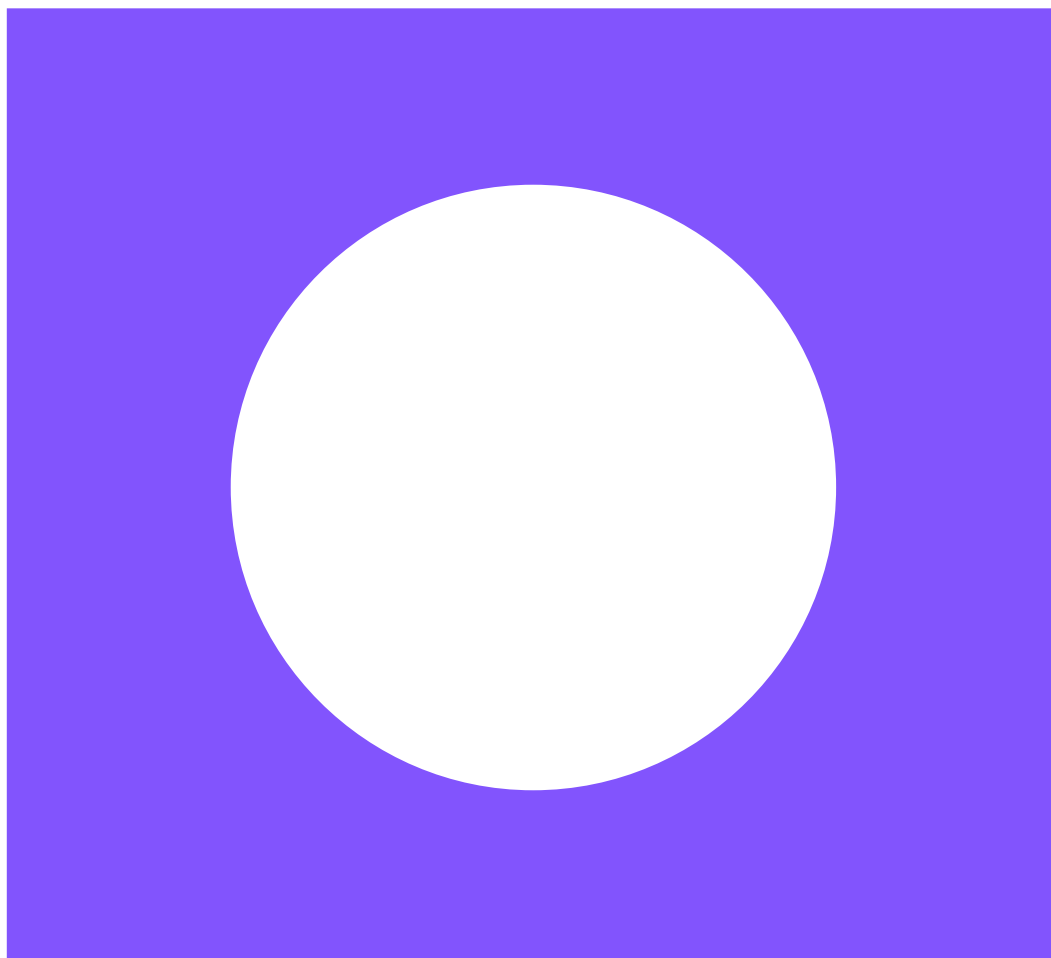




Queen Victoria Hospital, East Grinstead

Noise Impact Assessment

January 2025

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Queen Victoria Hospital, East Grinstead

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January 2025

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Executive summary

A noise assessment in relation to the proposal for the new Community Diagnostic Centre (CDC) at Queen Victoria Hospital, East Grinstead has been developed.

The Queen Victoria Hospital is a specialist NHS hospital providing reconstructive surgery, burns care, and rehabilitation services. The Queen Victoria Hospital NHS Trust are seeking to construct a new CDC on site at the existing Queen Victoria Hospital adjacent to Holtye Road.

The CDC will deliver additional, digitally connected, diagnostic capacity, providing all patients with a co-ordinated set of diagnostic tests in the community and in as few visits as possible, enabling an accurate and fast diagnosis on a range of clinical pathways..

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

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

Noise level limits for mechanical services noise have been set based on a background noise survey conducted around the site using the British Standard (BS) 4142:2014+A1:2019 '*Methods for rating and assessing industrial and commercial sound*' methodology.

Mechanical plant will be designed to achieve the following rating levels ($L_{Ar,Tr}$):

- 40dB during daytime and 30dB at night at any nearby residence to meet the planning requirements; and,
- 35dB during daytime and 25dB at night at any nearby residence to meet the BREEAM requirements.

These requirements are considered achievable utilising commonly used and well understood noise mitigation methods.

Noise produced by road traffic generated by the proposed CDC is shown to be negligible on the surrounding road network due to the very low number of vehicle movements generated by the proposed CDC compared to the existing number of vehicle movements on Holtye Road.

1 Introduction

It is proposed to construct a new Community Diagnostic Centre (CDC) at Queen Victoria Hospital, Holtye Road, East Grinstead, England RH19 3DZ. This report presents a noise assessment in support of the planning application for the proposed CDC.

The Queen Victoria Hospital is a specialist NHS hospital providing reconstructive surgery, burns care, and rehabilitation services. The Queen Victoria Hospital NHS Trust are seeking to construct a new CDC on site at the existing Queen Victoria Hospital.

The CDC will deliver additional, digitally connected, diagnostic capacity, providing all patients with a co-ordinated set of diagnostic tests in the community and in as few visits as possible, enabling an accurate and fast diagnosis on a range of clinical pathways. CDCs provide a broad range of elective diagnostics away from acute facilities, reducing pressure on hospitals and giving patients quicker and more convenient access to tests. CDCs co-ordinate all the diagnostic tests a patient requires and, wherever possible, provide them under one roof in a single visit.

The East Grinstead CDC will provide local access to imaging services:

- Magnetic Resonance Imaging (MRI);
- CT (Computed tomography);
- X-Ray;
- NOUS (Non-Obstetric Ultrasound); and
- DEXA (Bone Density).

MRI, CT and X-Ray will be provided from the existing QVH Imaging Department whilst NOUS and DEXA will be provided within the CDC facility.

In addition to imaging, the CDC will also provide access to:

- Respiratory tests including Lung Function Test, FeNo and Spirometry, Field Test;
- Cardiovascular testing, including EEG, ECG, Holter, APBM;
- Phlebotomy services;
- Sleep studies; and
- Dermoscopy.

This report presents a noise assessment of the proposed CDC in terms of its potential noise impact to nearby noise sensitive receptors. The potential noise sources which may impact nearby noise sensitive receptors are considered to be mechanical plant associated with the proposed operation of the CDC and road traffic generated by the staff and patients of the CDC.

In order to set noise criteria for potential noise emissions from the CDC it is necessary to know the background/ambient noise levels in the area of the proposed CDC. Therefore, a baseline noise survey has been conducted and is detailed here.

This report also sets out BREEAM requirements for credits under POL05 which may be sought by the project in addition to meeting the planning requirements.

2 Acoustic criteria

2.1 National Planning Policy Framework (NPPF)

The National Planning Policy Framework (NPPF)¹ was adopted by the Government in July 2018 and was subsequently updated in February 2019 and July 2021 and December 2024. It sets out the Government's planning policies for England and how these are expected to be applied.

Paragraph 187 of the NPPF states that: *"Planning policies and decisions should contribute to and enhance the natural and local environment by: e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability"*.

Paragraph 198 of the NPPF states that planning policy and decisions should aim to: *"Mitigate and reduce to a minimum, potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life."* and *"identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason"*.

Paragraph 200 reintroduces the 'Agent of Change' principle – *"Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.."*

2.2 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;*
- *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."*

2.3 Mid Sussex District Plan 2014 – 2031

Mid Sussex District Council adopted the Mid Sussex District Plan 2014-2031 as a Development Plan Document at its meeting on 28th March 2018. It replaces the Mid Sussex Local Plan 2004 (other than saved Local Plan policies). The following policies are relevant to noise impacts:

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

² DEFRA, Noise Policy Statement for England, 2010

DP29: Noise, Air and Light Pollution Mid Sussex has a high quality environment and its residents value tranquillity and freedom from unpleasant noises, smells or light glare. New development in the District needs to be managed so that the local economy can prosper within clear guidelines and businesses can operate efficiently alongside homes without adversely affecting the environment. Soil quality must be protected in accordance with Policy DP38: Biodiversity.

Where development is being proposed within 800m of a sewage treatment works, the developer should liaise with the statutory sewerage/water undertaker to consider whether an odour impact assessment is required as part of the promotion of the site and potential planning application submission. The odour impact assessment would determine whether the proposed development would result in adverse amenity impact for new occupiers, as those new occupiers would be located in closer proximity to a sewage treatment works. Where any such assessment identifies that there is an odour impact for proposed development and no improvements are programmed by the water company, the developer should contact the water company to agree what improvements are required and how they will be funded prior to any occupation of the development.

Sussex local authorities have developed guidance on noise to provide advice for developers and their consultants when making a planning application. This guidance can be viewed at www.midsussex.gov.uk/planningpolicy

Where development is being proposed within 15m of a pumping station, the developer should liaise with the statutory sewerage/water undertaker to consider whether an odour and/or noise and/or vibration impact assessment is required as part of the promotion of the site and potential planning application submission. Any impact assessment would determine whether the proposed development would result in adverse amenity impact for new occupiers, as those new occupiers would be located in closer proximity to a pumping station. Where any such assessment identifies that there is an odour impact for proposed development and no improvements are programmed by the water company, the developer should contact the water company to agree what improvements are required and how they will be funded prior to any occupation of the development.

DP29: Noise, Air and Light Pollution

Strategic Objectives: 3) To protect valued landscapes for their visual, historical and biodiversity qualities; and 12) To support sustainable communities which are safe, healthy and inclusive.

Evidence Base: Data held by Environmental Health, Air Quality Action Plan – Stonepound Crossroads, Hassocks. The environment, including nationally designated environmental sites, nationally protected landscapes, areas of nature conservation or geological interest, wildlife habitats, and the quality of people's life will be protected from unacceptable levels of noise, light and air pollution by only permitting development where:

Noise pollution:

- It is designed, located and controlled to minimise the impact of noise on health and quality of life, neighbouring properties and the surrounding area;*
- If it is likely to generate significant levels of noise it incorporates appropriate noise attenuation measures;*

Noise sensitive development, such as residential, will not be permitted in close proximity to existing or proposed development generating high levels of noise unless adequate sound insulation measures, as supported by a noise assessment are incorporated within the development. In appropriate circumstances, the applicant will be required to provide:

- an assessment of the impact of noise generated by a proposed development; or*

- *an assessment of the effect of noise by an existing noise source upon a proposed development;*

.....

The degree of the impact of noise and light pollution from new development or change of use is likely to be greater in rural locations, especially where it is in or close to specially designated areas and sites.

2.4 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 noise sources on residential receivers. In this sense, industrial noise sources include mechanical plant associated with new buildings and developments. In this sense it will be applied to the noise created by mechanical plant associated with the CDC at the nearest noise 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 $L_{A,r,T}$ 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 noise. 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 noise 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.

2.5 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.

2.6 BREEAM

BREEAM³ credits are being targeted under BREEAM POL 05. One Credit is available under POL05 which relates to the noise emissions from the proposed CDC to the environment. POL05 is summarised below:

POL 05

Under POL 05 one Credit is available for acoustics where:

'Where there are, or will be, no noise-sensitive areas or buildings within 800m radius of the assessed site.

OR

Alternatively, where the building does have noise-sensitive areas or buildings within 800m radius of the site, one credit can be awarded as follows:

Where a noise impact assessment in compliance with BS 7445 has been carried out and the following noise levels measured/determined:

- *Existing background noise levels at the nearest or most exposed noise-sensitive development to the proposed development or at a location where background conditions can be argued to be similar.*
- *The rating noise level resulting from the new noise source*

The noise impact assessment must be carried out by a suitably qualified acoustic consultant holding a recognised acoustic qualification and membership of an appropriate professional body (see Relevant definitions in the Additional information section).

The noise level from the assessed building, as measured in the locality of the nearest or most exposed noise-sensitive development, must be at least 5dB lower than the background noise level throughout day and night.

Note that the BREEAM target criterion is more onerous than the proposed planning requirement and is one of a number of BREEAM credits that may be pursued by the contractor to achieve the desired overall rating for the scheme.

2.7 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 CDC 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.

³ BUILDING RESEARCH ESTABLISHMENT. (2014) BREEAM UK New Construction Non-domestic Buildings (United Kingdom) Technical Manual SD5076:4.1 – 2018.

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 Baseline report

A baseline noise survey was conducted at the proposed site of the Queen Victoria Hospital CDC, in order to set noise criteria for mechanical plant associated with the new building at nearby noise sensitive receptors which are approximately 40m from the CDC south east of Holtye Road and a similar distance to the north of Tudor Court.

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

The noise survey was carried out, with long-term (LT) measurements taken from Thursday 10 October 2024 to Thursday 17 October 2024. LT measurement locations were selected to be representative of the noise levels at the nearest receptor locations surrounding the proposed CDC. Noise sensitive receptors located outside of the hospital boundaries include residential properties and a sensitive healthcare receptor.

Table 3.1 summarises the free field values of the LT data per each of the measurement positions respectively for representative weekdays, Saturday and Sunday. The time range of each parameter is:

- L_{A90,1hour} daytime - between 07:00 and 23:00
- L_{A90,15min} night time - between 23:00 and 07:00
- L_{Aeq,16h} daytime - between 07:00 and 23:00
- L_{Aeq,8h} night time - between 23:00 and 07:00

Table 3.1: Summary of free field LT data for BS 4142 assessment

	Date	Modal L _{A90,15min} daytime dB	Modal L _{A90,15min} night-time dB	L _{Aeq,16h} daytime dB	L _{Aeq,8h} night-time dB
Thu	10/10/2024	40	31	60	54
Fri	11/10/2024	51	30	61	53
Sat	12/10/2024	51	34	61	52
Sun	13/10/2024	48	30	59	54
Mon	14/10/2024	53	29	61	53
Tue	15/10/2024	49	32	60	52
Wed	16/10/2024	51	31	60	54
Thu	17/10/2024	50	---	61	---
Overall		40	30	61	52

Short-term (ST) measurements were captured during the daytime of the Thursday 10 January 2024. ST1, ST2 and ST3 measurement locations were representative of the façade levels at the proposed new CDC (Figure 3.1). These levels would inform the sound insulation required for the external façade of new building, to ensure that noise ingress was kept to a minimum in order to meet internal acoustic requirements.

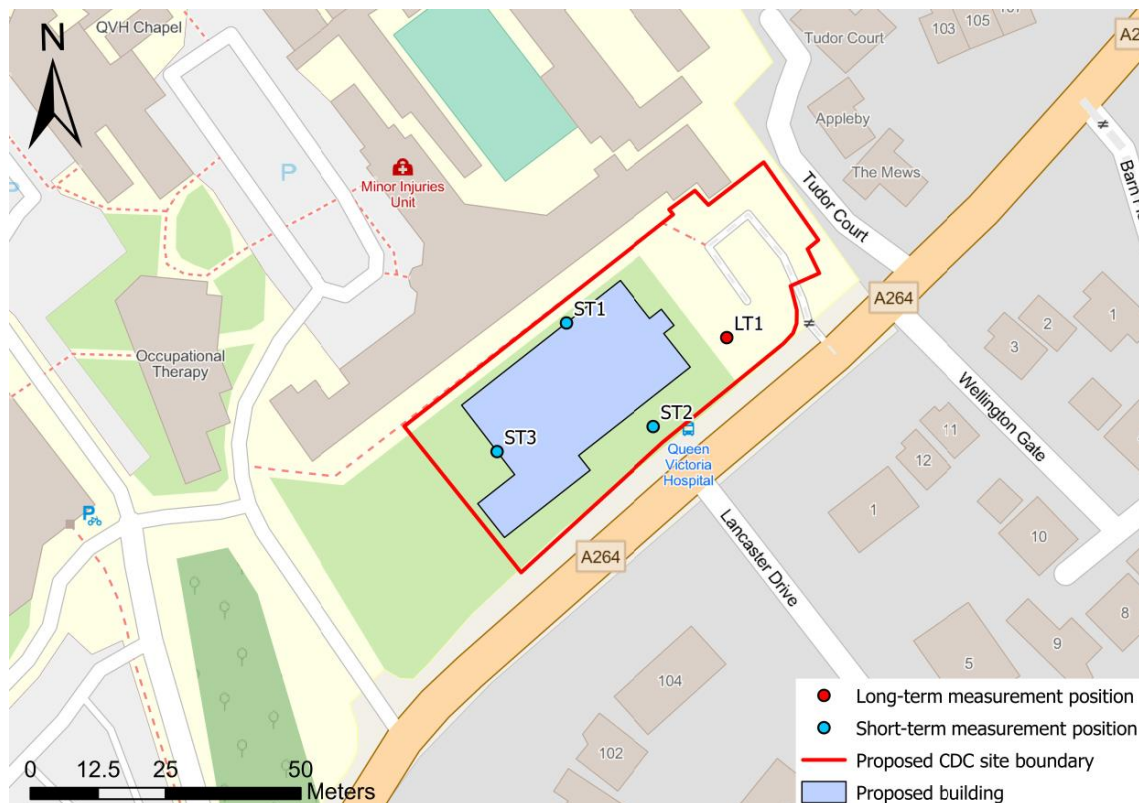
Table 3.2: Summary of short-term attended noise measurements

Location	Date	Start time	L _{Aeq,15min} dB	L _{Amax,15min} dB	L _{A10,15min} dB	L _{A90,15min} dB
ST1	10/10/2024	17:37	57	64	59	52

Location	Date	Start time	L _{Aeq,15min} dB	L _{Amax,15min} dB	L _{A10,15min} dB	L _{A90,15min} dB
ST2	10/10/2024	17:54	62	76	68	52
ST3	10/10/2024	17:22	58	73	64	52

Source: Mott MacDonald

Figure 3.1: Noise measurement locations



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

4 Mechanical Plant Noise Emissions

The CDC will inevitably require a certain amount of mechanical plant associated with air conditioning, the cooling of scanning equipment etc. The noise emissions from this plant will be controlled such that it does not have a significant adverse impact on sensitive receptors within and outside of the hospital. This will be achieved by careful selection and positioning of plant combined with appropriate noise control methods.

For planning purposes the noise level from the mechanical plant associated with the CDC building, as measured in the locality of the nearest or most exposed noise-sensitive development, must be at or below the background noise level throughout day and night. This is an indication of the specific sound source having a low impact, depending on the context when assessed according to BS4142. These criteria are rating levels ($L_{Ar,Tr}$) of::

- 40dB during daytime and 30dB at night at any nearby residence

To achieve the credit under BREEAM POL05 however the noise level from the assessed building, as measured in the locality of the nearest or most exposed noise-sensitive development, must be at least 5dB lower than the background noise level throughout day and night. This criterion will be used in the design of mechanical plant for the CDC.

Mechanical plant will be designed to achieve the following rating levels ($L_{Ar,Tr}$):

- 35dB during daytime and 25dB at night at any nearby residence

The nearest potentially affected noise sensitive receptors are located approximately 40m from the proposed CDC.

The proposed noise producing mechanical plant associated with the CDC comprises:

- 2 x Air handling units;
- 1 x Exhaust Fan; and
- Cold Water Pump.

These plant items above will all be installed within the fully enclosed plant room in the southern corner of the building. In addition, there will be:

- 2 x Air source heat pumps;
- 2 x DX AC outdoor units; and
- 2 x split AC units serving the IT room.

..which will be partially enclosed in an open-air compound adjacent to the plant room. This compound will be incorporate louvred walls with no roof to allow sufficient air flow through the plant.

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

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

Within the plant room the AHUs and exhaust fans will, as required, be fitted with both intake and exhaust silencers which will be designed to ensure that external environmental noise criteria outlined above and internal noise criteria will be achieved.

The air source heat pumps and DX AC outdoor units located in the open roofed plant space will be selected to minimise their noise emissions and the acoustic enclosure designed to ensure exterior environmental noise criteria outlined above will be achieved.

In addition to airborne sound transmission to the environment and other spaces within the CDC it will also be necessary to consider structure borne sound transmission. In order to control structure borne noise transmission mechanical plant within the plant rooms and elsewhere in the building will be fitted with vibration isolation where necessary. Plant items such as Air Handling Units (AHUs) are usually supplied with vibration isolated fans built in. Other items such as larger pumps may need to be mounted on vibration isolators and inertia blocks. Each item will be procured and considered individually with a view to vibration isolation.

Every effort will be made to control noise 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 above. In some instances, however it may not be practicably achievable. These areas would be designated hearing defender zones.

5 Traffic Noise

It has been estimated by the Traffic and Transport consultant that the CDC will generate below 280 vehicular movements per day in the period 06:00 to 20:00.

Reference to the DfT Transport website⁴ shows traffic counts conducted on Holtye Road (Site number: 26857) near the CDC site indicate a total vehicular flow of 10540 during a 12 hour daytime period.

Whilst the 14 hour period (06:00-20:00) for which the CDC generates traffic does not exactly correspond with the 12 hour period for which the baseline traffic count on Holtye Road was conducted it is clear that the additional traffic generated by the proposed CDC does not approach 20% of the existing flows (in fact it represent around 2.5%) on Holtye Road and therefore noise level changes would be significantly lower than 1dB. Potential noise impacts from traffic generated by the proposed CDC will therefore be negligible.

⁴ Road traffic statistics - Manual count point: 26857

6 Conclusions

A noise assessment in relation to the design for the new CDC at Queen Victoria Hospital, East Grinstead has been developed.

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

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

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.

Based on this requirement mechanical plant will be designed to achieve the following rating levels ($L_{Ar,Tr}$):

- 40dB during daytime and 30dB at night at any nearby residence to meet planning requirements
- 35dB during daytime and 25dB at night at any nearby residence to meet BREEAM requirements

These requirements are considered achievable utilising commonly used and understood noise mitigation methods such as:

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

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

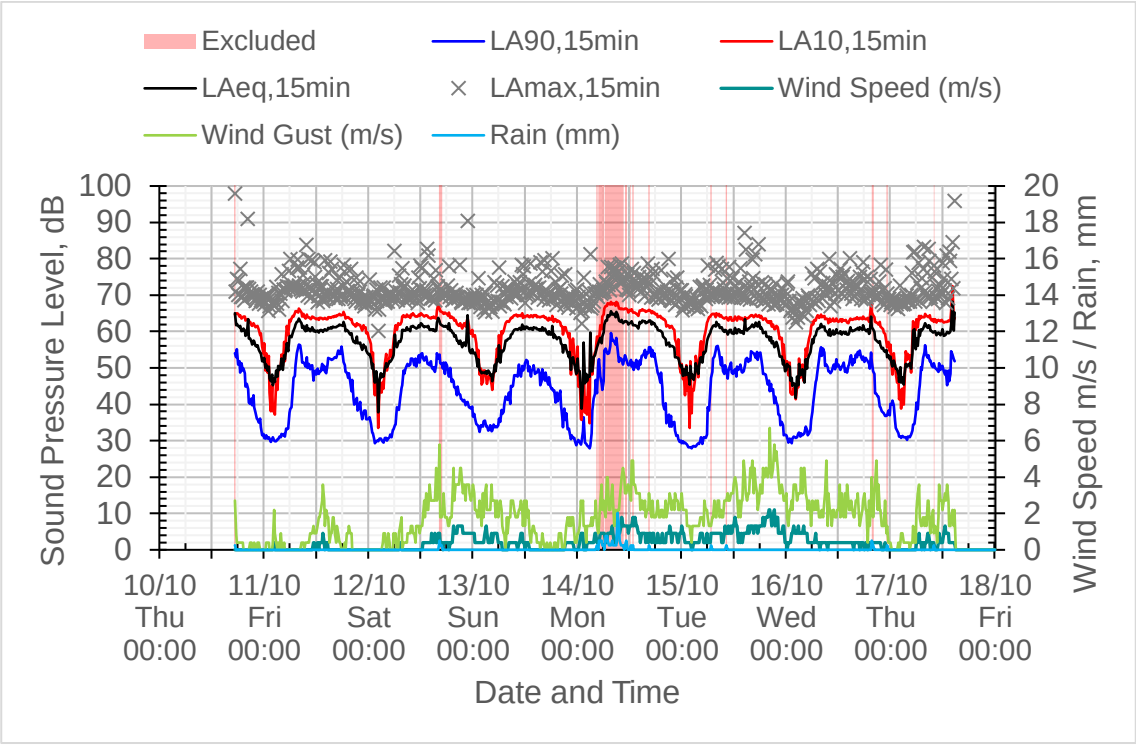
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A. Acoustic Glossary

A-weighting	The human ear also has a non-linear frequency response, being most sensitive in the frequency range 1 kHz to 4 kHz and is less sensitive at higher and lower frequencies. The A-weighting is a frequency function commonly applied to the linear output of a microphone to simulate the subjective response of the ear. A-weighted levels are usually indicated by a subscript A or postscript (A).
Z-weighting	A flat frequency response between 10Hz and 20kHz excluding microphone response.
Decibel	Sound and noise are commonly described using the decibel (dB) scale, which is logarithmic in nature to relate to the response of the human ear. The range of human hearing commonly varies from the threshold of audibility (0dB) to the threshold of pain (120dB). Such limits are seldom experienced in practice and typical levels might vary between 30dB in a quiet bedroom at night to 90dB at the kerbside of a busy road.
Sound Pressure Level (Lp)	The logarithmic measure of the root mean square sound pressure relative to a reference sound pressure. The reference sound pressure in air is 20 micro Pascals and represents the threshold of hearing in a healthy young person.
Equivalent continuous noise level Leq	The equivalent continuous noise level, $L_{Aeq,T}$, is the notional level of a steady sound which, at a given position and over the same period of time (T), would deliver the same sound energy as the fluctuating one. Used to quantify time-varying noise from industrial sources.
Maximum sound pressure level L(max)	The lowest sound pressure level reached within the measurement period.
Minimum sound pressure level L(min)	The lowest sound level reached within the measurement period.
Ln	A statistical parameter where the sound pressure level exceeded for a 'n' percentage of the measurement period.
Fast weighting	The sound pressure level is weighted to the response time of the ear (125ms).
Slow weighting	The sound pressure level is weighted to the response time of 1 second.

B. Graphical Representation of LT1 Data



C. Photos of Baseline Monitoring Locations

LT 1



ST1



January 2025

ST2



ST3



