB). To prevent sleep disturbances, one should thus consider the equivalent sound pressure level and the number and level of sound events. Mitigation targeted to the first part of the night is believed to be effective for the ability to fall asleep."

Thus, the WHO internal noise level limit for sleep disturbance of 30dB $L_{Aeq,T}$ corresponds to an external noise level limit of 45dB $L_{Aeq,T}$.

3.9 Health Technical Memorandum 08-01 Acoustics

Health Technical Memorandum 08-01 Acoustics (HTM-08-01)³ provides the primary criteria and guidance for the acoustic design of healthcare facilities. Most of its content relates to the internal acoustic design.

However HTM 08-01 sets out limits on the level of noise ingress from external noise sources and noise from building services. This has been used to set noise criteria for noise from the mechanical plant associated with the DASH building at nearest existing hospital building which is the Duke of Cornwall Special Treatment Centre which has openable windows.

Table 1 of HTM 08-01 presents the upper limit for the indoor ambient noise level $L_{Aeq,1hr}$ for various types of room within a healthcare building. The specified levels refer to the highest one-hour equivalent continuous A weighted sound pressure level likely to occur during operation of the Health Centre.

The criteria which HTM applies to noise levels from external noise sources for various types of spaces are reproduced below in Table 3.2. It can be seen that the most stringent internal noise level criterion is 35 $L_{Aeq, 1hr \text{ night}}$.

Table 3.2: Criteria for noise intrusion from external noise sources

Room type	Example	Criteria for noise intrusion to be met inside the spaces from external sources (dB)
Ward – single person	Single-bed ward, single-bed recovery areas and on-call room, relatives' overnight stay	40 $L_{Aeq, 1hr \text{ daytime}}$ 35 $L_{Aeq, 1hr \text{ night}}$ 45 $L_{Amax, f \text{ night}}$
Ward – multi bed	Multi-bed wards, recovery areas	45 $L_{Aeq, 1hr \text{ daytime}}$ 35 $L_{Aeq, 1hr \text{ night}}$ 45 $L_{Amax, f \text{ night}}$
Small office-type spaces	Private offices, small treatment rooms, interview rooms, consulting rooms	40 $L_{Aeq, 1hr}$
Open clinical areas	A&E	45 $L_{Aeq, 1hr}$
Circulation spaces	Corridors, hospital street, atria	55 $L_{Aeq, 1hr}$
Public areas	Dining areas, waiting areas, playrooms	50 $L_{Aeq, 1hr}$
Personal hygiene (en-suite)	Toilets, showers	45 $L_{Aeq, 1hr}$
Personal hygiene (public and staff)	Toilets, showers	55 $L_{Aeq, 1hr}$
Small food-preparation areas	Ward kitchens	50 $L_{Aeq, 1hr}$
Large food-preparation areas	Main kitchens	55 $L_{Aeq, 1hr}$
Large meeting rooms (>35m ² floor area)	Lecture theatres, meeting rooms, board rooms, seminar rooms, classrooms	35 $L_{Aeq, 1hr}$
Small meeting rooms (>35m ² floor area)	Meeting rooms, seminar rooms, classrooms, board rooms	40 $L_{Aeq, 1hr}$
Operating theatres	Operating theatres	40 $L_{Aeq, 1hr}$ 50 $L_{Amax, 1hr}$
Laboratories	Laboratories	45 $L_{Aeq, 1hr}$

HTM08-01 also sets criteria for external areas within hospitals. It states:

³ National Services Scotland, 2011. 'Health Technical Memorandum 08-01: Specialist services. Acoustics.'

Open external areas should be protected. Noise from services should not exceed the existing daytime background noise level or 50 dB L_{A90} , whichever is the higher. This limit should be achieved in any areas normally occupied by staff (except maintenance staff, notwithstanding the requirements of the Control of Noise at Work Regulations 2005) or the public (for example open courtyards and accessible landscaped areas). This means that noisy plantrooms should not face normally occupied external areas unless adequate acoustic control is provided.

4 Sound Sensitive Receptors

The nearest residential receptors to the DASH building and its associated plant compound are:

- Hospital Staff accommodation on site Approx 165m
- Dwelling south of the hospital - 2 Odstock Road Approx 305m
- Permanent Traveller Site at Oak Tree Field to the north of the hospital. Approx 305m

Further residences are located approx. 715m to the east on High Road.

The nearest hospital buildings to the new DASH are:

- The Procurement and Commercial Services building Approx 65m
- The Duke of Cornwall Spinal Treatment Centre Approx 70m

The DASH building includes an external play area recessed into the eastern façade. Whilst this play area is screened from most of the plant enclosure by the DASH building its eastern perimeter has an oblique line of sight of the CHPs.

5 Baseline sound survey

As BS4142 bases its sound level criteria on background sound levels, a baseline sound survey was conducted at the proposed site of the Salisbury District Hospital, in order to set sound criteria for mechanical plant associated with the new building at nearby sound sensitive receptors.

British Standard (BS) 4142:2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound*' was referred to when carrying out measurements for existing background/ambient sound levels.

The sound survey was carried out, with long-term (LT) measurements taken from Friday 12 June 2026 to Tuesday 16 June 2026. LT measurement locations were selected to be representative of the sound levels at the nearest receptor locations surrounding the proposed DASH.

Table 5.1 and Table 5.2 summarise the free field sound level values at LT1 and LT2 respectively.

Table 5.1: Summary of free field LT1 (Staff Accommodation) data for BS 4142 assessment

Date	L _{A90,15min} daytime, dB (07:00-23:00) dB	L _{A90,15min} night-time, dB (23:00-07:00) dB	L _{Aeq,1hr} daytime, dB (07:00-23:00) dB	L _{Aeq,8hr} daytime, dB (23:00-07:00) dB
12 June 26	30.9	23.0	44.3	50.3*
13 June 26	31.6	27.4	40.7	38.3
14 June 26	28.1	22.2	41.5	39.4
15 June 26	27.0	23.0	44.9	38.8
16 June 26	27.1	21.8	42.3	37.4
Overall	27	22	43.0	37.6

*night time L_{Aeq} values affected by anomalous short term event, possibly a low flying aircraft

Table 5.2: Summary of free field LT2 data for BS 4142 assessment

Date	L _{A90,15min} daytime, dB (07:00-23:00) dB	L _{A90,15min} night-time, dB (23:00-07:00) dB	L _{Aeq,1hr} daytime, dB (07:00-23:00) dB	L _{Aeq,8hr} daytime, dB (23:00-07:00) dB
12 June 26	31	23	48	46.0*
13 June 26	33.3	26.7	46.6	42.9
14 June 26	26.7	21.8	45.1	42.6
15 June 26	28.4	22.6	49.3	43.6
16 June 26	28.8	22.8	48.8	42.5
Overall	27	23	47.8	41.9

*night time L_{Aeq} values affected by anomalous short term event, possibly a low flying aircraft

Short-term (ST) measurements were captured during the daytime of the Friday 12 June 2026. ST1, ST2 and ST3 measurement locations representative of the daytime sound levels at hospital buildings and the Travellers site to the north of the hospital (Figure 5.1). Sound levels at

ST1 are also representative of the expected sound levels which would occur at the façade of the new DASH building.

A summary of the short-term data is shown in Table 5.3, Table 5.4 and Table 5.5.

Table 5.3: Summary of short-term attended sound measurements ST1

Start date/time	L _{Aeq,15min} dB	L _{Amax,15min} dB	L _{1,15min} dB	L _{A10,15min} dB	L _{A90,15min} dB
2026/06/12 10:32:53	58.9	76.3	69.1	63.4	41.5
2026/06/12 12:03:31	58.6	76.3	69.7	62.6	42.7
2026/06/12 13:23:50	57.3	72.8	67.6	61.8	43.2

Source: Mott MacDonald

Table 5.4: Summary of short-term attended sound measurements ST2

Start date/time	L _{Aeq,15min} dB	L _{Amax,15min} dB	L _{1,15min} dB	L _{A10,15min} dB	L _{A90,15min} dB
2026/06/12 10:49:29	55.7	71.9	66.4	58.9	46.7
2026/06/12 11:46:02	54.9	69.2	62	58.9	47.9
2026/06/12 12:21:34	53.1	64.9	61.1	56.9	46.9

Source: Mott MacDonald

Table 5.5: Summary of short-term attended sound measurements ST3

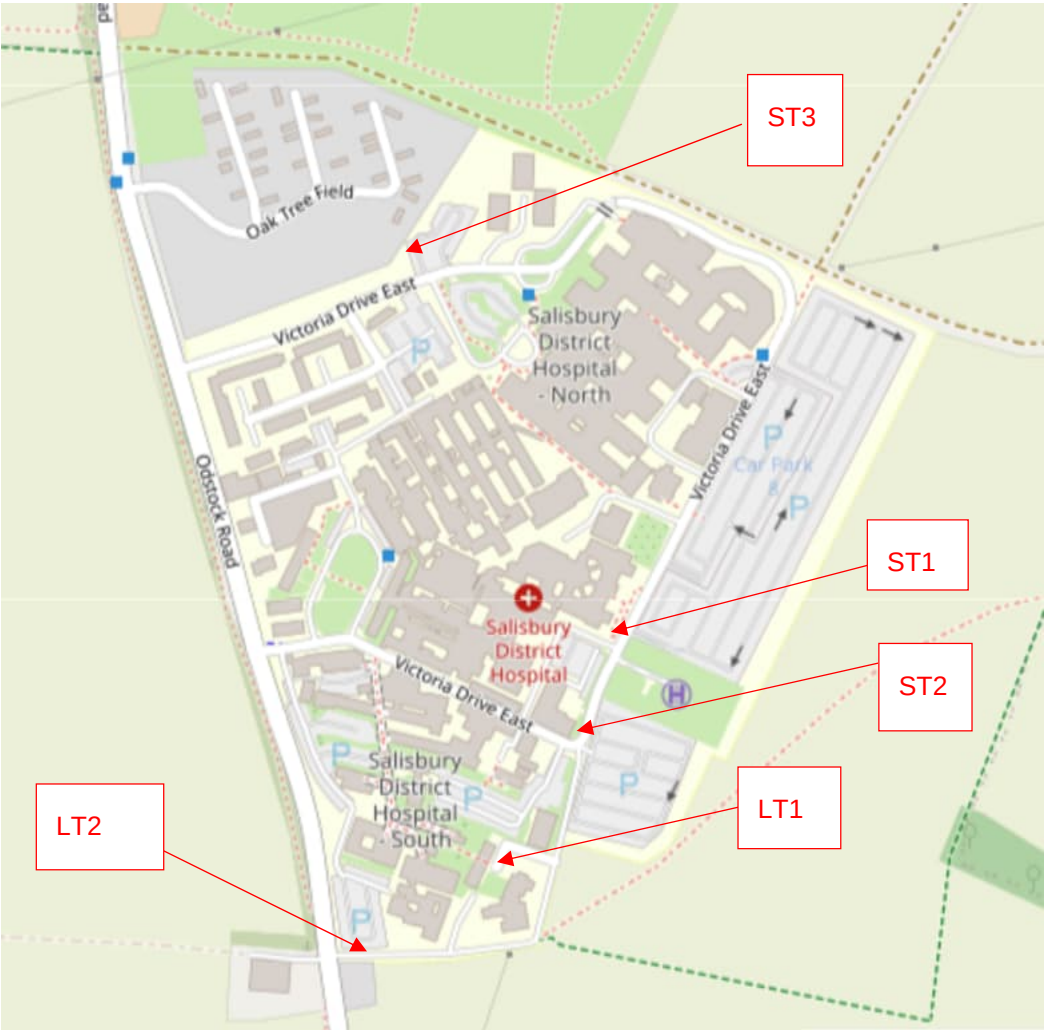
Start date/time	L _{Aeq,15min} dB	L _{Amax,15min} dB	L _{1,15min} dB	L _{A10,15min} dB	L _{A90,15min} dB
2026/06/12 11:16:58	53.5	71.4	63.8	57.2	45
2026/06/12 12:45:55	51.6	75.8	61	53	45.3
2026/06/12 13:00:55	53.1	77.5	63.1	55.2	45.4

Source: Mott MacDonald

Locations ST1 and ST2 are representative of existing sound levels near the proposed DASH building. The proposed DASH building will have non openable glazed facades. Typically, standard thermal double glazing provides around 33dB attenuation between external sound levels and internal. HTM08-01 sets internal sound level with wards of 35dB L_{AeqT}. This means that, in order to meet the internal criteria, external sound levels should not exceed 68dB L_{AeqT} at night and 73dB L_{AeqT} during daytime. Existing sound levels near the DASH building will therefore not result in these internal sound criteria being exceeded.

Observations on site indicated that background sound levels at the short-term measurement locations were controlled by distant traffic noise. Existing mechanical plant made little or no contribution to background L_{A90} levels. The results of the short-term measurement samples show background sound levels are generally consistent with measurements at similar times of the day at LT1. The temporal variation over a 24-hour period has therefore been assumed to be similar to that at LT1. The day and nighttime background sound levels measured at LT1 have therefore been assumed at ST1, ST2 and ST3.

Figure 5.1: Sound measurement locations



Source: © OpenStreetMap contributors. (data is available under the Open Database Licence, <https://www.openstreetmap.org/copyright>) with Mott MacDonald mark-up

6 Mechanical Plant Sound Criteria

6.1 Residential Receptors

BS4142 provides a methodology for assessing the potential impact of mechanical plant sound based on background L_{A90} sound levels as measured in the locality of the nearest or most exposed sound-sensitive development as described in Section 3.4 above.

Table 6.1 shows the background L_{A90} levels against which the predicted rating level ($L_{Ar,Tr}$) levels from mechanical plant may be compared.

Table 6.1: Background sound levels at residential receptors – used for BS4142 assessment

Receptor	Distance, m	Background L_{A90} Levels, Daytime (07:00-23:00) dB	Background L_{A90} Levels, Nighttime (23:00-07:00) dB
Staff Accommodation	175	27	22
2 Odstock Road	280	27	23
Travellers Site	390	27*	23*

*Estimated from LT2

It should be noted that these background L_{A90} levels are very low. As stated above, BS4142 states: “Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night.”

In this instance it is useful to consider sound criteria at residential receptors in terms of internal sound criteria provide by the BS8233 which provides an external sound level criterion of 45dB $L_{Aeq,T}$.

6.2 Hospital Buildings – Clinical

BS4142 applies primarily to assessment of sound impact on residential buildings and does not apply specifically to hospital buildings, although the principle of comparing the predicted $L_{Ar,Tr}$ with the background L_{A90} is sometimes applied to hospital buildings for the purposes of BREEAM.

For Hospital Buildings sound levels from mechanical plant have been considered in terms of their potential impact on internal sound levels within occupied spaces within hospital buildings.

For the nearby hospital buildings, with openable windows, which contain occupied beds at night, a sound criterion based on an internal sound limit for sleeping areas of 35dB $L_{Aeq,T}$ at night and 40dB $L_{Aeq,T}$ during daytime (based on HTM08-01 limits for wards) has been derived. Assuming a partially opened window will provide around 15dB attenuation between external sound levels and internal sound levels, this provides an external sound criterion of 50dB $L_{Aeq,T}$ for nighttime and 55dB $L_{Aeq,T}$ for daytime.

The DASH building itself will have non openable glazed facades. Typical thermal double glazing provides around 33dB attenuation between external sound levels and internal. This means that, in order to meet the internal criteria, external sound levels should not exceed 68dB $L_{Aeq,T}$ at night and 73dB $L_{Aeq,T}$ during daytime.

6.3 Hospital Buildings - Administrative

Sound criteria for the nearest hospital administrative buildings have also been set based on internal sound level criteria. HTM08-01 sets an internal sound level criterion of 40dB for offices. Again, assuming a partially opened window will provide 15dB attenuation between external sound levels and internal sound levels, this provides an external sound criterion of 55dB L_{AeqT} .

6.4 DASH - External Play area

HTM08-01 states:

Open external areas should be protected. Noise from services should not exceed the existing daytime background noise level or 50 dB L_{A90} , whichever is the higher. This limit should be achieved in any areas normally occupied by staff (except maintenance staff, notwithstanding the requirements of the Control of Noise at Work Regulations 2005) or the public (for example open courtyards and accessible landscaped areas). This means that noisy plantrooms should not face normally occupied external areas unless adequate acoustic control is provided.

As the above criterion applies to areas *normally occupied by staff* and it assumed that children in the play area would be supervised, this criterion has been applied to the play area.

Guidance has also been taken from *Acoustics of Schools: a design guide*, 2015, which states “Noise levels in unoccupied playgrounds, playing fields and other outdoor areas should not exceed 55 dB $L_{Aeq,30min}$ and there should be at least one area suitable for outdoor teaching activities where noise levels are below 50 dB $L_{Aeq,30min}$.”

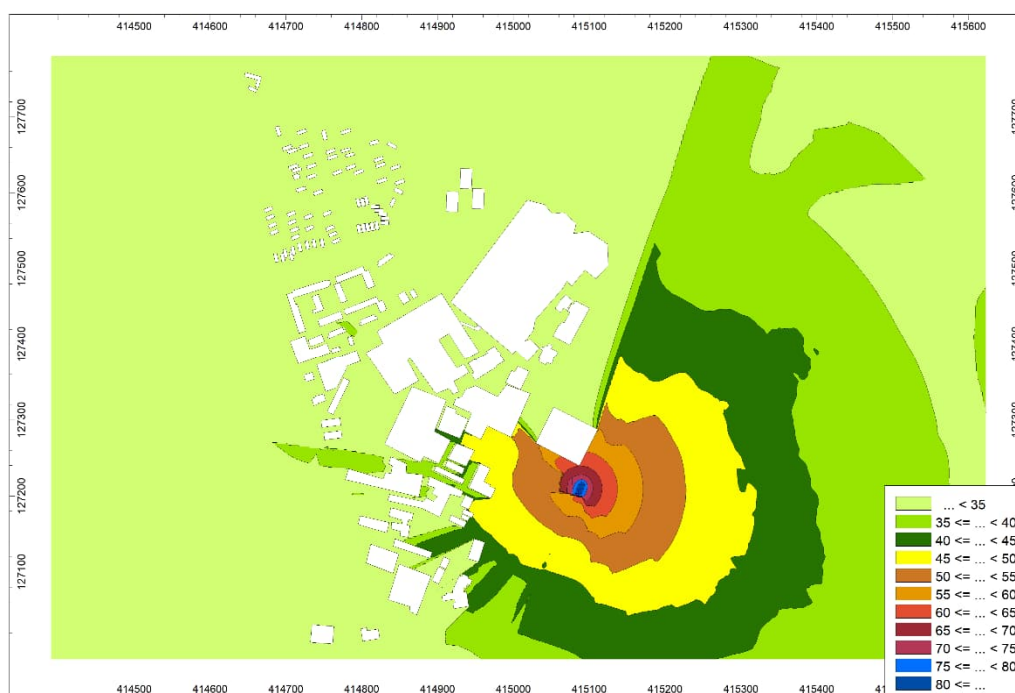
7 Sound Assessment

Sound levels from the mechanical plant have been calculated using Datakustik CADNA A noise modelling software based on the manufacturers sound emission data as given in Appendix B. This model takes account of the sound power level of sound sources, ground terrain, screening and reflection by buildings, air absorption and distance attenuation.

The operating hours of the DASH are understood to be 07:00-22:00. However, it is understood that to maintain satisfactory internal conditions within the DASH during these hours, mechanical plant would need to run within the nighttime hours. Therefore, sound from mechanical plant has been assessed for both the daytime (07:00-23:00) and nighttime (23:00-07:00) periods. Account has been taken of distance, intervening screening by buildings and terrain.

Sound level predictions have been conducted for the plant compound with a 3.5m sound barrier along the western and southern sides. These predictions are shown in Table 7.1 for residential receptors, and in Table 7.2 for hospital receptors and in graphical format in Figure 7.1. The sound barrier has been assumed to be solid on the western and southern sides with an open mesh or metal louvre to the east.

Figure 7.1: Predicted Noise Contours



Source: Mott MacDonald

Acoustic Character Corrections

The potential need for acoustic character corrections has been considered. Whilst Air Source Heat Pumps may exhibit tonal characteristics at source, BS4142 requires character corrections to be assessed on the basis of the noise as perceived at the receptor rather than at the source.

The nearest residential receptor is over 308 m from the proposed plant area. At this distance, the specific plant noise would be perceived in combination with the existing ambient sound environment, and any tonal characteristics would be significantly reduced.

Experience with similar installations indicates that noise from ASHP plant at this separation distance is unlikely to exhibit tonal characteristics that would satisfy the criteria set out in ISO 1996-2 for the identification of perceptible tones.

The noise is also not expected to be impulsive or intermittent in nature.

On this basis, no acoustic character correction was applied within the assessment.

Assessment Uncertainty

As with any predictive assessment, there is an inherent degree of uncertainty. The calculations are generally considered accurate to within approximately ± 3 dB. However, it should be noted the CADNA A noise modelling software uses ISO 9613-2:2024, *Acoustics — Attenuation of sound during propagation outdoors — Part 2: General method of calculation*. This method assumes a moderate downwind condition in all directions. Accordingly, the assessment is considered likely to overpredict rather than underpredict actual operational noise levels, and the conclusions should therefore be regarded as precautionary.

Table 7.1: Predicted sound levels from mechanical plant at residential receptors – with 3.5m Sound Barrier

Receptor	Staff Accommodation		2 Odstock Road		Travellers Site	
Time Period	Daytime	Night Time	Daytime	Night Time	Daytime	Night Time
Distance, m	175	175	280	280	390	390
Background, L_{A90} dB	27	22	27	23	27	23
Predicted Sound Level, $L_{Aeq,T}$	34.2	34.2	29.1	29.1	27	27
Character correction	0	0	0	0	0	0
Rating Level, $L_{Ar,Tr}$ dB	34.2	34.3	29.1	29.1	27	27
Difference between $L_{Ar,Tr}$ and L_{A90}	+7.2	+12.2	+2.1	+6.1	0	+4

Table 7.2: Predicted sound levels from mechanical plant at hospital receptors – with 3.5m Sound Barrier

Receptor	Distance, m	Sound criterion daytime, $L_{Aeq,16h}$ dB	Sound criterion night time, $L_{Aeq,8h}$ dB	Predicted sound level, $L_{Aeq,T}$ dB With Barrier	Compliance
Dash Building	15	73	68	65	yes
Procurement and Commercial Services	70	55	55	48.1	yes
Duke of Cornwall Special	77	50	50	51.6	Marginal exceedance

Receptor	Distance, m	Sound criterion daytime, $L_{Aeq,16h}$ dB	Sound criterion night time, $L_{Aeq,8h}$ dB	Predicted sound level, $L_{Aeq,T}$ dB With Barrier	Compliance
Treatment Centre					
DASH play area	32	50	50	59	Exceedance

The results of the sound predictions above are discussed below.

Residential Receptors

It is evident that with the proposed a sound barrier around the plant compound, the background L_{A90} sound levels at 2 Odstock View are exceeded, by between 2.1dB during daytime and 6.1dB and at night. This would be an indication of an adverse impact “*depending on the context*”.

At the travellers site to the north, predicted noise levels are equal to the background L_{A90} sound levels during daytime and 4dB and above the background L_{A90} at night. This would be an indication of an adverse impact “*depending on the context*” at night.

In these cases, the context should be considered in relation to the fact that the absolute external sound levels of 29.1 dBA would not exceed 45dB $L_{Aeq,T}$, the external sound criterion based on BS8233 internal sound criteria, at any residential receptor.

Whilst this exceeds the measured background sound levels, BS4142 specifically recognises that where both the rating level and background sound level are low, the absolute level of noise may be as important, or more important, than the numerical difference between them.

In this case, both the measured background sound levels and the predicted rating levels are exceptionally low. The measured background levels at 2 Odstock View were 27 dB L_{A90} during the day and 23 dB L_{A90} at night.

For context, these measured external background levels are below the recommended internal night-time criterion of 30 dB contained within BS8233:2014 for bedrooms.

The predicted rating level at 2 Odstock View is 29.1 dB $L_{Ar,Tr}$. Applying a typical attenuation of approximately 15 dB for a partially open window, this would equate to an internal noise level of approximately 14 dB within a bedroom.

This is substantially below the 30 dB $L_{Aeq,T}$ internal night-time criterion recommended by BS8233:2014 and indicates that adverse effects on sleep are unlikely. In fact, the internal sound value 30dB $L_{Aeq,T}$ within bedrooms is met outside the dwellings.

BS4142 also provides examples where rating levels around 30 dB are considered to have little impact on residential receptors despite being distinguishable from the residual acoustic environment.

Hospital Receptors

The sound predictions show that with the sound barrier around the ASHPs, external sound levels would marginally exceed external sound criteria at The Duke of Cornwall Special Treatment Centre. This would mean that internal sound levels internally within The Duke of Cornwall Special Treatment Centre would marginally exceed HTM08-01 criteria internally.

The sound level criterion of 50 dB L_{AeqT} would be exceeded at the eastern end of the DASH play area but would be met for the majority of its area. The external sound criterion at the Procurement and Commercial Services building would be met.

Every effort will be made to control sound levels within plant rooms to comply with Action Values of the Control of Noise at Work Regulations. Methods employed to achieve this will include those outlined in Section 2. In some instances, however it may not be practicably achievable. These areas would be designated hearing defender zones.

Emergency Diesel Generator

The emergency diesel generator will operate only during emergency situations and routine testing. Routine testing is anticipated to occur weekly during daytime hours for approximately 30 minutes.

Predicted noise levels from the Emergency Diesel Generator would be 11 dB L_{AeqT} at the nearest off site residential receptor. This is significantly below the Day and Nighttime background L_{A90} levels of 27dB and 23dB respectively.

In line with BS4142, *'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.'*

7.1 Sound Mitigation

Sound mitigation is required to meet relevant sound criteria at the Duke of Cornwall Special Treatment Centre and the DASH play area.

This acoustic screening should take the form of a solid concrete or masonry barrier to at least the height of 3.5m. The eastern side of the plant compound is required to be a mesh or metal louvre to allow sufficient air flow to the ASHPs.

8 Traffic Noise

Reference to the DfT Transport website⁴ shows traffic counts conducted on Odstock Road (Site number: 807303) near the DASH site indicate a total vehicular flow of 1 during a 12 hour daytime period in 2019.

Table 8.1: Traffic data

Year	Count method	All motor vehicles	Cars & Taxis	LGVs	HGVs	Pedal cycles	Motor cycles	Buses & coaches
2019	Manual count	10,141	9,214	732	44	212	33	118
2028	Prediction *	16,391	14,893	1,183	71	343	53	191

Source: SLR *based on a growth factor of 1.0548.

In general terms additional traffic generated by the proposed DASH would need to result in an increase of 25% of the existing flows on Odstock Road in order to result in a 1dB increase in noise level. This would equate to an increase of 2028 vehicles per day.

The proposed DASH is expected to generate traffic movements as shown in Table 8.2 below.

Table 8.2 Predicted Traffic Generation for the proposed DASH

Link	AAWT
	Proposed Dev Trips (2 Way)
Odstock Road (North)	278
Odstock Road (South)	34

Potential noise impacts from traffic generated by the proposed DASH would therefore be significantly less than 1dBA and will therefore be negligible.

⁴ [Road traffic statistics - Manual count point: 26857](#)

9 Conclusions

A sound assessment in relation to the design for the new DASH Salisbury District Hospital has been conducted.

Potential sound sources associated with the proposed DASH are considered to be:

- Sound from mechanical plant associated with the building services
- Noise from additional road traffic generated by the proposed DASH

In accordance with BS4124:2014, sound level from mechanical services sound have been considered in relation to the measured background sound levels of:

- 27dB $L_{A90,1hr}$ during daytime (07:00-23:00)
- 23dB $L_{A90,1hr}$ at night (07:00-23:00).

Given that these background sound levels are very low and BS8233 recommends an internal sound level of 30dB L_{AeqT} in bedroom during night-time hours inside bedrooms, in line with guidance provide by BS4142:2014, predicted sound levels from mechanical plant have also been considered in relation to their absolute level external to the receptor, and their consequent internal level.

It is assumed that a solid 3.5m high sound barrier is constructed along the western and southern sides of the plant compound. The northern side of the plant compound will comprise a 3m high 'Hit and Miss' fence.

With the proposed sound mitigation of a 3.5m sound barrier around the plant area, rating sound levels from the Air Source Heat Pumps would exceed the background L_{A90} sound levels by between 0dB and 2dB at offsite residential receptors during daytime and between 4dB and 6dB during night-time. Under BS4142 this would be considered an adverse impact "depending on context".

The 'context' is that the predicted external sound levels do not exceed 29dB L_{AeqT} at the exterior of any offsite residential receptor. This exterior sound level is below the internal BS8233 night-time sleep disturbance criterion of 30dB L_{AeqT} . Based on an attenuation for a partially opened window of 15dB between external sound level and internal sound levels, the predicted sound levels inside the bedrooms are 14dB L_{AeqT} , which falls well below the recommended sound level for night-time sleeping per BS8233 of 30dB L_{AeqT} .

With the proposed 3.5m sound barrier on the western and southern sides of the plant compound, it is also predicted that sound levels at the clinical buildings, i.e. the DASH Building, Procurement and Commercial Services, will be met, based on internal sound criteria extracted from HTM08-01.

The criterion extracted from HTM08-01 for The Duke of Cornwall Special Treatment Centre would be marginally exceeded.

The DASH external play area has also been assessed against guidance from Acoustics of Schools: a design guide, 2015, and it has been found to not exceed the recommended external sound levels for the majority of its area but exceedance would occur at its eastern edge.

Noise produced by road traffic generated by the proposed DASH will be negligible on the surrounding road network due to the very low number of vehicle movements generated by the proposed DASH compared to the existing number of vehicle movements on Odstock Road.

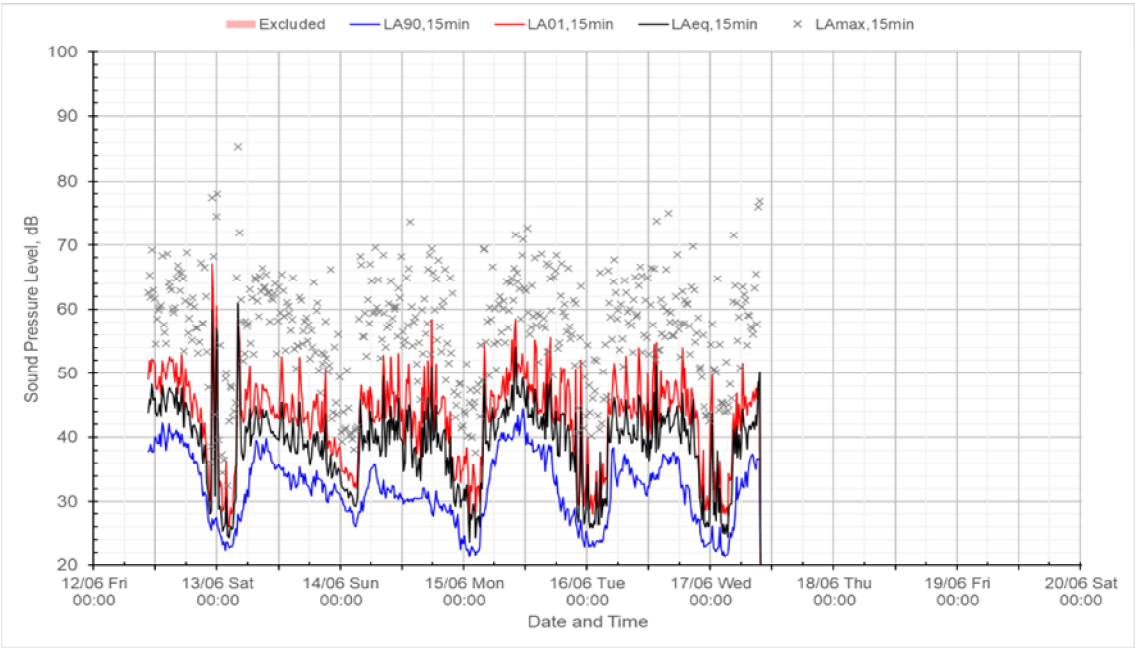
A. Sound Survey Locations and Long Term Data

Figure A.1: LT1



Source: Mott MacDonald

Figure A.2: Measured Sound Data at LT1



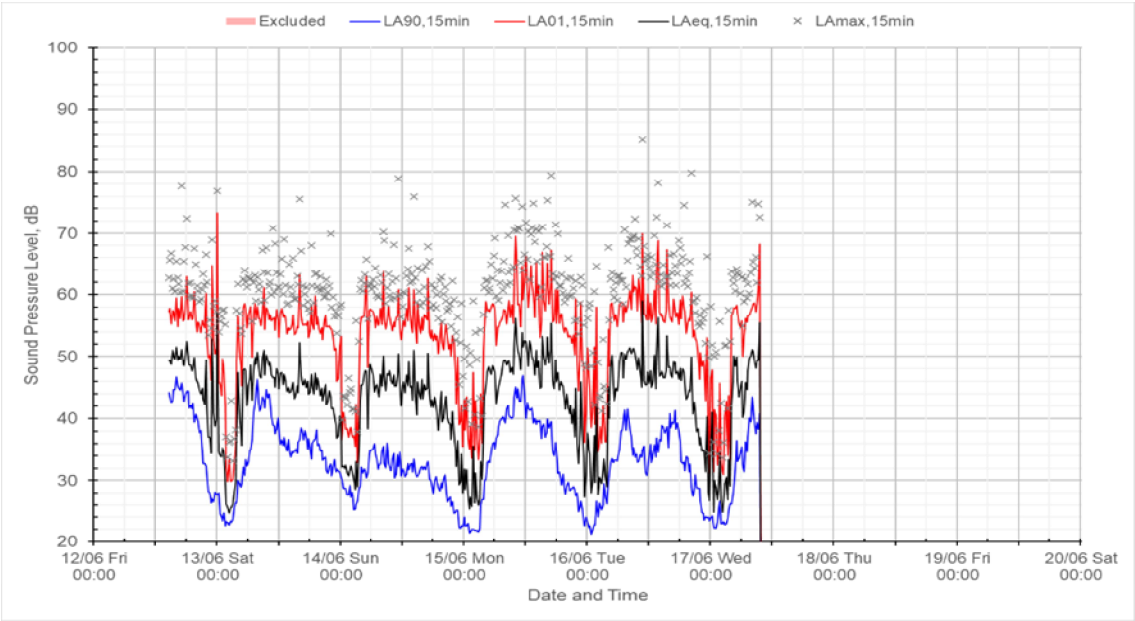
Source: Mott MacDonald

Figure A.3: LT2



Source: Mott MacDonald

Figure A.4: Measured Sound Data at LT2



Source: Mott MacDonald

Figure A.5: ST1



Source: Mott MacDonald

Figure A.6: ST2



Source: Mott MacDonald

Figure A.7: ST3



Source: Mott MacDonald

B. Sound Emission Data – ASHPs and CHPs

Figure B.2: Sound Emission Data – Air Source Heat Pumps

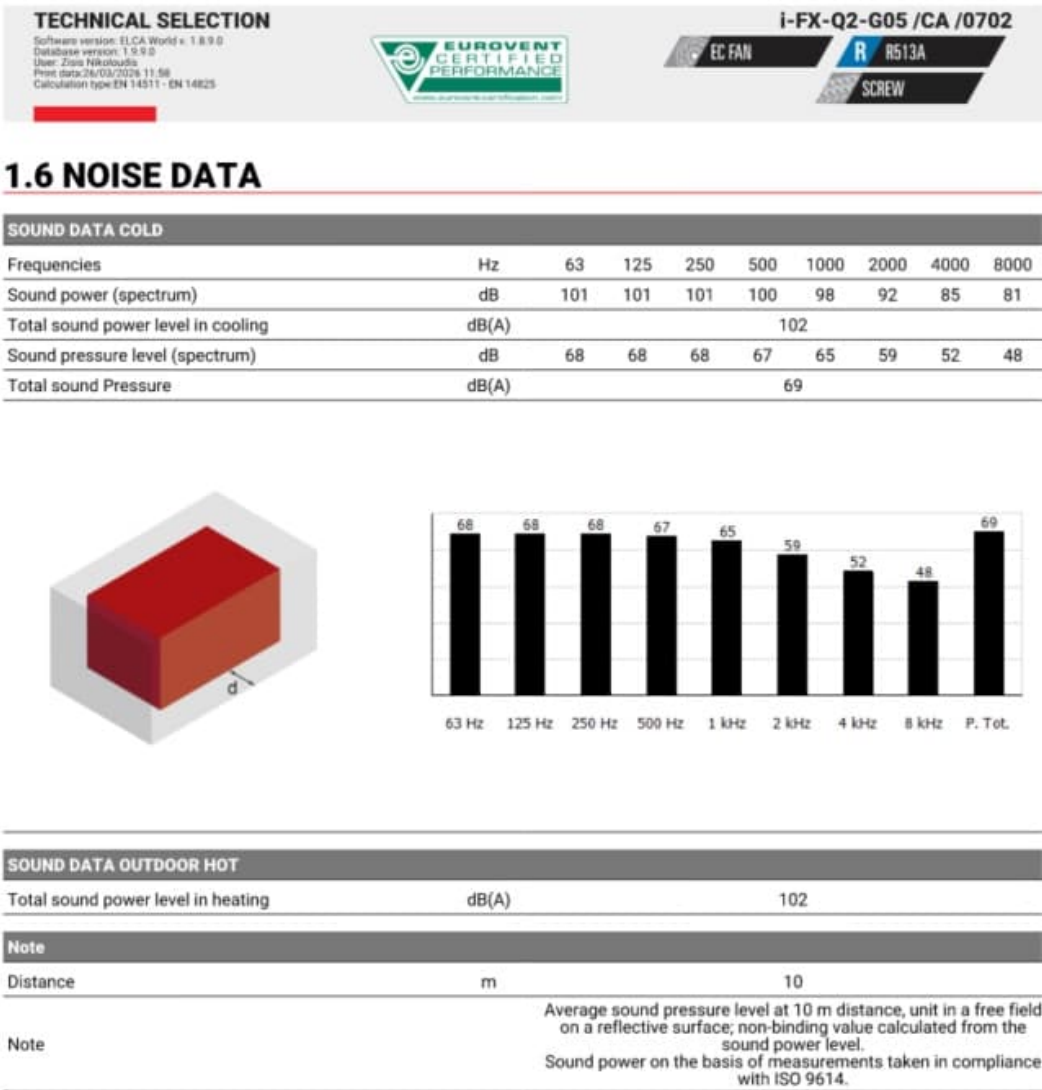
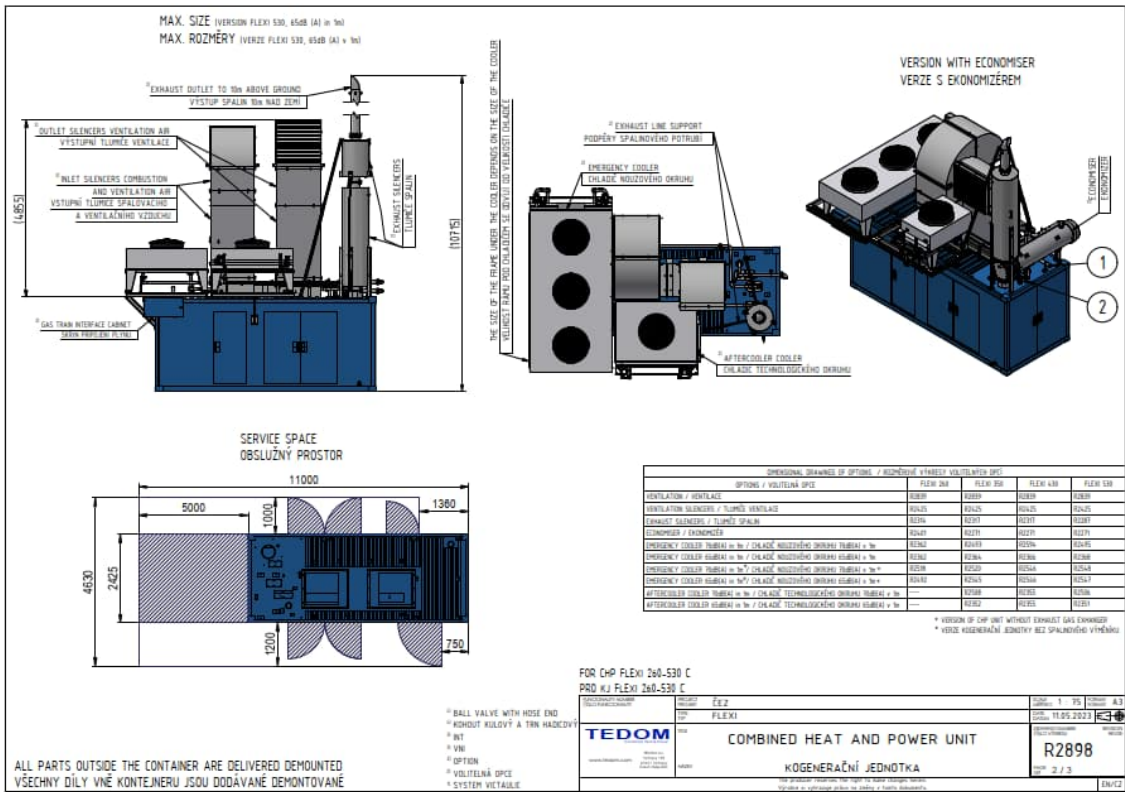


Figure B.3: Sound Emission Data- Combined Heat and Power Units



Source: Tedom

