Noise Assessment Report

Telehouse Campus Environmental Permit Variation

Telehouse International Corporation of Europe Ltd

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Making Sustainability Happen

Revision Record

Revision	Date	Prepared By	Checked By	Authorized By
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Basis of Report

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1.0 Introduction

SLR Consulting Limited (SLR) has been instructed by Telehouse International Corporation of Europe Limited (Telehouse) to prepare a noise assessment report. The report has been prepared to support an Environmental Permit (EP) variation application for the Telehouse South (TS) data centre (EP reference EPR/EP3507SL), located at Blackwall Way, Poplar, London, E14 2EH.

1.1 Standby Generators

Electricity for the operation of the data centres is provided from the local electricity transmission network, however, given the nature of data centres and their requirement to always have an available energy supply, the datacentres have a number of Standby Generators (SBGs), which are included on the existing EP.

The SBGs provide power to the data centres in the event of an emergency such as a brown- or black-out of the local electricity transmission network where there are fluctuations or loss of the electrical power provided by the network.

On occurrence of such an event, there is the potential for a delay between fault detection and initial operation of the SBGs; each building data centre also has a battery based uninterruptable power supply (UPS) system which can supply power for up to 15 minutes should there be transient interruptions or fluctuations in power supply. These arrays can provide sufficient protection to the supply of electrical power whilst the SBGs are started in order to cover such delays and the potential for a loss/reduction in the power supply to the on-site equipment.

1.2 Permit Variation

The EP variation addresses the following:

- Consolidation of the currently separately permitted Docklands data centre (now referred to as Telehouse North (TN)) (EP reference EPR/SP3237JU)), located on Coriander Avenue, London, with the TS EP.
- TS is undergoing extensive refurbishment, including the replacement of the SBGs; this EP variation application includes details of the planned changes.
- Since issue of the TN EP, a number of SBGs, which were included as 'future SBGs' in the EP, have been installed, as agreed with the EA in accordance with the EP pre-operational condition. At the request of the EA, this EP variation includes details of all the SBGs currently in place at TN.

1.3 Noise Assessment

As part of the permit variation, this noise assessment considers the potential noise impact of TN, TS, and the potential cumulative noise impact from both sites. The assessment has been undertaken in accordance with the relevant EA and technical guidance.

This Report has been prepared by Nick Auckland, Associate Acoustic Consultant (MIOA), and approved by Michelle Dawson, Technical Discipline Manager (MIOA).

1.4 Report Structure

This Noise Assessment Report presents:

- An overview of technical guidance.
- A description of the Site.
- The results of a baseline background sound survey at locations representative of the nearest noise-sensitive receptors to TN and TS.
- An assessment undertaken in accordance with British Standard 4142:2014+A1:2019 *Methods for rating and assessing industrial and commercial sound (BS4142)* as required by the Environment Agency (EA) Guidance Noise and vibration management: environmental permits. Assessments have been completed for*:*

- Telehouse North;
- Telehouse South; and
- the potential cumulative impact.

Whilst reasonable effort has been made to ensure that this report is easy to understand, it is technical in nature; to assist the reader, a glossary of terminology is included in **Appendix A**.

2.0 Technical Guidance

A summary of the requirements outlined in the EA Guidance document, and BS4142 is detailed below.

2.1 Noise and Vibration Management: Environmental Permits

The Environment Agency (EA) released the guidance document *Noise and vibration management: environmental permits* in January 2022, replacing the previous guidance presented in *Horizontal Guidance for Noise (H3) parts 1 and 2*. The EA guidance details when a noise assessment is required, the competency required to undertake an assessment and how to carry out a noise impact assessment.

The guidance references BS4142:2014+A1:2019 as the appropriate assessment methodology.

The guidance outlines how context should be taken into account in the assessment and notes that *"Whilst context allows you to interpret impact thresholds (to a degree), there are practical limits to the extent of the interpretation. It is unlikely you could adjust the assessment outcome beyond the next band (for example, modifying a BS 4142 outcome of more than 10dB to be less than an 'adverse impact')."*

Determining the outcome of the assessment the following should be considered:

- weekdays rather than weekends.
- what the sound 'means' – meaningful sound is one that conveys an unpleasant meaning beyond its mere acoustic content, for example noise from an abattoir.
- time of day.
- the absolute sound level.
- where the sound occurs.
- new industry or new residences.
- intrinsic links between the source and receptor, for example the source is the resident's place of work.
- local attitudes.
- the residual acoustic environment.
- the land use at the receptor (for example, gardens rather than yards).
- the exceedance (traditional BS 4142).
- whatever else might be particular to that individual situation.

Based on the results of the BS4142 assessment, the guidance has three distinct requirements as detailed in Table 2-1 below.

Table 2-1: Impact Assessment

NVM Result	BS4142 Descriptor	Next Stage
Unacceptable level of audible or detectable noise	The closest corresponding BS 4142 descriptor is 'significant adverse impact'	You must take further action or you may have to reduce or stop operations. The environment agencies will not issue a permit if you are likely to be operating at this level.
Audible or detectable noise	The closest corresponding BS 4142 descriptor is 'adverse impact'	Your duty is to use appropriate measures to prevent or, where that is not practicable, minimise noise. You are not in breach if you are using appropriate measures. But you will need to rigorously demonstrate that you are using appropriate measures.
No noise, or barely audible or detectable noise	The closest corresponding BS 4142 descriptor is 'low impact or no impact'	Low impact does not mean there is no pollution. However, if you have correctly assessed it as low impact under BS 4142, the environment agencies may decide that taking action to minimise noise is a low priority.

2.2 British Standard 4142:2014+A1:2019

British Standard 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound is intended to be used to assess the potential adverse impact of sound, of an industrial and/or commercial nature, at nearby noise-sensitive receptor locations within the context of the existing sound environment.

Where the specific sound contains tonality, impulsivity and/or other sound characteristics, penalties should be applied depending on the perceptibility. For tonality, a correction of either 0, 2, 4 or 6dB should be added and for impulsivity, a correction of either 0, 3, 6 or 9dB should be added. If the sound contains specific sound features which are neither tonal nor impulsive, a penalty of 3dB should be added.

In addition, if the sound contains identifiable operational and non-operational periods, that are readily distinguishable against the existing sound environment, a further penalty of 3dB may be applied.

The assessment of impact contained in BS4142:2014+A1:2019 is undertaken by comparing the sound rating level, i.e. the specific sound level of the source plus any penalties, to the measured representative background sound level immediately outside the noise-sensitive receptor location. Consideration is then given to the context of the existing sound environment at the noise-sensitive receptor location to assess the potential impact.

Once an initial estimate of the impact is determined, by subtracting the measured background sound level from the rating sound level, BS4142:2014+A1:2019 states that the following should be considered:

- typically, the greater the 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; and
- 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 level, this is an indication that the specific sound source will have a low impact, depending on the context.

BS4142:2014+A1:2019 notes that:

"Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact."

BS4142:2014+A1:2019 outlines guidance for the consideration of the context of the potential impact including consideration of the existing residual sound levels, location and/or absolute sound levels.

To account for the acoustic character of proposed sound sources, BS4142:2014+A1:2019 provides the following with respect to the application of penalties to account for "the subjective prominence of the character of the specific sound at the noise-sensitive locations and the extent to which such acoustically distinguishing characteristics will attract attention".

- **Tonality** – "For sound ranging from not tonal to predominantly tonal the Joint Nordic Method gives a correction of between 0dB and +6dB for tonality. Subjectively, this can be converted to a penalty of 2dB for a tone which is just perceptible at the noise receptor, 4dB where it is clearly perceptible and 6dB where it is highly perceptible;
- **Impulsivity** – A correction of up to +9dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3dB for impulsivity which is just perceptible at the noise receptor, 6dB where it is clearly perceptible, and 9dB where it is highly perceptible;
- **Intermittency** – When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied; and
- **Other Sound Characteristics** – Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3dB can be applied."

Finally, BS4142:2014+A1:2019 outlines guidance for the consideration of the context of the potential impact, including consideration of the existing residual sound levels, location and/or absolute sound levels.

2.3 ISO 9613-2:1996

The levels of sound generated by the operation of the proposed Plant has been predicted in accordance with the prediction framework within ISO 9613-2:1996 *Acoustics – Attenuation of Sound during Propagation Outdoors– Part 2: General Method of Calculation*. This method of calculation takes into account the distance between the sound sources and the closest receptors, and the amount of attenuation due to atmospheric absorption. The methodology also assumes downwind propagation, i.e. a wind direction that assists the propagation of sound from the source to the receiver.

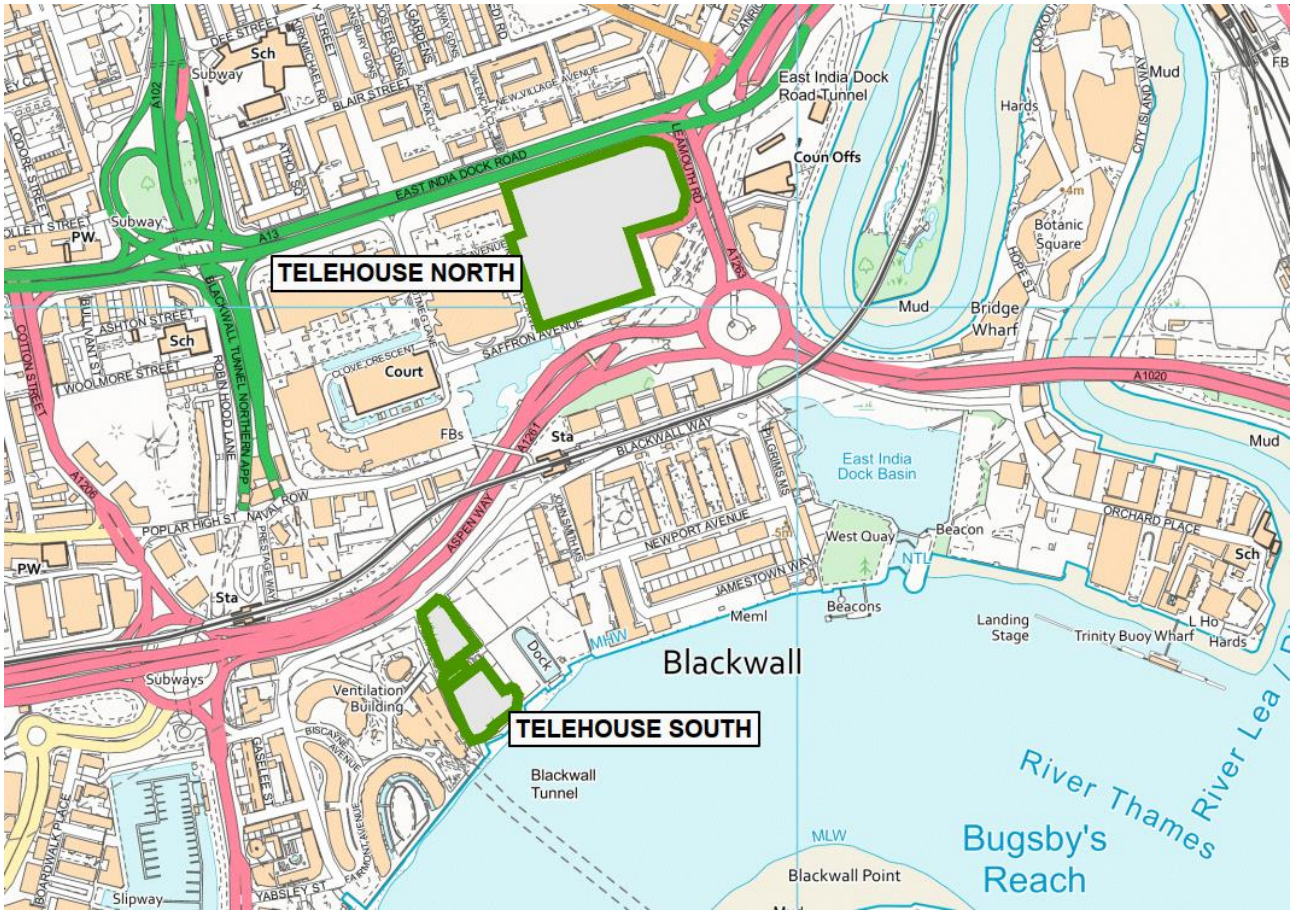
3.0 Site Description

This Site comprises of two separate Site locations, known as TN and TS. The two Sites are located approximately 350m apart, with the A1261 Aspen Way, and East India Dockland Lights Railway station, residential, and commercial uses located on the intervening land.

A full description of the areas, and operating techniques that are implemented at each Site are detailed within the Best Available Techniques and Operating Techniques (BATOT) document, submitted to support the application for a variation of the EP.

A summary of the two Sites is detailed within this section, with Figure 3-1 identifying the location of the sites.

Figure 3-1: Site Location



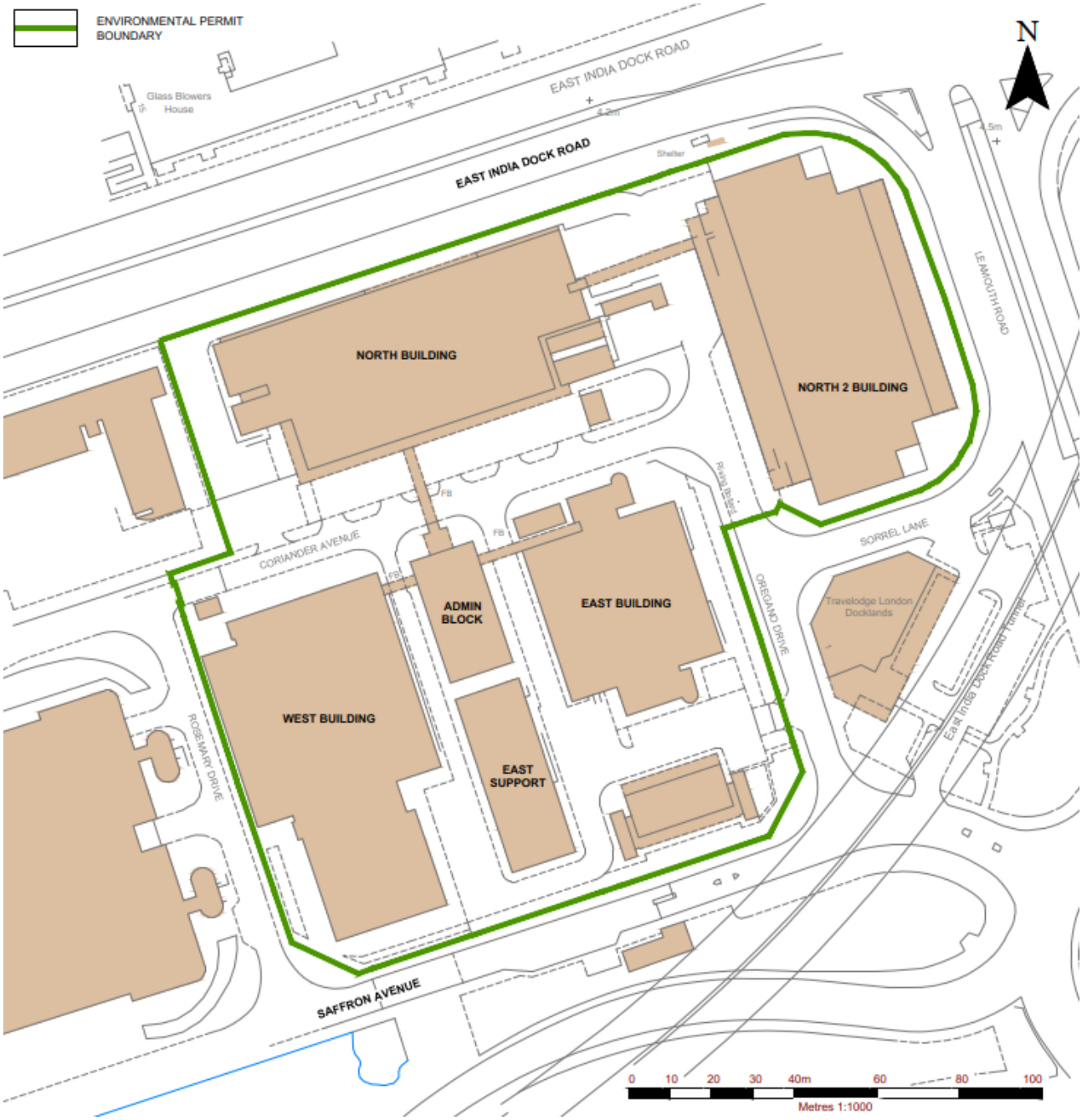
3.1 Telehouse North

TN, which consists of four data centre buildings, is located on Coriander Avenue, London, E14 2AA.

The Site is predominantly surrounded by commercial and residential properties. There are residential apartment complexes approximately 40m to the north. There are further residential complexes within the area located 100m and 180m to the south, 355m to the west and 370m to the east. The closest commercial properties to the Site are a Travelodge hotel, located adjacent to the east of the Site, and a data centre (Global Switch) 20m to the west.

Figure 3-2 below, shows the permit boundary at TN.

Figure 3-2: Telehouse North - Environmental Permit Boundary



3.1.1 Standby Generators

The current EP for TN allows a total of 145MWth for 27 SBGs. However, at the time of the original EP application, only 19 of the 27 SBGs were in place, with the option to increase the thermal rating if future expansion was required.

Since issue of the EP, and as part of this expansion, an additional five SBGs have been installed which includes:

- 3 x SBGs in West Building were installed in September 2018; and
- 2 x SBGs in North 2 Building were installed in December 2021.

Currently, there are a total of 24 SBGs operating at TN leaving further capacity for future expansion, therefore the TN assessment considers the impact of 27 SBGs.

3.2 Telehouse South

The Telehouse South data centre is located at 1 Blackwall Way, Paul Julius Close, London E14 2EH, and comprises of the Main Datacentre Building (DTC) and Energy Utility Building (EUB) (note that the EUB is now referred to as the South Support Building (SSB).

The Site is located on the banks of the River Thames and is bordered to the north by the A1261 Aspen Way. The Radisson Blue hotel, and the Blackwall Tunnel Ventilation Towers are located to the west of the site. To the east, the Site is immediately bordered by the Blackwell Yard development; a new residential development that is currently under construction.

Figure 3-3 below, shows the permit boundary (coloured green) at Telehouse South.

Figure 3-3: Telehouse South - Environmental Permit Boundary

3.2.1 Standby Generators

TS has an EP in place (reference EPR/EP3507) which permits operation of the following:

- 10 x SBGs (4 x 6.4MWth and 6 x 6.3MWth); and
- 3 x natural gas-fired heating boilers each with a thermal rated input of 1.172MWth.

The data centre is undergoing significant refurbishment, which will include the removal of all existing SBGs and gas-fired heating boilers. It is proposed that 10 new SBGs will be installed.

4.0 Baseline Sound Levels

A range of noise assessment reports have previously been undertaken for TN and TS, as part of the historical planning and permit applications. The previous reports have therefore been reviewed, and a summary of the baseline sound levels used at receptors locations is detailed within this section.

It should be noted that the baseline surveys were undertaken while the Sites were operational, however as noted, sound from the Sites was not audible at any of the monitoring locations during each survey. Therefore, the results are considered robust with the baseline background not being elevated by operations at either Site.

4.1 Telehouse North

The original permit application for TN (previously known as Docklands), was supported by a noise assessment which was prepared by SLR in June 2018. While the survey was undertaken over 3 years ago, the results are still considered robust, as noise levels in this area are likely to have remained unchanged since 2018. Therefore, the data obtained during the survey is presented for use within this assessment.

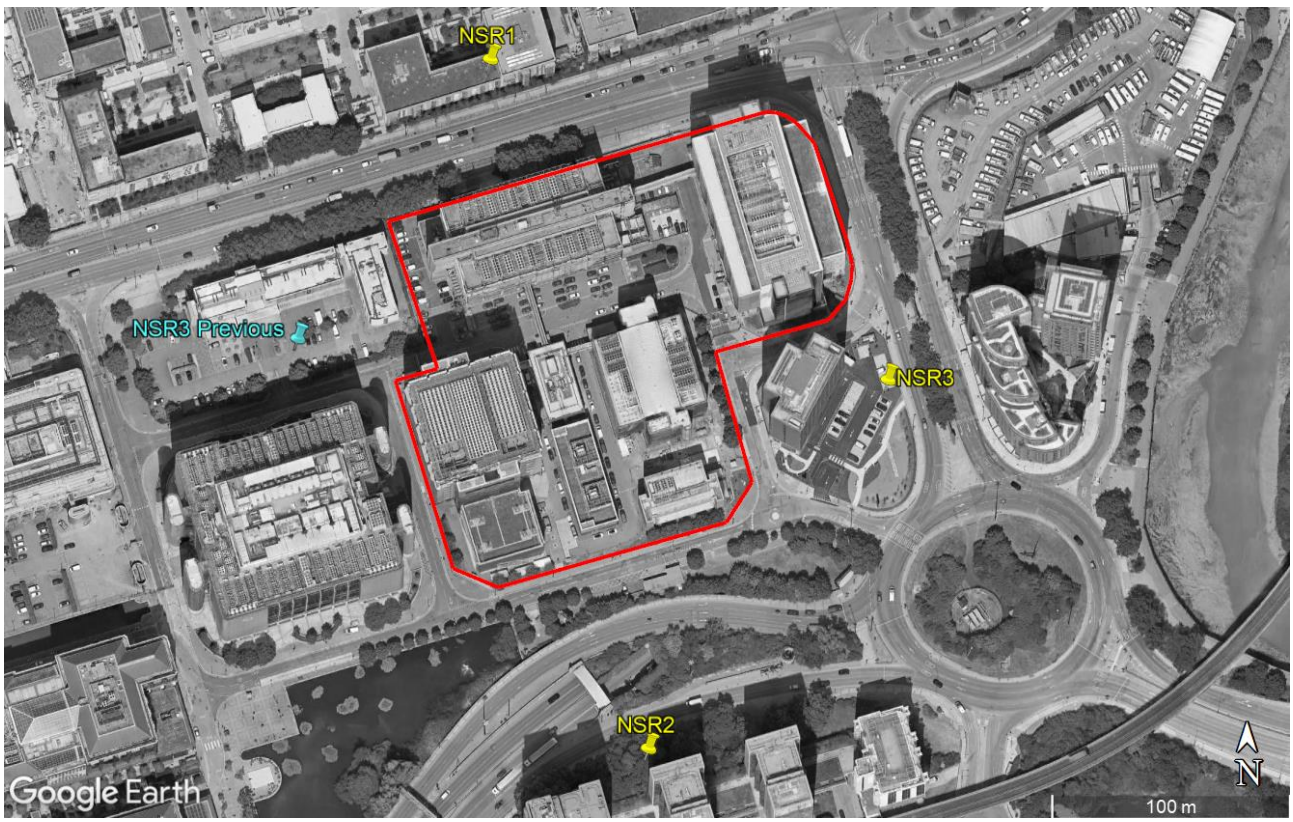
4.1.1 Receptors

The receptors which were assessed within the previous assessment for TN, and which are considered most likely to be affected by operations at TN are shown in Figure 4-1 below, and are as follows:

- NSR1 Blairgowrie Court (Residential)
- NSR2 Blackwall Way (Residential)
- NSR3 Oregano Drive (Hotel)

When the 2018 noise report was produced, NSR3 was previously located to the west of the site on Coriander Avenue. However, since then, the hotel has moved to a new location, to the east of the site on Oregano Drive as indicated below.

Figure 4-1: Telehouse North - Receptor Location Plan



4.1.2 Results

Baseline sound surveys were undertaken between Thursday 17th May 2018 and Sunday 20th May 2018. The survey was undertaken following the methodology found within BS4142, which includes suitable weather conditions, and was subsequently approved by the EA.

A summary of the measured sound levels presented within the report, and which were considered representative of the receptors, are shown in Table 4-1 below.

A monitoring location plan is presented in **Appendix B** of this report, together with the survey data.

At NSR3, the monitoring results from the 2018 survey at the Hotel are still considered representative for use at the relocated Hotel. This is due to the similar distances from the surrounding roads and the Site.

Table 4-1: Telehouse North - Monitoring Results

Location	Date	Period	$L_{Aeq,T}$	$L_{A90,T}$
1 – Representative of NSR1 and NSR3	17/05/2018 to 20/05/2018	Daytime	64	63
		Night-Time	64	63
2 - Representative of NSR2	17/05/2018 to 18/05/2018	Daytime	64	61
		Night-Time	61	59

From the measurements obtained at TN, it can be seen that ambient and background noise levels in the area are high. This is further evidenced by the surveyor noting that noise from constant road traffic was dominant at receptor locations, and sound from the Site was not audible.

4.2 Telehouse South

For the purpose of the planning application required for the proposed refurbishment of TS, a noise assessment and a noise impact assessment report was completed by Sweco in March 2022 (Doc Ref: TSX002-SWE-TS-ZZ-RP-Y-000010 Revision: P01). The data obtained during this survey is presented for use within this assessment.

4.2.1 Receptors

The Receptors which were assessed within the previous assessment for TS, and which are considered most likely to be affected by operations at TS are shown in Figure 4-2 below, and are as follows:

- NSR4 Radisson Blue Hotel (Hotel)
- NSR5 Ontario Tower (Residential)
- NSR6 Blackwall Yard South (Future Residential)
- NSR7 Blackwall Yard North (Future Residential)

Figure 4-2: Telehouse South - Receptor Location Plan

4.2.2 Results

The baseline sound data used within the Sweco noise report, was based on surveys undertaken by Cundall and Buro Happold, in May 2019 and January 2020 respectively. The survey was undertaken following the methodology found within BS4142, which includes appropriate weather conditions, and was subsequently approved by the LPA.

As stated within the Sweco noise report, the lowest background sound levels were selected allowing for a robust worst-case scenario, while considering the differences in noise levels within the Site, and the surrounding noise-sensitive receptors, depending on the distance to main roads.

A summary of the background sound levels used in the BS4142 assessment and reported in the Sweco report, is shown Table 4-2 below.

A monitoring location plan is presented in **Appendix C** of this report, together the survey data.

Table 4-2: Telehouse South - Monitoring Results (Sweco)

Location	Period	$L_{A90,15min}$ (dB)
NSR4 Radisson Blue Hotel	Daytime (07:00 – 23:00)	60
	Night-time (23:00 – 07:00)	58
NSR5 Ontario Tower	Daytime (07:00 – 23:00)	60
	Night-time (23:00 – 07:00)	58
NSR6 Blackwall Yard South (Development Plot 4)	Daytime (07:00 – 23:00)	60
	Night-time (23:00 – 07:00)	58
NSR7 Blackwall Yard North (Development Plot 1.1)	Daytime (07:00 – 23:00)	61
	Night-time (23:00 – 07:00)	61

5.0 Telehouse North - Assessment

5.1 Existing BS4142 Assessment

As part of the original permit application, a noise assessment was prepared by SLR in June 2018 (Ref 410.04438.00003). This included an assessment of the potential noise impact from the Site, at the Receptor locations. A summary of the previous noise assessment for the TN EP, is detailed below, together with information regarding the model assumptions and source data used.

5.1.1 External Sound Sources

The Site comprises of four buildings (North, North 2, West and East buildings), and there are a number of noise sources across the Site, principally rooftop cooling units on each building which do not generate significant levels of noise.

The noise model was based on data provided by Cundall; the Telehouse appointed Project Consultant, and from the data provided, it was determined that the external noise emission points were principally those detailed in Table 5-1 below.

With regard to the SBGs, the 2018 assessment assumed a worst-case scenario at each building, and the model assumed 8 SBGs within each building. Therefore, for this EP variation, the previous noise model has been updated to reflect the permitted SBG generating capacity of 27 at TN, as also detailed in the table below.

Table 5-1: TN – Plant List at Each Building

Building	Number of SBGs	Noise Source	Quantity	Location	Sound Level
North	6	SBG Inlets	6	Western Facade, Ground/Mezzanine Floor	61dB(A) @ 1m, modelled as 71.9dB L_{WA}
		SBG Outlets	6	Eastern Facade, Ground/Mezzanine Floor	
		SBG Exhaust	6	North East and South East Corners	
North 2	8	SBG Inlets	8	Western Facade, Ground/Mezzanine Floor	
		SBG Outlets	8	Eastern Facade, Ground/Mezzanine Floor	
		SBG Exhaust	8	North East and South East Corners	
East	5	SBG Inlets	5	Western Facade, Ground/Mezzanine Floor	
		SBG Outlets	5	Eastern Facade, Ground/Mezzanine Floor	
		SBG Exhaust	5	North East and South East Corners	
West	8	SBG Inlets	8	Western Facade, Ground/Mezzanine Floor	
		SBG Outlets	8	Eastern Facade, Ground/Mezzanine Floor	
		SBG Exhaust	8	North East and South East Corners	
All	-	Cooling Units	60 (per building)	Gantry on western facade, 2nd to 7th Floor (10 x Per floor)	61dB(A) @ 3m – Normal 68dB(A) @ 3m - high external temperature
		Air Handling Equipment	7 (each building)	Roof Level	61dB(A) @ 1m

At the East, West and North 2 Buildings, the model assumed the cooling units were arranged on gantries external to the western façade, at 10 units per floor from the 2nd to the 7th floor. A solid facade (of sheet steel of at least 10kg/m^2 with insulation behind) is in front of the units (i.e., to the west), with air circulating the gantries through louvred openings, on the northern and southern facades.

At the North building, the model assumed that cooling units were located on the northern façade, facing towards East India Dock Road, with air circulating the gantries through louvred openings, on the eastern and western facades.

With regards to internal operations, sound from the SBGs inside the building, along with other internal plant, was not considered significant, and would be attenuated by the building façade. Furthermore, internal sound sources were considered negligible, and the assessment focused on external emissions only.

5.1.2 Character Corrections

During the survey, sound from the Site was not audible above road traffic, and therefore it was considered that no character correction was required during normal operations.

During an emergency, the higher noise levels that are generated due to additional plant operating may be audible at the receptor locations. The character of this noise may be tonal, therefore, a 4dB correction was considered appropriate during emergency operation.

5.1.3 Predicted Existing Specific Sound Level

The sound predictions in this assessment have been undertaken using a proprietary software-based noise model (CadnaA) which implements the full range of UK noise calculation methods. The calculation algorithms set out in ISO 9613-2:1996 are used in the model, with the following assumptions:

- A ground absorption factor of 0; and
- A reflection factor of two.

Two scenarios have been modelled:

- Normal operations (fans at normal capacity, SBGs not running); and
- Emergency operation (fans at high capacity, SBGs running).

The predicted sound levels for each situation is presented below in Table 5-2. The worst-case level at the receptor has been assumed, taking account of the height of the building at 20m.

Table 5-2: Telehouse North - Predicted Noise Specific Sound Level

Location	Predicted Free-Field Specific Sound Level, dB $L_{Aeq,T}$	
	Normal Operation	Emergency Operation
NSR1 - Blairgowrie Court	43	49
NSR2 - Blackwall Way	42	48
NSR3 - Oregano Drive	48	55

5.1.4 BS4142 Assessment

The predicted sound levels shown in Table 5-2, have been added to the relevant character corrections detailed above, to derive the rating level at each Receptor. The rating levels have then been compared to the representative background sound levels at each Receptor and assessed accordingly.

The results of the BS4142 assessment are shown in Table 5-3. It should be noted that the rating levels and the representative background sound levels have been rounded to the nearest decibel.

Table 5-3: Existing Telehouse North – BS4142 Assessment

Receptor	Assessment	Operation	Predicted Specific Sound Level, $L_{Aeq,T}$	Predicted Rating Level, L_{Ar}	Derived Background Sound Level LA90	Difference	Significance
NSR1 Blairgowrie Court	Daytime	Normal	43	43	63	-20	Low Impact
		Emergency	49	53	63	-10	Low Impact
	Night-time	Normal	43	43	63	-20	Low Impact
		Emergency	49	53	63	-10	Low Impact
NSR2 Blackwall Way	Daytime	Normal	42	42	63	-21	Low Impact
		Emergency	48	52	63	-11	Low Impact
	Night-time	Normal	42	42	63	-21	Low Impact
		Emergency	48	52	63	-11	Low Impact
NSR3 Oregano Drive	Daytime	Normal	48	48	60	-12	Low Impact
		Emergency	55	59	60	-1	Low Impact
	Night-time	Normal	48	48	59	-11	Low Impact
		Emergency	55	59	59	0	Low Impact

The assessment results indicate that during normal operations, sound from the site is at least 10dB below the background noise level, during both the day and night-time periods, at all Receptors.

During emergency operations sound from the site will also be equal to, or below the background sound level during the day and night-time periods, at all Receptors.

BS4142:2014 +A1:2019 states:

"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, dependant on context."

Therefore, it is considered that the TN Site does not have an adverse impact on the nearby Noise Sensitive Receptors.

5.2 Permit Variation

Five 'future SBGs', which were included on the existing TN EP (and noise assessment), have been installed since issue of the original EP. These SBGs are different models and sizes compared to that as stated in the original EP application. However, it is expected that the noise output would be similar.

As noted above, the 2018 assessment accounted for the potential noise emissions from future expansions (i.e. future SBGs not yet installed), and the model for this EP variation reflects the permitted SBG generating capacity of 27 at TN.

Therefore, it is considered acceptable to use the existing worst-case rating levels presented in Table 5-3, to assess the proposed permit variation at TN, which indicates a **low impact** at the residential receptors.

6.0 Telehouse South – Assessment

As part of the permit variation, this part of the assessment will consider the existing noise impact of the SBGs at TS as part of the permit consolidation.

In January 2022, a planning application for the data centre was submitted to Tower Hamlets Council (Planning Ref: PA/22/01023/NC), which was supported by a noise impact assessment report, prepared by Sweco in March 2022 (Doc Ref: TSX002-SWE-TS-ZZ-RP-Y-000010 Revision: P01), which is summarised below in Section 6.1 and 6.2.

For the purpose of this assessment "Normal" Operations do not include the SBGs at the SSB building, which only operates during "Emergency" operations. For consistency with the assessment of TN, a Normal Operations assessment is presented, followed by an Emergency Operations Assessment.

6.1 Existing "Normal Operations" BS4142 Assessment

6.1.1 Noise Sources

As detailed within Section 5 of the Sweco report, the assessment at the DTC considers the potential noise impact from:

- Level 9 – 2 x chillers, and heat pump.
- Level 10 – 3 x Air Handling Units (AHU), and 36 x outdoor condenser units.
- Level 11 – Heat rejection plant, including 14 No Air-Cooled Chillers Flakt 1440kW with attenuation packages.

The assessment assumed that all the plant would operate simultaneously for 24 hours, except for one AHU and associated condenser. The proposals were assessed as operating at 100% load for high external temperatures, which is considered a worst-case approach.

6.1.2 Character Corrections

BS4142 advises that when the noise contains a tonality, impulsivity, intermittency, and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific noise level to obtain the $L_{Ar,Tr}$ 'rating noise level'.

Based on the data provided by the manufacturers above, the mitigations included in the design and the continuous operating profile of the site no character corrections were considered necessary for intermittency, tonality or impulsivity of the sound arising from the external plant in the Main Building.

6.1.3 Predicted Specific Level

Table 6-1 presents the predicted sound rating levels presented in the Sweco report, for the Receptors and compares them against the limits based on the lowest background levels measured during the sound survey. The assessment has been carried out for the daytime and night-time period.

Table 6-1: Existing Telehouse South "Normal" BS4142 Assessment

Receptor	Period	Rating Sound Level LAr,Tr (dB)	Background Sound Level $L_{A90,15min}$ (dB	Difference	Significance
NSR4 Radisson Blue Hotel	Daytime	48	60	-12	Low Impact
	Night-time	48	58	-10	Low Impact
NSR5	Daytime	48	60	-12	Low Impact

Receptor	Period	Rating Sound Level LAr,Tr (dB)	Background Sound Level $L_{A90,15min}$ (dB	Difference	Significance
Ontario Tower	Night-time	47	58	-11	Low Impact
NSR6 Blackwall Yard South	Daytime	52	60	-8	Low Impact
	Night-time	51	58	-7	Low Impact

The rating levels from the development were predicted to be below the average background levels, and therefore it was predicted to have a low impact at all Receptors.

It should be noted, that the Sweco report did not consider the potential impact at NSR7 Blackwell Yard North, however NSR6 is located significantly closer to the DTC. Therefore the precited impact at NSR7 will be less than NSR6, and will therefore likely be below the background sound level, resulting in a low impact.

6.2 Existing "Emergency" BS4142 Assessment

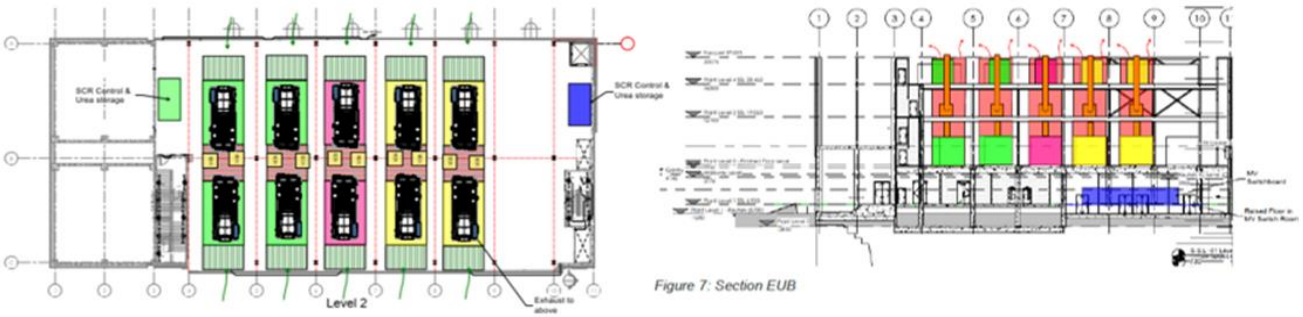
6.2.1 Noise Sources

With regard to the SBGs, as detailed in the Sweco report, these are located within the EUB building (now referred to as the SSB).

The EUB building will accommodate the backup power generation for the site. Each genset will be housed in an acoustic enclosure. Flue stacks will be silenced and will be located at approximately 21.5 metres above local ground level. The unit's ventilation air exhausts will be turned vertically and attenuated with louvres at Level 4. The air intakes will be attenuated and located at each end of the acoustic containers at Level 2. Remote cooling units will be located at Level 4.

A copy of the plans provided within the Sweco noise report are shown in Figure 6-1 below.

Figure 6-1: Telehouse South - Existing SBG plan



The assessment at the EUB included 10 x 2900MW SBGs, to be located within acoustic enclosures with sufficient sound reduction. Based on the high-level information provided, it was assumed that the following mitigation measures will be applied to the design:

- Each SBG enclosure will be designed for a maximum breakout of 65 dBA at 1 metre.
- Each SBG exhaust flue will be mitigated using silencers to a maximum sound pressure level of 65 dBA at 1 metre.
- Air intakes will be mitigated using attenuators to a maximum sound pressure level of 75 dBA at 1 metre.
- Cooling Units at level 4 will have a maximum sound power level of 85 dBA.

At the time of the reports production, there was no available information on the proposed plant sound data and therefore, to undertake the prediction calculations, the above mitigation measures were applied, and SBG data from the Sweco library for comparable plant was used.

It was assumed that all the plant would operate simultaneously during the daytime, as the testing regime would take place during the normal working hours. The night-time impact has also been considered although this scenario will be unlikely, or would be of a short duration.

6.2.2 Character Corrections

BS4142 advises that when the noise contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific noise level to obtain the $L_{Ar,Tr}$ 'rating noise level'.

Based on the noise data assumed and the likely short-term operation for this plant, no character corrections are considered necessary for intermittency, tonality or impulsivity of the sound arising from the EUB plant at this stage.

6.2.3 Predicted Specific Level

Table 6-2 below, presents the predicted sound rating levels at the Receptors, and compares them against the lowest background levels measured during the sound survey. The assessment has been carried out for the daytime and night-time period.

Table 6-2 Existing Telehouse South "Emergency" BS4142 Assessment

Receptor	Time Period	Rating Sound Level LAr,Tr (dB)	Background Sound Level $L_{A90,15min}$ (dB)	Difference	Significance
NSR4 Radisson Blue Hotel	Daytime	55	60	-5	Low Impact
	Night-time	55	58	-3	Low Impact
NSR5 Ontario Tower	Daytime	51	60	-9	Low Impact
	Night-time	51	58	-7	Low Impact
NSR6 Blackwall Yard South	Daytime	57	60	-3	Low Impact
	Night-time	57	58	-1	Low Impact
NSR7 Blackwall Yard North	Daytime	61	>61	0	Low Impact
	Night-time	61	61	0	Low Impact

The rating levels from the operation of the SBGs was not predicted to exceed the background levels in the area, and therefore are predicted to have a **low impact** at the nearest receptors to the Site.

7.0 Cumulative Assessment

Whilst the individual noise impact assessments for TN and TS have demonstrated that there would be a low impact at the receptors, the potential cumulative impact of both sites also needs to be considered as part of this permit variation as requested by the EA.

However, based on the separation distance between the sites and the surrounding environment, as detailed below, SLR believe that a detailed cumulative noise assessment is not required.

- **Separation Distance:** The two data centres are situated approximately 350 meters apart. This substantial separation distance helps minimise the potential for cumulative noise effects. The physical distance between the sites allows for natural attenuation of noise, reducing the likelihood of cumulative impacts.
- **Intervening Buildings:** The surrounding area between the two data centres comprises a significant number of buildings, including high-rise apartments, and further developments. These structures act as effective sound barriers, helping to isolate the noise generated by each data centre and further reducing the potential for cumulative impacts.
- **Transportation Noise**: The data centres are located within a busy London area, which is exposed noise from transportation sources, together with other ambient sources. These include noise generated by road traffic, public transportation, railways, and other ambient sources. The noise survey has demonstrated that the existing ambient noise level is high due to transportation noise.
- **Low Impact at the Boundary:** The individual noise assessments undertaken for each data centre, has indicated a low impact on the surrounding environment. These assessments have considered the noise generated by the data centre, and the results confirm that the noise levels at the boundary of each site are within acceptable limits, and therefore do not pose a significant cumulative impact.

Based on the above factors, it can be concluded that cumulative noise impacts are highly unlikely to even occur. Therefore, the existing conditions and factors adequately mitigate any potential cumulative noise effects between the two sites, and the potential cumulative impact of both sites would be **negligible** when assessed in accordance with Table 2-1.

8.0 Conclusion

SLR Consulting Limited has been instructed by Telehouse International Corporation of Europe Limited to prepare a noise assessment report. The report has been prepared to support an EP variation application for the TS data centre located at Blackwall Way, Poplar, London, E14 2EH.

This EP variation consolidates the currently separately permitted TN data centre, located on Coriander Avenue, London, with the existing EP for TS, and includes information on all currently installed standby generators at the facilities.

The SBGs provide power to the data centres in the event of an emergency such as a brown- or black-out of the local electricity transmission network where there are fluctuations or loss of the electrical power provided by the network.

As part of the permit variation, this noise assessment considers the potential noise impact of TN, TS, and the potential cumulative noise impact from both sites. The assessment has been undertaken in accordance with relevant EA and technical guidance.

8.1 Telehouse North

Based on the results of a previous noise assessment undertaken by SLR in 2018, it can be concluded that the TN site has a low impact in terms of noise emissions.

The assessment considered various external sound sources, including rooftop cooling units, and considered the potential impact of SBGs within the buildings. It was found that the specific noise levels were overestimated due to the assumption of a larger number of SBGs, than currently installed to date. Additionally, internal operations and other internal plant noise were deemed insignificant and attenuated by the building facade. The assessment results, including BS4142 analysis, indicated that the Site's noise levels were significantly below background noise levels at all receptor locations, both during normal and emergency operations. Therefore, it can be concluded that the TN site does not have an adverse impact on nearby receptors.

8.2 Telehouse South

Based on the results of a previous noise assessment undertaken by Sweco in 2021, it can be concluded that the TS site has a low impact in terms of noise emissions.

The assessment considered the noise impact of the SBGs at TS, during normal and emergency operations. The assessment found that the predicted sound levels from the existing plant were below background levels, resulting in a low impact on nearby receptors. Similarly, the SBGs' predicted sound levels during emergencies were also of a low impact at the receptors, when considering the context. Therefore, it can be concluded that the TS site does not have an adverse impact on nearby receptors.

8.3 Cumulative Impact

Based on the significant separation distance between the data centers, the presence of intervening buildings, the existing impact of transportation noise and ambient sources, and the confirmed low noise impact at the boundary, it is concluded that a cumulative noise assessment is not required.

Therefore, the existing conditions and factors adequately mitigate any potential cumulative noise effects between the two sites, and the potential cumulative impact of both sites would be **negligible** when assessed in accordance with EA guidance.

Appendix A Glossary of Terminology

Noise Assessment Report

Telehouse Campus Environmental Permit Variation

Telehouse International Corporation of Europe Ltd

SLR Project No.: 410.064698.00001

20 June 2023

A.1 Introduction

The human ear can detect a very wide range of pressure fluctuations, which are perceived as sound. In order to express these fluctuations in a manageable way, a logarithmic scale called the decibel, or dB scale is used. The decibel scale typically ranges from 0dB (the threshold of hearing) to over 120dB. An indication of the range of sound levels commonly found in the environment is given in the following table.

Table A01 Sound Levels Commonly Found in the Environment

Sound Level	Location
0 dB(A)	Threshold of hearing
20 to 30 dB(A)	Quiet bedroom at night
30 to 40 dB(A)	Living room during the day
40 to 50 dB(A)	Typical office
50 to 60 dB(A)	Inside a car
60 to 70 dB(A)	Typical high street
70 to 90 dB(A)	Inside factory
100 to 110 dB(A)	Burglar alarm at 1m away
110 to 130 dB(A)	Jet aircraft on take off
140 dB(A)	Threshold of Pain

A.2 Acoustic Terminology

dB (decibel) The scale on which sound pressure level is expressed. It is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (of 20 μPa).

dB(A) A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e. 'A' weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.

$L_{Aeq,\,T}$ This is defined as the notional steady sound level which, over a stated period T, would contain the same amount of acoustical energy as the A-weighted fluctuating sound measured over that period.

$L_{A10,\,T}$ & L_{A90} If a non-steady noise is to be described it is necessary to know both its level and the degree of fluctuation. The Ln indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time and as such can be regarded as the 'average maximum level'. Similarly, L_{90} is the 'average minimum level' and is often used to describe the background noise. It is common practice to use the L_{10} index to describe traffic noise.

$L_{Amax(F)}$ $L_{Amax(F)}$ is the maximum A-weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.

Appendix B Telehouse North – Noise Survey Map and Data

Noise Assessment Report

Telehouse Campus Environmental Permit Variation

Telehouse International Corporation of Europe Ltd

SLR Project No.: 410.064698.00001

20 June 2023

APPENDIX B

B.1 Telehouse North- Noise Survey Map and Data Noise Survey

Figure B01 Telehouse North - Monitoring Location Plan

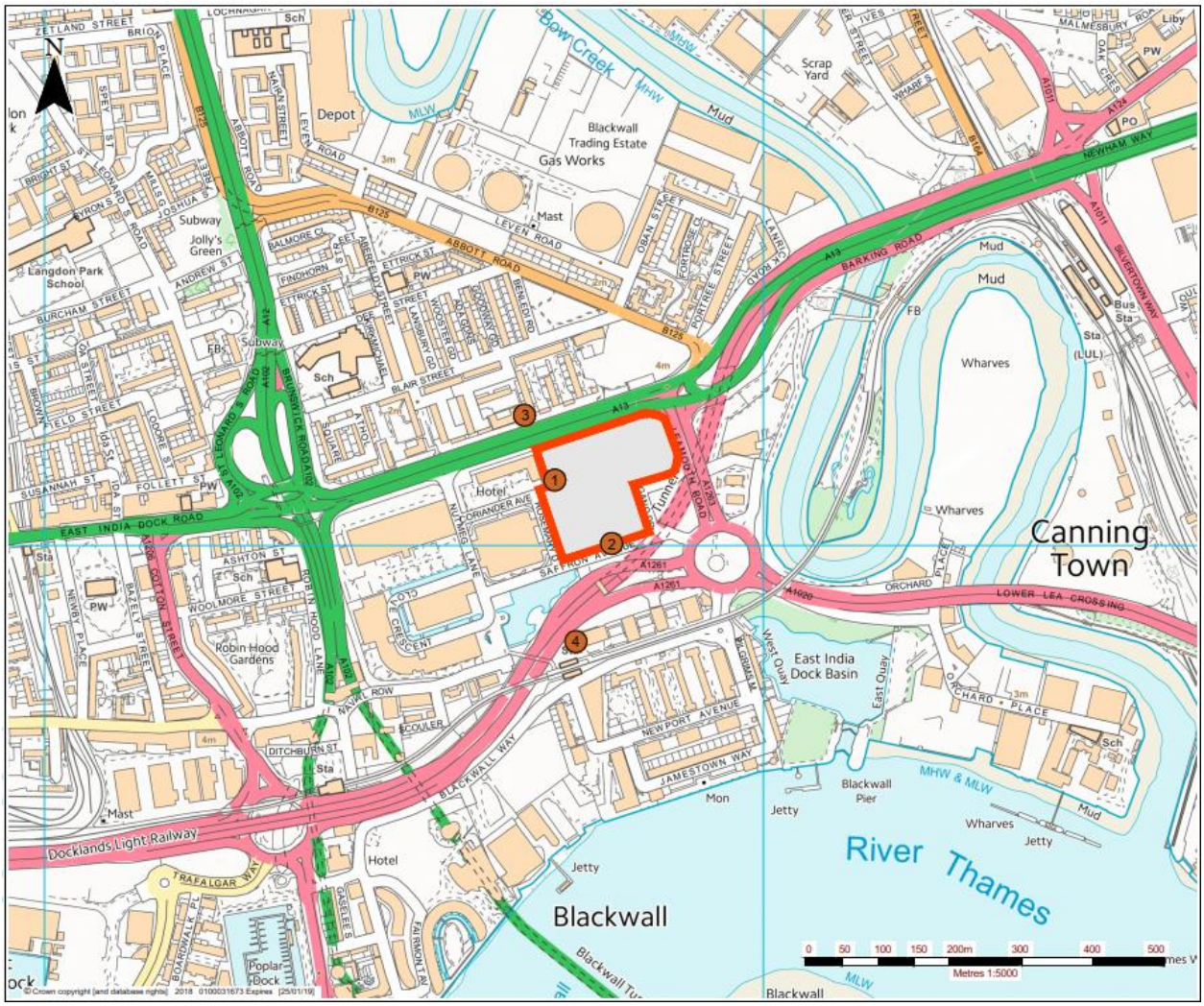


Table B01 Telehouse North - Location 1 Survey Results, dB

Date	Time	LAeq	LA90	LA10	LAFmax
17th May 2018	12:45	63.9	63.2	64.6	74.5
	13:00	65.0	63.2	65.5	81.9
	13:15	64.4	63.1	65.5	75.9
	13:30	64.0	63.1	64.8	77.1
	13:45	63.8	63.2	64.6	74.9
	14:00	64.0	63.2	65.1	72.9
	14:15	64.6	63.6	65.6	73.7
	14:30	64.8	63.7	65.9	75.4
	14:45	64.0	63.1	65.0	78.0

Date	Time	LAeq	LA90	LA10	LAFmax
	15:00	64.8	63.1	65.2	80.4
	15:15	64.3	63.2	65.5	74.1
	15:30	63.6	62.8	64.6	73.4
	15:45	65.7	62.8	64.5	88.5
	16:00	64.7	63.0	65.9	78.5
	16:15	63.7	62.9	64.5	75.6
	16:30	63.7	62.9	64.7	78.3
	16:45	65.2	62.9	64.6	87.1
	17:00	63.6	62.8	64.3	77.8
	17:15	63.8	62.9	64.7	74.8
	17:30	63.7	63.0	64.5	71.9
	17:45	63.6	63.0	64.3	73.2
	18:00	63.8	63.0	64.8	77.9
	18:15	63.9	63.0	65.0	77.1
	18:30	63.5	62.9	64.3	70.5
	18:45	63.9	63.1	64.9	76.2
	19:00	64.1	63.2	65.5	74.4
	19:15	63.8	63.2	64.6	71.8
	19:30	64.2	63.4	65.1	74.4
	19:45	64.2	63.4	65.1	74.7
	20:00	64.1	63.4	65.0	71.6
	20:15	64.2	63.5	64.8	76.4
	20:30	63.8	63.2	64.4	78.8
	20:45	63.7	63.2	64.4	75.0
	21:00	63.8	63.2	64.5	73.7
	21:15	63.7	63.2	64.3	73.4
	21:30	63.7	63.2	64.3	67.8
	21:45	63.7	63.2	64.3	70.6
	22:00	63.9	63.3	64.7	71.4
	22:15	64.4	63.4	64.3	83.9
	22:30	63.8	63.2	64.3	74.2
	22:45	63.5	63.1	64.1	65.8
	23:00	63.6	63.2	64.2	67.3
	23:15	63.5	63.0	64.1	71.7
	23:30	63.6	63.1	64.2	76.9
	23:45	63.6	63.2	64.2	70.9
18th May 2018	00:00	63.5	63.1	64.0	73.3
	00:15	63.5	63.2	64.1	67.8

Date	Time	LAeq	LA90	LA10	LAFmax
	00:30	63.4	63.1	64.0	65.9
	00:45	63.8	63.2	64.4	73.7
	01:00	63.5	63.2	64.1	71.0
	01:15	63.7	63.1	64.0	75.9
	01:30	63.4	63.1	63.9	67.5
	01:45	63.3	63.0	63.8	65.4
	02:00	63.6	63.0	63.9	74.8
	02:15	63.4	63.1	63.8	66.6
	02:30	63.2	62.9	63.7	65.4
	02:45	63.2	62.9	63.7	65.2
	03:00	63.2	62.9	63.7	67.0
	03:15	63.3	63.0	63.8	64.7
	03:30	63.3	62.9	63.8	72.2
	03:45	63.4	62.8	63.6	78.1
	04:00	63.7	62.9	63.8	82.2
	04:15	63.2	62.8	63.7	72.0
	04:30	63.2	62.8	63.7	65.1
	04:45	63.2	62.9	63.8	65.4
	05:00	63.3	62.9	63.9	66.4
	05:15	63.9	63.0	64.5	79.1
	05:30	63.7	63.1	64.4	71.1
	05:45	63.8	63.2	64.6	70.6
	06:00	64.0	63.2	64.8	75.0
	06:15	63.9	63.2	64.6	72.5
	06:30	65.1	63.3	65.3	85.2
	06:45	65.8	63.4	66.0	88.1
	07:00	64.6	63.5	65.8	76.3
	07:15	64.1	63.3	65.1	74.1
	07:30	64.0	63.4	65.1	70.7
	07:45	64.5	63.5	65.7	74.9
	08:00	64.6	63.7	65.6	77.9
	08:15	64.2	63.4	65.3	71.0
	08:30	64.4	63.5	65.2	76.1
	08:45	64.5	63.6	65.8	73.8
	09:00	64.7	63.5	65.7	78.0
	09:15	64.1	63.4	64.8	73.2
	09:30	64.3	63.3	65.2	76.5
	09:45	65.0	63.5	65.9	81.7

Date	Time	LAeq	LA90	LA10	LAFmax
	10:00	65.8	63.7	66.6	79.6
	10:15	64.8	63.5	66.0	77.5
	10:30	64.1	63.2	65.0	73.1
	10:45	63.9	63.2	64.6	73.4
	11:00	64.0	63.3	64.8	72.4
	11:15	64.1	63.2	64.9	79.5
	11:30	63.5	63.0	64.1	72.0
	11:45	64.5	63.2	65.2	78.9
	12:00	70.7	64.3	74.2	84.4
	12:15	64.3	63.4	65.4	74.6
	12:30	65.9	63.2	65.6	83.8
	12:45	64.2	63.3	65.3	75.5
	13:00	64.6	63.2	65.6	78.1
	13:15	64.2	63.3	65.3	73.9
	13:30	64.4	63.4	65.3	74.8
	13:45	63.8	63.1	64.4	75.0
	14:00	64.1	63.1	65.1	74.2
	14:15	64.8	63.6	65.8	77.5
	14:30	63.8	62.8	64.9	74.5
	14:45	63.9	62.8	64.6	80.5
	15:00	64.8	62.7	65.2	80.5
	15:15	63.8	63.1	64.6	71.4
	15:30	63.8	63.0	64.9	72.1
	15:45	63.6	62.7	64.2	75.8
	16:00	63.6	62.7	64.3	78.6
	16:15	63.3	62.6	64.1	73.5
	16:30	63.2	62.5	64.1	74.7
	16:45	64.4	62.5	63.9	85.3
	17:00	63.5	62.7	64.3	75.8
	17:15	63.7	62.8	64.7	80.5
	17:30	64.3	62.8	64.9	78.3
	17:45	65.2	62.8	66.2	79.3
	18:00	65.4	62.9	67.6	82.2
	18:15	64.3	62.9	64.9	78.2
	18:30	65.5	62.8	66.6	83.8
	18:45	63.5	62.7	64.5	72.8
	19:00	63.5	62.7	64.4	79.9
	19:15	63.8	63.0	64.7	72.1

Date	Time	LAeq	LA90	LA10	LAFmax
	19:30	63.6	63.0	64.3	74.0
	19:45	63.7	63.1	64.4	73.0
	20:00	64.0	63.3	64.9	69.9
	20:15	63.6	63.3	64.2	68.3
	20:30	63.8	63.3	64.5	69.5
	20:45	63.6	63.1	64.3	69.3
	21:00	63.7	63.1	64.3	69.7
	21:15	64.2	63.1	64.8	76.2
	21:30	63.7	63.1	64.3	73.7
	21:45	63.7	63.2	64.3	68.9
	22:00	63.8	63.3	64.3	70.4
	22:15	63.7	63.3	64.3	71.0
	22:30	63.6	63.1	64.2	70.9
	22:45	63.7	63.2	64.3	72.2
	23:00	63.7	63.2	64.3	71.2
	23:15	63.7	63.1	64.3	75.5
	23:30	63.8	63.2	64.3	76.3
	23:45	63.5	63.2	64.1	68.9
19th May 2018	00:00	63.6	63.4	64.2	66.1
	00:15	63.7	63.3	64.2	70.7
	00:30	63.4	63.1	64.0	66.9
	00:45	63.5	63.2	64.1	68.6
	01:00	63.6	63.2	64.3	72.6
	01:15	63.5	63.1	64.0	67.0
	01:30	63.5	63.2	64.0	67.3
	01:45	63.3	63.0	63.8	65.0
	02:00	63.4	63.0	63.9	72.3
	02:15	63.6	63.2	64.1	66.8
	02:30	63.4	63.1	63.9	65.3
	02:45	63.5	63.1	64.1	66.4
	03:00	63.3	63.0	63.8	65.8
	03:15	63.4	63.1	63.8	66.7
	03:30	63.4	63.2	63.9	65.8
	03:45	63.4	63.1	63.9	65.0
	04:00	63.4	63.0	63.9	71.6
	04:15	63.4	63.1	63.9	70.8
	04:30	63.4	63.1	64.0	65.7
	04:45	63.6	63.2	64.1	71.3

Date	Time	LAeq	LA90	LA10	LAFmax
	05:00	63.6	63.3	64.3	66.8
	05:15	63.7	63.2	64.2	79.9
	05:30	63.6	63.2	64.2	75.7
	05:45	63.6	63.2	64.2	68.5
	06:00	63.9	63.2	64.6	76.8
	06:15	63.7	63.2	64.4	70.0
	06:30	64.1	63.2	64.7	86.5
	06:45	63.7	63.2	64.5	70.4
	07:00	63.8	63.2	64.5	73.6
	07:15	64.1	63.3	64.9	75.4
	07:30	63.8	63.2	64.7	71.9
	07:45	64.0	63.3	64.9	73.3
	08:00	63.8	63.2	64.7	71.5
	08:15	63.9	63.2	65.0	71.5
	08:30	63.9	63.2	64.7	71.9
	08:45	64.0	63.3	64.7	75.9
	09:00	63.7	63.1	64.4	71.0
	09:15	64.0	63.0	65.2	70.6
	09:30	64.0	63.1	65.2	70.4
	09:45	64.3	63.0	66.1	73.5
	10:00	64.6	63.4	66.1	71.1
	10:15	64.0	62.9	65.6	70.3
	10:30	63.5	62.9	64.1	72.8
	10:45	63.5	63.1	64.1	70.7
	11:00	63.6	63.0	64.2	71.2
	11:15	63.5	62.9	64.2	70.5
	11:30	63.6	62.9	64.2	73.2
	11:45	63.5	62.9	64.1	76.0
	12:00	64.2	63.1	65.1	78.3
	12:15	63.5	63.0	64.2	70.5
	12:30	63.4	62.9	64.0	71.7
	12:45	63.4	62.8	64.0	71.5
	13:00	63.3	62.7	63.8	73.5
	13:15	63.4	62.7	63.8	76.8
	13:30	63.1	62.6	63.7	69.9
	13:45	63.2	62.6	63.7	75.2
	14:00	63.2	62.6	63.8	71.3
	14:15	63.0	62.6	63.6	72.3

Date	Time	LAeq	LA90	LA10	LAFmax
	14:30	63.0	62.7	63.6	69.4
	14:45	63.1	62.6	63.7	67.8
	15:00	63.4	62.7	63.9	74.0
	15:15	63.0	62.6	63.6	69.9
	15:30	63.0	62.6	63.5	68.2
	15:45	62.8	62.4	63.3	70.1
	16:00	63.0	62.6	63.4	68.5
	16:15	63.0	62.5	63.3	77.9
	16:30	63.1	62.6	63.5	67.5
	16:45	63.5	62.7	63.8	74.6
	17:00	63.4	62.8	63.9	67.3
	17:15	63.5	62.9	64.0	73.5
	17:30	63.4	62.8	63.9	67.5
	17:45	63.6	62.9	64.1	73.4
	18:00	63.5	63.0	64.1	72.4
	18:15	63.9	63.0	64.7	74.4
	18:30	64.0	63.1	65.6	73.1
	18:45	64.1	63.1	64.5	80.8
	19:00	63.5	62.9	64.1	78.4
	19:15	63.4	62.9	64.1	72.4
	19:30	63.5	62.8	64.1	74.4
	19:45	63.6	62.9	64.2	72.2
	20:00	63.4	62.9	64.1	71.0
	20:15	63.4	62.9	64.0	80.1
	20:30	63.8	63.1	64.3	76.9
	20:45	63.5	63.0	64.1	68.0
	21:00	63.4	63.0	64.0	69.4
	21:15	63.5	62.9	64.0	72.5
	21:30	63.4	62.9	64.0	75.9
	21:45	64.0	63.0	64.1	81.8
	22:00	63.5	63.0	64.1	71.2
	22:15	63.7	63.0	64.1	73.8
	22:30	63.6	63.2	64.2	74.4
	22:45	63.6	63.2	64.2	71.3
	23:00	63.7	63.3	64.3	70.4
	23:15	63.6	63.2	64.2	69.7
	23:30	63.6	63.2	64.1	70.6
	23:45	63.7	63.2	64.2	74.6

Date	Time	LAeq	LA90	LA10	LAFmax
20th May 2018	00:00	63.5	63.2	64.1	74.4
	00:15	63.5	63.1	64.0	68.4
	00:30	63.5	63.1	64.0	69.5
	00:45	63.6	63.2	64.2	71.0
	01:00	63.3	62.9	63.9	67.9
	01:15	63.3	63.0	63.8	66.8
	01:30	63.2	62.9	63.8	68.0
	01:45	63.3	62.9	63.8	67.7
	02:00	63.3	63.0	63.8	65.4
	02:15	63.3	63.0	63.9	70.2
	02:30	63.3	63.0	63.8	67.9
	02:45	63.4	63.0	63.8	72.4
	03:00	63.1	62.8	63.6	64.6
	03:15	63.1	62.8	63.6	64.6
	03:30	63.2	62.9	63.6	64.8
	03:45	63.2	62.9	63.6	65.8
	04:00	63.2	63.0	63.7	66.6
	04:15	63.3	63.0	63.7	67.9
	04:30	63.4	63.1	63.9	65.9
	04:45	63.4	63.1	63.9	71.8
	05:00	63.3	63.0	63.8	65.4
	05:15	63.4	63.1	63.9	71.5
	05:30	63.3	63.0	63.9	64.8
	05:45	63.4	63.0	63.9	70.6
	06:00	63.6	63.1	64.1	73.7
	06:15	63.4	63.0	64.0	70.4
	06:30	63.7	63.0	64.1	86.0
	06:45	63.7	63.1	64.3	77.6
	07:00	63.5	63.1	64.0	71.5
	07:15	63.6	63.2	64.2	69.5
	07:30	63.5	63.1	64.1	68.6
	07:45	64.6	63.1	64.1	87.1
	08:00	63.6	63.1	64.2	72.5
	08:15	63.6	63.1	64.2	70.0
	08:30	63.4	63.0	64.0	67.6
	08:45	63.5	63.0	64.1	68.8
	09:00	63.5	63.1	64.2	74.0
	09:15	63.4	63.0	64.1	70.8

Date	Time	LAeq	LA90	LA10	LAFmax
	09:30	63.3	62.9	63.9	69.9
	09:45	63.3	62.9	63.9	71.3
	10:00	63.2	62.8	63.9	71.4
	10:15	63.6	63.0	64.2	70.5
	10:30	63.7	63.0	64.1	76.2
	10:45	64.1	63.4	64.5	73.7
	11:00	64.8	63.7	65.1	82.6

Table B02 Telehouse North - Location 2 Survey Results, dB

Date	Time	LAeq	LA90	LA10	LAFmax
17th May 2018	13:00	64.2	60.6	65.8	82.7
	13:15	67	60.7	68.6	89.5
	13:30	63	60.2	65	75.2
	13:45	63.3	60.4	64.7	80.2
	14:00	62.8	60.2	64.6	75.2
	14:15	63	60.3	64.8	78.5
	14:30	63.2	60.2	65.3	76.5
	14:45	63.1	60.3	65.6	75.4
	15:00	62.3	60.2	63.6	76.1
	15:15	62.1	60.3	63.2	73.8
	15:30	63.9	60.2	66.3	80.5
	15:45	63.2	60.3	64.5	78.9
	16:00	64.7	60.7	67.1	88.9
	16:15	64.1	60.6	66.8	83.3
	16:30	63.6	60.3	65.4	78.9
	16:45	63.8	60.3	65.7	82.8
	17:00	63.8	60.1	66.2	77.2
	17:15	63.5	59.7	66.5	81.2
	17:30	62.8	60.1	64.8	76.3
	17:45	63.8	60.5	66.6	77.2
	18:00	63.9	60.7	66.7	74
	18:15	64.2	61.1	66.4	85.5
	18:30	64	60.8	66.5	78.3
	18:45	64.2	61.1	67	76.1
	19:00	65.2	61.2	68.3	82.4
	19:15	64.2	61	66.5	75.7
	19:30	63.7	60.9	65.3	75.7

Date	Time	LAeq	LA90	LA10	LAFmax
	19:45	64	60.7	66.4	78
	20:00	63.8	60.5	66.4	76.3
	20:15	62.1	60.5	62.9	73.6
	20:30	62.5	60.3	63.5	75
	20:45	62.4	59.9	63.2	75.2
	21:00	62.1	59.8	63.3	73.7
	21:15	61.6	59.9	62.3	73.4
	21:30	61.7	59.8	61.9	76.4
	21:45	61.8	59.8	62.7	73.5
	22:00	60.9	59.7	61.7	69.9
	22:15	61.5	59.9	62.5	70.7
	22:30	61.3	59.9	62	72
	22:45	60.9	59.5	61.7	70.7
	23:00	60.9	59.5	61.9	67
	23:15	60.8	59.4	61.7	69.5
	23:30	61.4	59.3	61.6	87.4
	23:45	60.8	59.4	61.9	68.8
18th May 2018	00:00	60.4	59	61.4	70.3
	00:15	60.4	59	61.4	68.3
	00:30	60.1	59	60.9	67.6
	00:45	60.1	58.9	61.1	71
	01:00	59.9	58.8	60.8	65.9
	01:15	60.2	58.8	61.1	69.1
	01:30	59.9	58.5	60.6	70.2
	01:45	59.4	58.3	60.2	67.5
	02:00	59.7	58.5	60.5	68
	02:15	59.3	58.1	60.1	65.8
	02:30	59.1	58	60.1	65.3
	02:45	59	58	59.8	61.8
	03:00	59.2	58	59.8	69.8
	03:15	59.1	58	60.2	64.3
	03:30	59.6	58	60.1	76.6
	03:45	59	57.9	59.8	64.3
	04:00	59.8	58.2	60.4	73.8
	04:15	59.9	58.6	60.6	69.2
	04:30	59.8	58.7	60.6	63.5
	04:45	59.9	58.7	60.7	67.3
	05:00	60.5	59.1	61.4	69.1

Date	Time	LAeq	LA90	LA10	LAFmax
	05:15	61.2	59.6	62.2	70.1
	05:30	61.5	60.1	62.4	67.1
	05:45	61.9	60.6	62.7	72
	06:00	62.9	60.7	63.7	81.7
	06:15	63.6	60.7	64	85.3
	06:30	64.4	61	66	79.8
	06:45	66.3	61.1	66.5	93.1
	07:00	64.8	60.9	66.7	82.5
	07:15	64.2	61	66.5	76.9
	07:30	64.5	60.8	66.9	80.4
	07:45	64.3	60.9	66.9	76.2
	08:00	65.2	60.9	66.6	92.4
	08:15	63.8	60.7	66.7	75.9
	08:30	63.6	60.7	65.2	81.4
	08:45	65.4	61.2	66.7	89.1
	09:00	63.7	61	65.6	79.6
	09:15	62.9	60.6	64.6	76.3
	09:30	64.6	60.8	65.2	88.3
	09:45	65.2	61.8	66.7	82.9

Table B03 Telehouse North - Location 3 Survey Results, dB

Date	Time	LAeq	LA90	LA10	LAFmax
17th May 2018	14:51	71.6	65.5	73.9	83.3
	14:52	72.4	69.5	75.0	78.5
	14:53	71.0	60.7	73.7	81.7
	14:54	73.1	68.7	76.2	80.8
	14:55	74.6	68.0	77.7	85.2
	14:56	71.8	65.2	75.2	80.7
	14:57	70.8	68.9	72.6	77.0
	14:58	71.4	67.5	74.0	82.0
	14:59	72.3	66.5	75.2	80.9
	15:00	71.1	66.0	73.5	78.0
	15:01	67.8	64.5	69.9	74.7
	15:02	70.8	67.6	72.4	76.0
	15:03	77.3	65.5	80.7	90.7
	15:04	72.3	66.4	74.6	76.3
	15:05	72.5	68.0	75.0	78.1
	15:06	72.6	68.0	75.2	82.6

Date	Time	LAeq	LA90	LA10	LAFmax
	15:07	71.3	67.2	73.7	78.9
	15:08	70.0	66.5	72.7	75.3
	15:09	72.5	67.5	76.2	80.4
	15:10	71.3	68.6	73.2	75.1
	15:11	72.1	69.6	74.0	77.1
	15:12	71.7	65.8	73.7	75.4
	15:13	70.0	66.6	72.4	75.1
	15:14	73.7	69.8	76.1	82.6
	15:15	71.3	68.2	73.4	80.1
	15:16	70.0	66.1	72.8	74.5
	15:17	72.2	67.5	74.7	79.1
	15:18	72.6	65.5	75.9	80.3
	15:19	68.8	66.1	70.8	74.9
	15:20	72.0	66.1	73.6	82.2
	15:21	70.2	65.7	73.2	81.1
	15:22	67.2	64.5	69.1	72.8
	15:23	77.2	67.0	80.5	87.1
	15:24	68.2	64.1	71.0	72.7
	15:25	71.1	65.0	74.6	82.2
	15:26	69.3	63.1	72.7	77.0
	15:27	68.2	63.8	68.6	83.0
	15:28	64.9	61.7	67.7	70.5
	15:29	68.0	64.6	70.0	74.2
	15:30	69.4	63.9	72.3	79.3
	15:31	66.3	63.4	68.4	73.7
	15:32	69.3	65.1	72.2	75.8
	15:33	71.6	64.5	74.5	80.1
	15:34	69.2	62.4	72.1	79.8
	15:35	71.3	62.0	74.5	77.4
	15:36	67.9	63.3	69.6	78.1
	15:37	69.9	62.1	73.4	79.3

Table B04 Telehouse North - Location 4 Survey Results, dB

Date	Time	L_{Aeq}	L_{A90}	L_{A10}	L_{AFmax}
17th May 2018	13:51	76.6	71.8	78.5	86.0
	13:52	76.5	70.1	78.6	81.5
	13:53	76.2	72.4	78.1	79.4
	13:54	75.3	72.6	77.0	80.2

Date	Time	L_{Aeq}	L_{A90}	L_{A10}	L_{AFmax}
	13:55	76.1	72.1	77.5	78.7
	13:56	76.7	72.0	79.8	82.3
	13:57	76.6	74.4	78.4	81.7
	13:58	76.6	74.2	78.5	80.3
	13:59	76.8	72.4	78.9	81.2
	14:00	77.0	72.2	80.0	85.1
	14:01	77.1	73.5	79.1	82.8
	14:02	76.1	72.6	78.2	80.3
	14:03	77.5	74.6	79.4	83.1
	14:04	77.3	74.5	79.5	82.4
	14:05	77.2	74.1	79.1	80.8
	14:06	75.7	70.1	77.8	83.0
	14:07	75.5	70.4	78.1	81.6
	14:08	75.3	70.3	78.1	80.7
	14:09	76.1	72.0	78.0	80.5
	14:10	76.2	73.1	78.6	81.8
	14:11	75.7	71.4	77.9	80.7
	14:12	77.8	74.8	79.8	82.5
	14:13	77.5	73.8	79.5	82.4
	14:14	76.3	72.6	78.3	81.6
	14:15	76.3	73.3	78.3	80.8
	14:16	75.7	73.2	77.3	79.6
	14:17	77.1	74.1	79.0	81.7
	14:18	76.7	73.6	79.0	81.9
	14:19	76.4	73.4	78.8	82.3
	14:20	77.1	75.5	78.5	82.6
	14:21	77.1	75.0	78.5	81.4
	14:22	75.2	71.7	77.6	79.8
	14:23	75.9	74.0	77.3	79.2
	14:24	76.1	73.4	77.8	79.7
	14:25	76.6	73.1	78.9	80.5
	14:26	76.4	73.2	78.6	80.8
	14:27	76.6	73.8	78.7	81.6
	14:28	77.3	74.9	78.8	81.2
	14:29	74.9	72.0	76.9	84.7
	14:30	75.7	72.0	78.3	80.1
	14:31	76.2	73.9	78.1	80.3
	14:32	76.1	73.9	78.1	80.4

Date	Time	L_{Aeq}	L_{A90}	L_{A10}	L_{AFmax}
	14:33	76.9	73.8	78.6	81.3
	14:34	76.4	73.2	78.4	81.1
	14:35	76.2	72.9	78.6	80.9
	14:36	77.8	71.6	80.2	88.7
	14:37	75.6	74.1	76.5	77.3
	23:00	75.5	70.9	77.7	80.8
	23:01	75.0	71.8	77.4	79.2
	23:02	77.0	72.1	78.8	83.1
	23:03	74.1	68.8	76.5	79.7
	23:04	76.0	73.3	77.9	80.7
	23:05	74.8	70.2	78.6	80.1
	23:06	74.9	72.7	77.0	79.2
	23:07	72.2	68.3	75.1	76.8
	23:08	74.4	69.1	77.0	78.1
	23:09	75.1	72.1	76.8	78.7
	23:10	73.9	71.4	76.2	78.5
	23:11	75.0	72.0	76.7	79.0
	23:12	73.9	69.9	76.1	78.3
	23:13	74.6	68.7	77.6	80.9
	23:14	75.3	72.3	76.9	78.6
	23:15	74.4	69.0	76.7	80.5
	23:16	75.8	73.1	77.6	80.2
	23:17	75.8	72.1	77.8	80.3
	23:18	76.4	72.4	78.5	82.2
	23:19	75.8	71.6	77.8	84.1
	23:20	76.0	73.4	78.0	80.0
	23:21	74.9	72.4	76.7	78.8
	23:22	76.3	73.1	78.7	80.7
	23:23	75.1	71.5	76.9	81.3
	23:24	75.8	71.4	78.5	79.9
	23:25	74.4	71.0	76.7	78.5
	23:26	74.3	71.9	76.2	79.5
	23:27	74.3	67.3	77.2	83.1
	23:28	74.9	70.5	76.8	79.2
	23:29	75.7	72.5	78.0	80.0
	23:30	74.7	71.0	77.6	80.9
	23:31	74.7	72.1	76.6	80.0
	23:32	74.5	69.5	78.0	79.9

Date	Time	L_{Aeq}	L_{A90}	L_{A10}	L_{AFmax}
	23:33	74.7	70.4	76.9	79.5
	23:34	76.5	74.6	78.0	79.7
	23:35	75.4	72.6	77.6	79.5
	23:36	75.6	71.0	78.1	80.7
	23:37	76.0	70.9	78.1	84.7
	23:38	74.4	68.2	77.5	81.1
	23:39	76.1	72.5	77.6	83.6
	23:40	76.5	71.0	79.3	85.5
	23:41	75.2	70.9	78.3	80.7
	23:42	76.1	73.2	78.4	83.4
	23:43	75.8	72.9	77.9	81.8
	23:44	74.2	70.3	76.1	78.0
	23:45	76.7	72.6	79.2	85.0

Appendix C Telehouse South – Sweco Noise Report (20.05.2022)

Noise Assessment Report

Telehouse Campus Environmental Permit Variation

Telehouse International Corporation of Europe Ltd

SLR Project No.: 410.064698.00001

20 June 2023

TELEHOUSE

black&white engineering

Client	Telehouse International Corporation of Europe Ltd.
Project No.	TSX002
Date	20/05/2022
Revision	00

Telehouse South Main Works

Planning Application

Acoustic Report

May 2022

Acoustic Report

Noise Impact Assessment – Stage 3

Telehouse South Main Works

Main Building and SSB

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12/05/2022
Project Reference: 65202635
Document Reference: TSX002-SWE-ZZ-TS-RP-Y-000010
Revision: 3
Prepared For: Black & white Engineering

Status / Revisions

Rev.	Date	Reason for issue	Prepared		Reviewed		Approved	
P01	23.03.22	S2	MA	21.03.22	JW	21.03.22	JF	23.03.22
P02	08.04.22	S2	MA	08.04.22	JW	08.04.22	JF	08.04.22
P03	12.05.22	S2 – EP variation report	MA	12.05.22	JW	12.05.22	JF	12.05.22

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Appendices

1 Introduction

Sweco UK Ltd has been commissioned by Black and White Engineering to undertake a noise impact assessment at RIBA Stage 3 for the proposed data centre re-development located at 1 Blackwall Way, Paul Julius Cl, London, E14 2EH.

The proposals include the re-development of the existing main building and the SSB, with a partial or full new fitout of Levels 1 to 9M incorporating new supporting infrastructure and services for 6No. Data Centre floors. This will include the removal of existing rooftop plant and the installation of new cooling and ventilation plant.

The main building will be extended up to level 11 to accommodate data halls in levels three to eight. Plant will be located at levels 9, 10 and 11.

In addition to new external plant at the THS building, the SSB building will accommodate the backup power generation for the site. The current backup generation plant is located in the SSB building and on levels 1 and 9 of the main building. The new proposals will replace existing backup generation plant.

The proposals are to be subject to a planning application and therefore, this report contains a noise impact assessment for the current design to inform the client and the design team, and to support a planning application.

The proposals will also require a variation of the existing environmental permit for the existing data centre facilities, and this report is also intended to be submitted to the Environmental Agency (EA) in support of the Environmental Permit application.

The site has been operated previously as a Data Centre. The existing site noise conditions were established by others as part of the due-diligence assessments.

This report presents the acoustic works undertaken for Stage 3 in reference to the control of external building services noise.

This report presents the acoustic planning criteria to be achieved for the development and assess the capability of the proposals to meet the planning targets in terms of noise impact. Where necessary, mitigation measures have been proposed and included in the design to meet the advised criteria.

The noise impact assessment has been undertaken in line with EA guidance. It must be noted that LBTH noise limit requirements at the closest noise sensitive receptors would correspond to no noise or barely audible noise in terms of the EA guidance. On this basis, the LBTH planning noise requirements have been used as the key drivers in the noise assessment.

The assessment presents the impact for the proposed plant in respect of the limits for the site based on a sound survey carried out prior to the Covid-19 outbreak and with the existing data centre operating, in January 2020 by Cundall, and presented in Cundall's "Acoustic Constraints Review" report, Doc. Ref. THTRR-CDL-XX-XX-RP-AS-001 Rev P02 dated 24 June 2020. Further analysis of the sound survey data has

been undertaken and presented in this report following consultation with the London Borough of Tower Hamlets Environmental protection team.

The sound survey data available and presented in Buro Happold's Noise Impact Assessment report for Blackwall Yard, Doc. Ref 0040787 Revision 02 dated 25 August 2020, has also been used to add context.

Whilst every effort has been made to ensure that this Report is easily understood, it is technical in nature; a glossary of terms in Appendix A is included to assist the reader.

2 Assessment Methodology and Criteria

The assessment has been undertaken in accordance with the following references and standards.

- BS4142:2014+A1 Method for Rating and Assessing Industrial and Commercial Sound.
- Local Authority requirements: London Borough of Tower Hamlets
- EA Guidance on noise

2.1 Relevant Guidance - British Standard 4142

BS 4142 sets out a method to assess the likely effect of sound from factories, industrial premises or fixed installations and sources of an industrial nature in commercial premises, on people who might be inside or outside a dwelling or premises used for residential purposes in the vicinity.

The procedure contained in BS 4142 for assessing the effect of sound on residential receptors is to compare the measured or predicted sound level from the source in question, the $L_{Aeq,T}$ 'specific sound level', immediately outside the dwelling with the $L_{A90,T}$ background sound level.

Where the sound contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific sound level to obtain the $L_{Ar,Tr}$ 'rating sound level'. A correction to include consideration of a level of uncertainty in sound measurements, data and calculations can also be applied when necessary. BS 4142 states: "The significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs". An estimation of the impact of the specific sound can be obtained by the difference of the rating sound level and the background sound level and considering the following:

- "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."

For the daytime, the assessment is carried out over a reference time period of one hour, but at night-time it is carried out over a 15-minute period. The periods associated with day or night, for the purposes of the Standard, are considered to be 07.00 to 23.00 and 23.00 to 07.00, respectively.

The Data Center will operate 24/7 and therefore, both night-time and daytime periods have been considered.

It is assumed that the Emergency Plant will be tested during daytime working hours, and therefore the impact has been assessed during the daytime periods. In case of an emergency operation, this has the potential to happen during the daytime and night-time periods and therefore, although this operation is unlikely and will be for short periods of time, the impact of night-time operation has been considered.

2.2 Local Authority Consultation and Requirements

Typical London Borough of Tower Hamlets (LBTH) requirements state that the normal operation of the site should not exceed a level 10 dB below the lowest $L_{A90,\ 15minutes}$.

For the emergency plant operation, which applies to the generators in the SSB building, a relaxed limit of not exceeding the lowest $L_{A90,\ 15minutes}$ would normally apply.

In the event of a power failure all generators will run simultaneously to provide continuous power to the data halls. This scenario will only occur in the very rare case that a power outage occurs. Generators will also be tested, typically on a monthly basis.

A consultation with the LBTH Environmental Protection team has been undertaken, in order to agree methodology and noise limits for the development, due to the fact that the proposed external plant will generally replace existing external plant, and the site has been operating as a Data Centre.

The consultation was undertaken via email and online meeting with Mr. Paul Murphy, Principal Environmental Protection Officer (Noise), on 15 and 16 February 2022.

The assessment methodology proposed included the following aspects:

- The consideration as sensitive receptors of the existing Radisson Blu Edwardian hotel building situated directly to the west of the site, the Ontario Tower residential development located further to the west, and the consented residential development to the east (Blackwall Yard).
- The use of the available data from the baseline sound survey undertaken by Cundall in January 2020 at the site prior to the Covid-19 outbreak for the current assessment.
- The noise assessment to be carried out in accordance with BS4142:2014+A1:2019.
- Based on the character of the proposed re-development of the site, and the replacement of existing plant, the limits for the normal site operations were proposed to not exceed the lowest background levels reported in the January 2020 survey.
- For the backup generator emergency operation, the limits were proposed to not exceed the lowest background levels reported in the January 2020 survey.

During our meeting, Mr. Paul Murph agreed to the use of the available baseline sound survey data for the current assessment. He acknowledged the fact that the site has been operating as a data centre and therefore proposed the use of average $L_{A90,15min}$

as background levels for the daytime and night-time periods instead of the lowest $L_{A90, 15min}$ values for the current assessment.

In relation to the noise limits for the site, it was understood that targeting a sound rating level of 10 dB below the average $L_{A90,15\ min}$ was preferred for the existing and proposed residential receptors in the area, for normal operations.

The worst-case approach methodology for the noise assessment was also discussed in order to provide context.

In relation to the new residential development, the fact that the site was consented accepting a high noise impact from the existing plant was discussed.

The consented development is understood to incorporate into the design mitigations to deal with noise impact from the existing external plant, based on the information supporting Planning Application PA/20/02509.

It was agreed to consider the consented development as a sensitive receptor, although the impact should be assessed considering the context.

It is understood that the applicant for the current re-development has negotiated with Hadley development a noise limit of 58 dB $L_{Aeq\ (free\text{-}field)}$ at Backwall Yard residential building facades from the operation of the data centre building external plant.

3 Site Location and Development Proposals

3.1 Site Description

The site is located at 1 Blackwall Way, Paul Julius Cl, London, E14 2EH. The site is south of Aspen Way and falls within the jurisdiction of The London Borough of Tower Hamlets. The surrounding area is a mixture of commercial and residential developments. The site will also see additional permitted residential properties constructed to the east of the Site.

The site is currently not operational and under construction, although it was previously operating as a Data Centre. The location of the Telehouse building and SSB building and surrounding noise-sensitive land uses are presented in Figure 1 below.

Figure 1: Telehouse building and surrounding land uses, Nearest Noise Sensitive Receptors

The nearest/worst-affected existing noise-sensitive receptors to the Proposed Development are expected to be the residential properties on Ontario Tower and Radisson Blue Hotel to the west. The consented Blackwall Yard residential development is to be located adjacent to the site boundary to the east.

3.2 Proposed Development

The proposals include the re-development of the existing main building and the SSB, with a new fitout of Levels 2 to 8, incorporating new supporting infrastructure and services for 6No. Data Centre floors. This will include the removal of currently operating rooftop plant and installation of new cooling and ventilation plant.

The main building will be extended up to level 11 to accommodate data halls in levels 2 to 8. Plant will be located at levels 9, 10 and 11.

The current building includes external roof rejection plant at level 9M, and other external plant at level 9.

In addition to new external plant at the THS building, the SSB building will accommodate the backup power generation for the site. The current backup generation plant is located at SSB building and at levels 1 and 9 of the main building.

3.2.1 Main Building – THS

The proposals for the heat rejection plant at Level 11 include 14 No Air-Cooled Chillers Flakt 1530kW with attenuation packages.

Additional external plant will be installed, such as three AHUs and 36No outdoor condenser units at Level 10; and two chillers and a Heat Pump at Level 9.

The proposed AHUs will replace the existing provisions.

The locations of the external plant are shown in the images below.

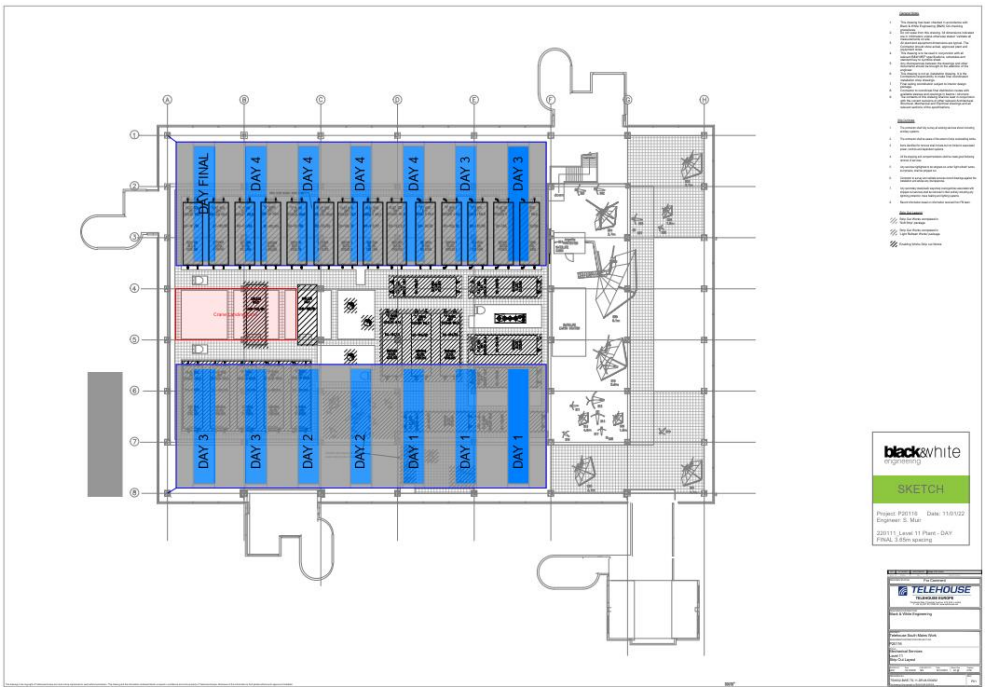


Figure 2: Air Cooled Chillers (14 units) with attenuation packages

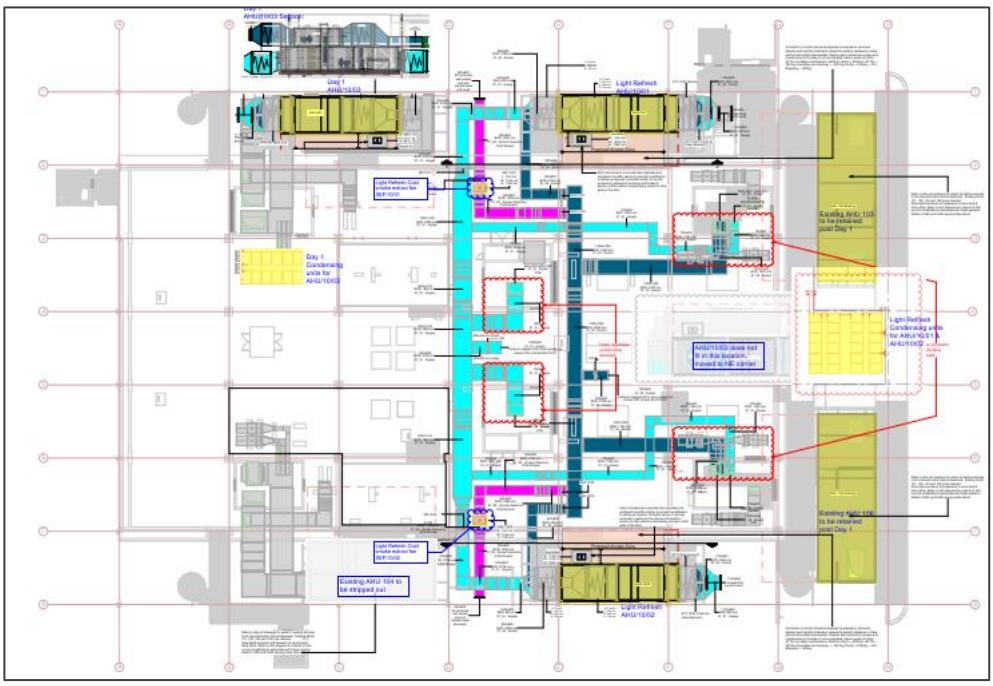


Figure 3: AHUs and Condensers location Level 10

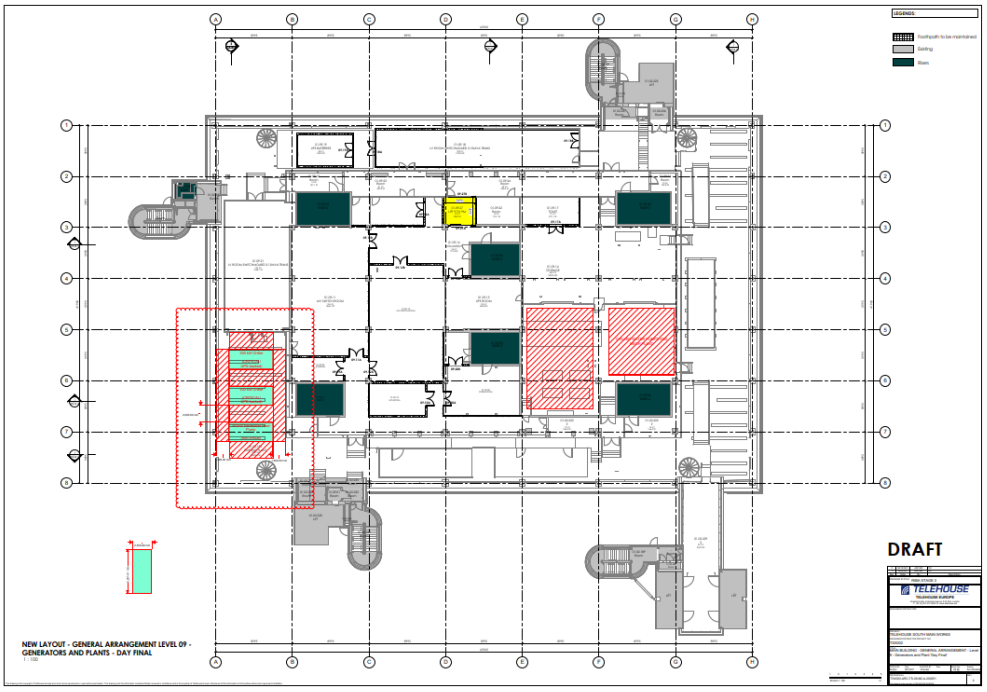


Figure 4: Chillers and Heat Pump location Level 9

3.2.2 SSB

The SSB building will accommodate the backup power generation for the site.

At this stage the proposal for the emergency power generation at the site includes 10no 2.9MW generator sets in acoustic enclosures.

The proposal includes the removal of the existing gensets within the main building.

Each genset will be housed in an acoustic enclosure. Flue stacks will be silenced and will be located at approximately 21.5 metres above local ground level. The unit's ventilation air exhausts will be turned vertically and attenuated with louvres at Level 4. The air intakes will be attenuated and located at each end of the acoustic containers at Level 2. Remote cooling units will be located at Level 4.

The proposals are shown in Figures 5 – 7 below:

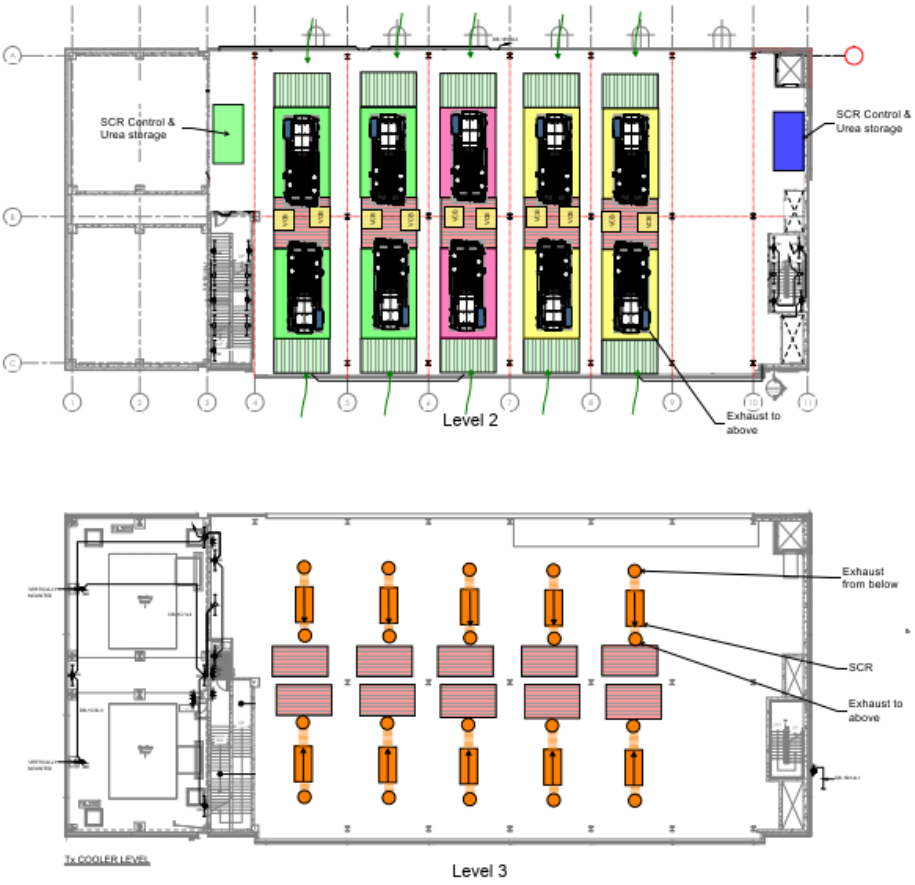


Figure 5: Level 2 and Level 3 SSB

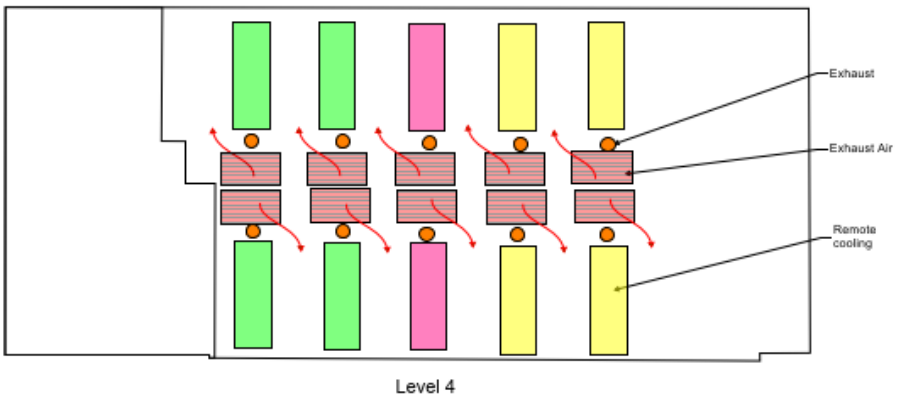


Figure 6: Level 4 SSB

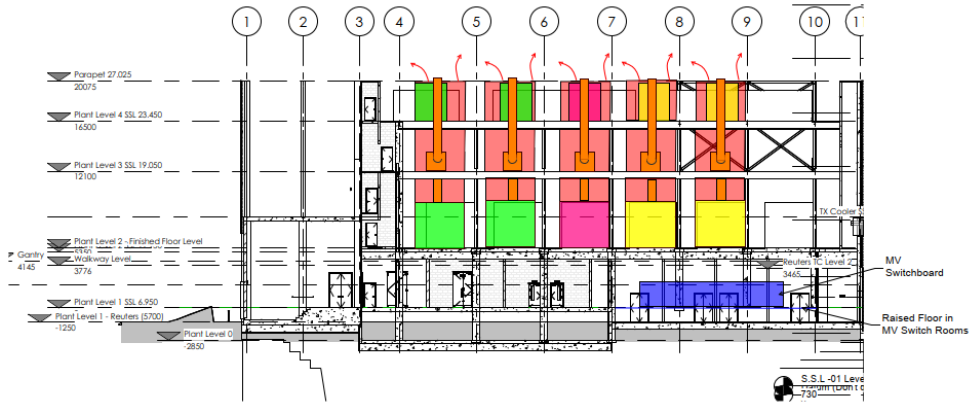


Figure 7: Section SSB

4 Baseline Sound Survey

The results from sound surveys undertaken by Cundall and Buro Happold in January 2020 and May 2019 respectively have been considered in the current assessment. As agreed with LBTH, the data for the survey undertaken by Cundall in January 2020 has been analysed in terms of average $L_{A90,15min}$ to set out the background levels to be considered for the assessment of the proposed development.

The details of the sound surveys can be found in the following reports:

- Cundalls' "Acoustic Constraints Review" report, Doc. Ref. THTRR-CDL-XX-XX-RP-AS-001 Rev P02 dated 24 June 2020.
- Buro Happold's Noise Impact Assessment report for Blackwall Yard, Doc. Ref 0040787 Revision 00 dated 6 October 2020.

A summary of the results presented in the above documents, along with the current analysis of the average $L_{A90,15min}$ for the Cundall Survey, are presented below for the purposes of clarity. Time history graphs for the January 2020 long term survey are provided in Appendix B

4.1 January 2020 Sound Survey

The sound survey was undertaken in January 2020 and included unattended long-term monitoring and short-form attended measurement positions.

The sound levels measured at U1 on Level 9 and used for setting the limits for the development, were reported to be dominated by road traffic, and not affected by noise from the DC plant which was reported as barely audible. The monitoring positions are shown in Figure 15 below.

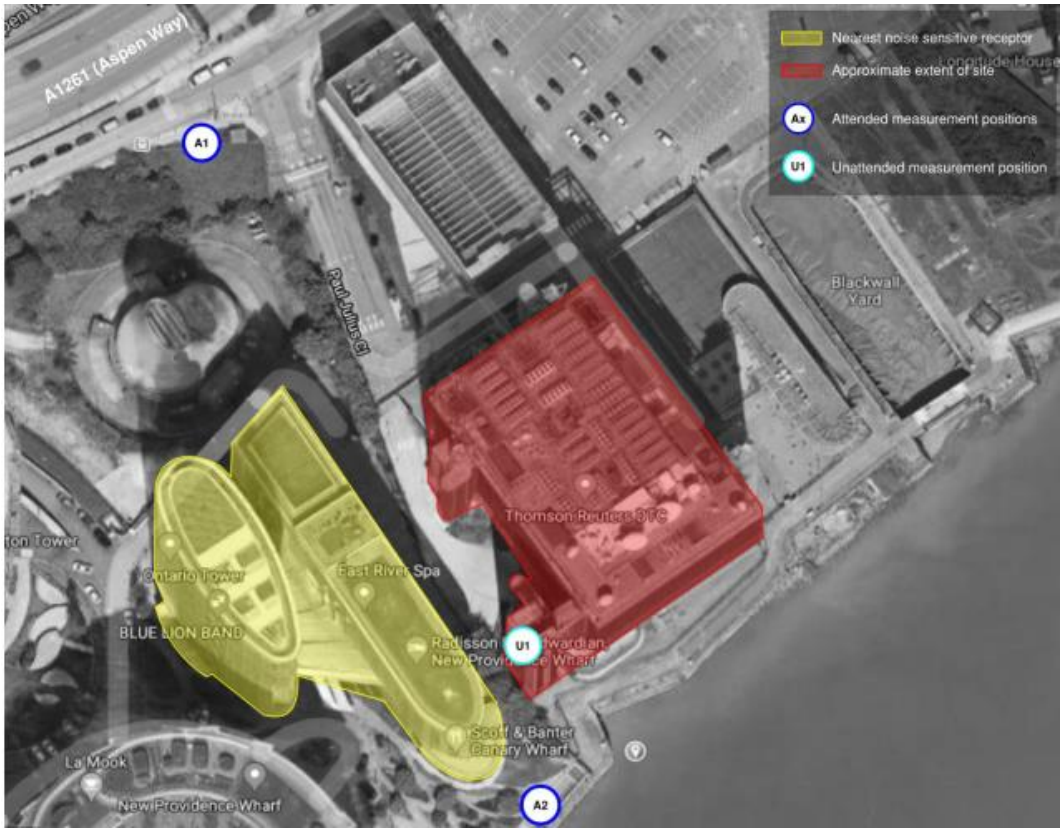


Figure 8: Sound Monitoring Positions U1, A1 and A2 – Cundall Survey – Extracted from Cundall Report

Measurement Position A1 was found to be representative of the noise levels affecting areas closer to Aspen Way, which will be representative of the background sound levels affecting some of the buildings of the new Blackwall Yard development.

The following table provides a summary of the measured noise levels during the survey as reported in the Cundall Report.

Table 1: Summary of Cundall Baseline Survey Results

Measurement Position	Date	*Period	Measurement time, T (hrs)	Lowest background noise level $L_{A90,15min}$ (dB)	Ambient noise level $L_{Aeq,T}$ (dB)
U1	Fri 17 Jan	Day	11.5	58	62
		Night	8	57	59
	Sat 18 Jan	Day	16	59	62
		Night	8	57	61
		Day	16	59	63

Table 1: Summary of Cundall Baseline Survey Results					
Measurement Position	**Date**	***Period**	**Measurement time, T (hrs)**	**Lowest background noise level $L_{A90,15min}$ (dB)**	**Ambient noise level $L_{Aeq,T}$ (dB)**
	Sun 19 Jan	Night	8	56	61
	Mon 20 Jan	Day	16	59	64
		Night	8	53	61
	Tue 21 Jan	Day	3.25	61	65
*Day=07:00 – 23:00 hours, Night=23:00 – 07:00 hours					

Table 2: Summary of Cundall Baseline Survey Results				
Measurement Position	**Measurement start time**	**Measurement duration, T**	**Lowest background noise level $L_{A90,15min}$ (dB)**	**Ambient noise level $L_{Aeq,T}$ (dB)**
A1	11:45	30 min	71	73
A2	12:40	1 hr	55	61

The average background levels extracted from the previous sound survey at the site, and agreed to be used as the background levels for the proposed development are as follows:

Table 3: Average Background Levels		
Period	**Location**	**Average background noise level $L_{A90,15min}$ (dB)**
Daytime (07:00 – 23:00)	Hotel and proposed residential development	60
Night-time (23:00 – 07:00)		58

4.2 May 2019 Sound Survey

The sound survey was undertaken in May 2019. The monitoring positions are shown in Figure 9 below.

The results for the long-term monitoring position 3 undertaken for 7 days are deemed to be representative of the sound levels affecting some of the buildings of the new Blackwall Yard development, closer to Aspen Way.

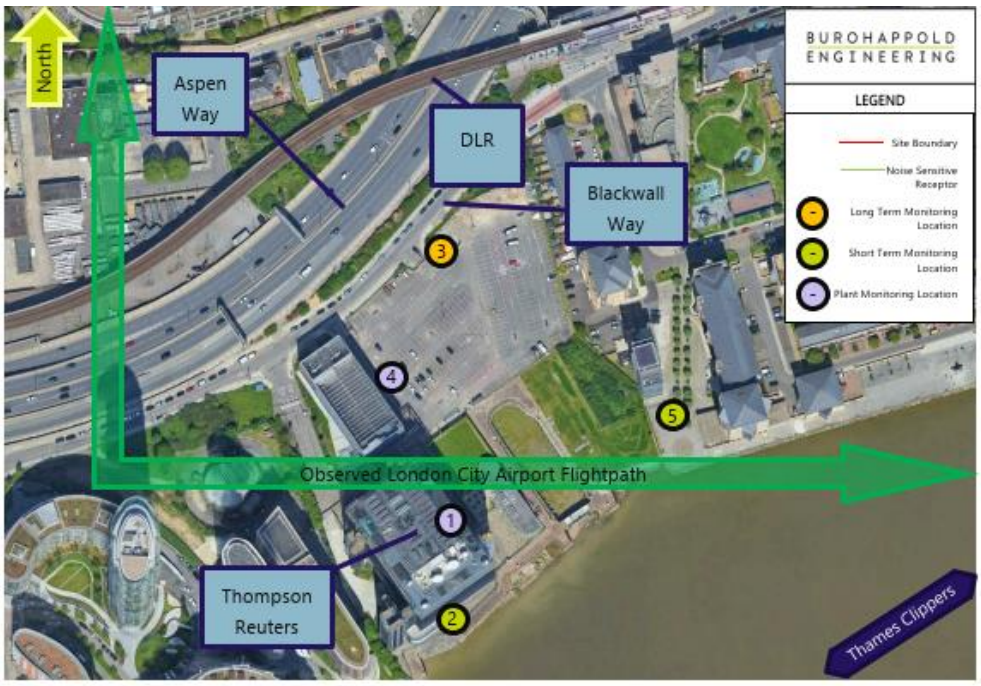


Figure 9: Sound Monitoring Positions– Buro Happold Survey – Extracted from Buro Happold Report

The reported background levels at position 3 are 61 dB $L_{A90,T}$ during the night-time periods. No information is provided for the daytime.

4.3 Background Levels Used for the Current Assessment

Based on the results of the surveys presented above, the following background levels have been used for the assessment of the proposed development.

The background sound levels have been selected allowing for a robust worst-case scenario, while considering the differences in noise levels within the site and the surrounding noise-sensitive receptors, depending on the distance to main roads.

The average $L_{A90,15\ min}$ measured form the Cundall Survey will be used as the background level for the existing receptors and the new residential buildings closer to the river at Blackwall Yard Development (Plot 4). For the new proposed buildings closer to Aspen Way (Plot 1.1), the background levels measured during the night-time will be adopted as the background sound level for the assessment. It should be noted that the levels measured by Cundall during the daytime close to Aspen Way are well above, however the measurement duration is only of 30 min, and could be only representative of the levels during the central hours of the day.

Table 4: Summary of Baseline Background levels adopted for each receptor

Position	Period (T)	$L_{A90,15min}$ (dB)
NSR1 Radisson Blue Hotel	Daytime (07:00 – 23:00)	60
	Night-time (23:00 – 07:00)	58

Table 4: Summary of Baseline Background levels adopted for each receptor		
Position	**Period (T)**	**$L_{A90,15min}$ (dB)**
NSR2 Ontario Tower	Daytime (07:00 – 23:00)	60
	Night-time (23:00 – 07:00)	58
NSR3 Blackwall Yard Development Plot 4 (South)	Daytime (07:00 – 23:00)	60
	Night-time (23:00 – 07:00)	58
NSR4 Blackwall Yard Development Plot 1.1 (North)	Daytime (07:00 – 23:00)	61
	Night-time (23:00 – 07:00)	61

5 Sound Predictions and Assessment

Normal and emergency operating external plant noise emissions are to be controlled to meet the requirements of London Borough of Tower Hamlets when assessed in accordance with BS4142:2014.

The limits would apply to the total noise emission levels from all static plant and processes within the proposed development. Individual plant items will need to be designed to a lower limit such that the overall total level achieves the stated criteria above.

5.1 Proposed Plant Main Building Levels 9, 10 and 11

As presented in Section 3, the re-development of the Main Building includes the removal of existing heat rejection plant and ventilation plant and the installation of new units, which will include mitigation measures and will replace the existing external plant.

The proposals for the heat rejection plant at Level 11 include 14 No Air-Cooled Chillers Flakt 1530kW with attenuation packages.

Additional external plant will be installed, such as three AHUs and 36No outdoor condenser units at Level 10; and two chillers and a Heat Pump at Level 9. As stated above, the proposed AHUs will replace the existing provisions.

The location of the external plant is shown in Figures 2 to 4 in Section 3.

The noise data provided by the manufacturers and used in the assessment are presented in sections below.

5.1.1 Heat rejection Plant Level 11

For the 14 No Air-Cooled Chillers the manufacturer has provided the below sound power levels corresponding to operation at external temperatures of 45°C and 42°C. The second has been used for the night-time operation.

Table 5: Heat Rejection Plant Level 11 – without attenuation

Description	Octave Band Data (dB) at Centre Frequency (Hz) - PWL								Global dB(A)
	63	125	250	500	1000	2000	4000	8000	
Air Cooled Chillers Flakt 1530kW - 45°C operation	113	103	92	96	105	89	84	78	106
Air Cooled Chillers Flakt 1530kW - 42°C operation	109	99	88	92	101	85	80	74	102

The noise data correspond to operation at full fan speed for extreme ambient temperatures of 45°C during the day and at reduced fan speed for ambient temperatures of 42°C during the night, which represent a worst case and the operation with extremely hot ambient conditions. It is therefore very likely that during most of the

year the plant will operate at lower loads with lower ambient temperatures. This reflects the worst-case scenario assessed.

In order to mitigate the noise impact from the chillers, attenuation packages will be used, including attenuators for the air inlet and discharge as shown in the sketch below.

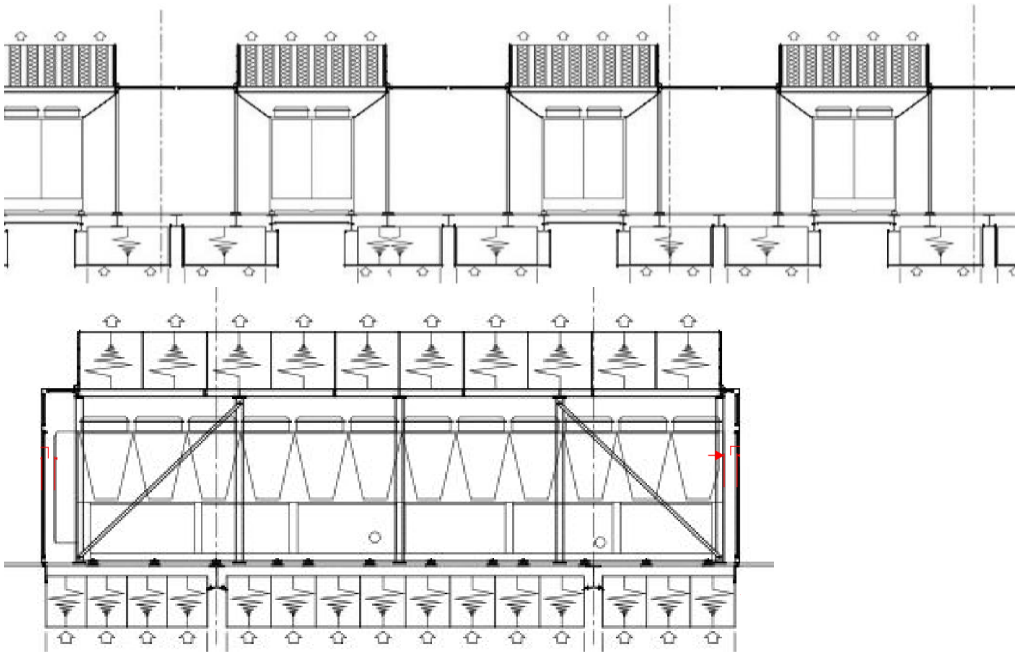


Figure 10: Air-Cooled Chillers Attenuation package sketch - sections

The following table presents the sound power levels for the attenuated air-cooled chillers, based on the data provided by the manufacturer, and used in the assessment.

Table 6: Heat Rejection Plant Level 11 – with attenuation packages

Description	Octave Band Data (dB) at Centre Frequency (Hz) - PWL								Global dB(A)
	63	125	250	500	1000	2000	4000	8000	
Air Cooled Chillers Flakt 1530kW - 45°C operation + attenuation package	104	87	71	69	73	62	62	61	80
Air Cooled Chillers Flakt 1530kW - 42°C operation + attenuation package	100	83	67	65	69	58	58	57	76

5.1.2 Internal Noise Break out

Internal noise levels within the data halls have the potential to be high, and therefore noise breakout through the building envelope must be considered when predicting the total emissions at the nearest noise sensitive receptors.

To undertake this prediction, assumptions must be made at this stage with regards to the internal noise level that will occur. Noise data and frequency spectrums have been based on historical measurements at comparable facilities. The assumed noise levels are presented in Table 7.

Table 7: Data Halls Internal Sound Levels

Description	Octave Band Data (dB) at Centre Frequency (Hz) - PWL								Global dB(A)
	63	125	250	500	1000	2000	4000	8000	
Data Halls Internal Reverberant Levels	68	68	77	77	76	72	70	63	80

The noise breakout from the office block and other minor plant/network rooms is considered negligible.

The existing façade comprises metal panels at the lower levels (up to Level 4) and curtain walling on the upper levels (Levels 5 to 8). For the data halls, in addition to the external wall metal panelling and curtain walling system, the proposals include an internal 150mm white wall system for levels 4 to 8.

Based on the assumed noise data within the data halls minimum sound reduction index for these building elements are presented in Table 8. These sound reduction performances have been considered in the assessment and are understood to be achievable by the proposed constructions.

Table 8: MINIMUM SOUND REDUCTION REQUIREMENT – EXTERNAL WALLS

Element Type	Location	Insertion Loss (dB) at Octave Band Centre Frequency (Hz)								
		63	125	250	500	1k	2k	4k	8k	Total R_w
External Wall	Metal Panel	12	15	19	23	24	22	32	30	24
	Metal Panel & Data Halls Internal Lining	23	27	31	35	35	33	41	40	35
	Curtain Wall & Data Halls Internal Lining	23	25	24	35	46	50	68	60	39

It is understood that data halls internal white wall will be 150mm Euroclad Firemaster Wall or similar. Based on the manufacturer's data provided, this would achieve a sound reduction performance of 33 dB R_w.

The metal panel performances used are typical values assumed at this Stage and will need to be confirmed as the design progresses, although it is deemed to be sufficient for planning purposes.

The minimum sound reduction estimated for the curtain glazing and the white wall lining has been estimated and assumed for this assessment as presented above.

The above sound reduction requirements are based on typical performances for these types of elements and estimations based the information provided at this Stage.

The performance of the above systems has been assessed as capable of controlling noise break-out from the data halls, assuming a maximum internal reverberant noise level of 80 dB $L_{p,rev}$.

5.1.3 External Plant Level 9

The proposals include the installation of two chillers and one Air source Heat Pump at Level 9, to be located in the northwest corner of the building.

Based on the data provided by the manufacturer, each of these units will include compressor acoustic boxes and a level of fan speed reduction. Although, operation at night is likely to be lower, the assessment considers 24/7 operation at full load, to allow for a worst-case scenario.

The sound power levels provided by the plant manufacturer are presented in table below.

Table 9: Chillers Level 9 – with compressors acoustic boxes

Description	Octave Band Data (dB) at Centre Frequency (Hz) - PWL								Global dB(A)
	63	125	250	500	1000	2000	4000	8000	
Chillers Flakt 300kW	64	69	78	80	83	80	72	63	86

5.1.4 External Plant Level 10

As part of the refreshment works undertaken at the building, it is understood that 3No AHUs will be installed at Level 10, to replace existing plant.

These AHUs will have associated 36No external condensers located at the same level, 12 of them associated with each AHU. As advised by the M&E engineers' team, these AHUs are arranged in N+1 operation, and therefore two out of three would operate simultaneously, along with their associated external condenser units.

The noise levels for the selected plant and the attenuators included in the design are presented below, as provided by the manufacturer.

Table 10: Level 10 External Plant										
Element	**Model / Type**		**Octave Band Data (dB) at Centre Frequency (Hz) - PWL**							**Global dB(A)**
			63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
AHU/10/01 & AHU/10/02 & AHU/10/03	Daikin	Exhaust	81	81	91	87	86	81	78	78	91
		Intake	75	84	83	78	80	78	74	71	85
Condenser units	Daikin	RYMQ10U	87	81	79	78	71	71	68	61	79
		RYMQ12U	90	85	83	81	76	74	75	68	83

Table 11: AHUs Attenuator Insertion Losses									
Element	**Model / Type**	**Insertion Loss (dB) at Octave Band Centre Frequency (Hz)**							
		63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**
AHUs attenuators	SP2048 / Exhaust	7	14	25	40	51	42	36	22
	SP2048 / Intake	7	14	25	40	51	42	36	22

Noise emissions of each condenser unit will need to be attenuated by 2 dB, based on our calculations, with a maximum sound power level of 77 and 81 respectively.

The above levels for the condenser units are based on the cooling mode which is worst case. The levels reported by the manufacturer in heating mode range between 14 and 18 dB less. Each AHU has associated 12No condenser units, six of each type. It has been considered that the plant will operate 24/7, although it's likely that night-time operation might be lower.

Based on the noise model, the closest receptors will be more affected by condenser units associated with AHU/10/01 and AHU/10/02 located at the south of the building. Therefore, the noise impact assessment assumes the simultaneous operation of these two AHUs, in line with the worst-case approach followed.

5.2 Proposed Generators and Acoustic Mitigations – SSB Plant

The current proposals include 10No 2.9MW generators to be located within acoustic enclosures with sufficient sound reduction. Based on the high-level information provided at this stage, it has been assumed that the following mitigation measures will be applied to the design:

- Each generator enclosure will be designed for a maximum breakout of 65 dBA at 1 metre.
- Each generator exhaust flue will be mitigated using silencers to a maximum sound pressure level of 65 dBA at 1 metre.
- Air intakes will be mitigated using attenuators to a maximum sound pressure level of 75 dBA at 1 metre.

- Air exhausts will be mitigated using attenuators to a maximum sound pressure level of 70 dBA at 1 metre.
- Cooling Units at level 4 will have a maximum sound power level of 85 dBA.

At this stage, there is no available information on the proposed plant noise data and therefore, to undertake the noise predictions, the above mitigation measures have been applied and generator noise data from the Sweco library for comparable plant has been used. Data provided for enclosures and plant dimensions have been used at this stage.

Predictions have been carried out with the information available at this stage. Where information is not available, assumptions have been made based on professional judgement.

The attenuation required to limit noise emissions to the levels above is extensive although feasible based on discussions with the design team. The design and attenuation requirements will need to be confirmed by the gensets' provider.

The generators will be subject to regular testing. A typical test regime for each generator would be monthly.

The emergency condition includes for all generators running at full capacity. This will only occur if there is a power outage is therefore not considered under normal operating conditions.

5.3 Noise Modelling

To assess the impact of noise from the proposals, the likely specific noise level from the most significant sources of noise associated with the SSB at this stage has been predicted at the nearest noise-sensitive receptors. Predictions have been carried out in the noise-modelling suite Cadna/A, in accordance with the ISO 9613 prediction methodology.

The model considers the effects of ground absorption, atmospheric absorption, and acoustic reflections, as well as applying a light downwind correction to consider a typical worst-case downwind situation. In terms of ground absorption, the intervening ground between the sources and receivers has been modelled as hard, which is considered suitable considering the site and surrounding areas. A maximum 2 orders of reflection have been considered in the model.

The current assessment has been carried out based on the information and the assumptions presented above.

Views of the 3D noise model are presented in figures below.

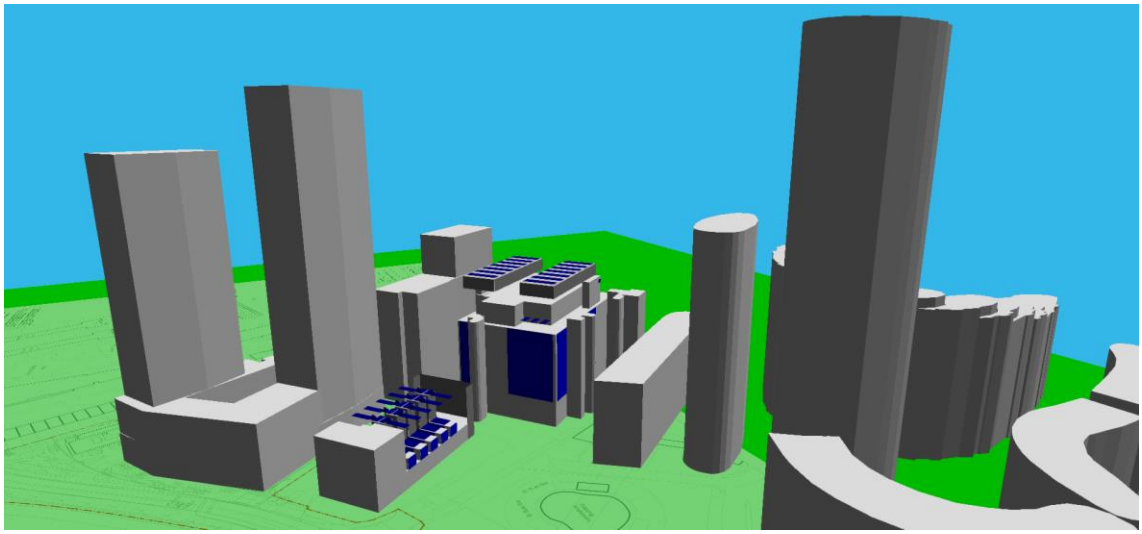


Figure 11: Image of the Nosie model – North-west view

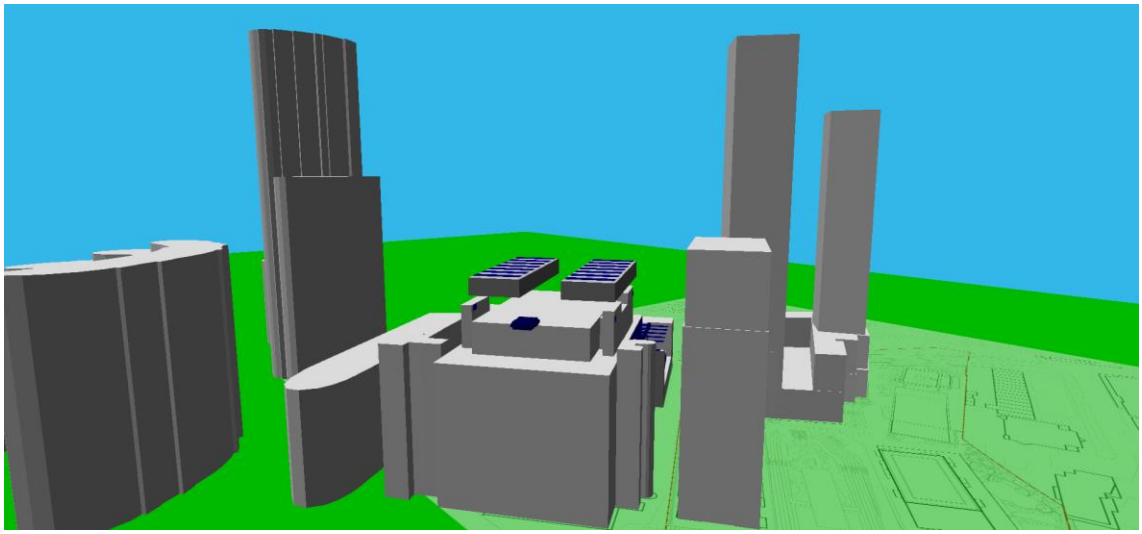


Figure 12: Image of the Nosie model – South-east view

5.4 Main Building Operation

The assessment assumes that all the plant at level 9, 10 and 11 will operate simultaneously during the 24 hours, except for one AHU and associated condensers as explained above. The proposals are assessed operating at 100% load for high external temperatures, which is considered a worst-case approach.

BS4142:2014 advises that when the noise contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific noise level to obtain the $L_{Ar,Tr}$ 'rating noise level'.

Based on the data provided by the manufacturers above, the mitigations included in the design and the continuous operating profile of the site no penalties are considered necessary for intermittency, tonality or impulsivity of the sound arising from the external plant in the Main Building.

At this stage, information in 1/3 octave bands for the plant has not been provided, and therefore a full tonality assessment cannot be undertaken; however, observing the noise data provided and the attenuation included, it is deemed that the plant proposed is not likely to present a tone, and on review of the predicted levels at the receptors locations, which will be well below the background levels in the area, then we can conclude that a tone is very unlikely to be perceptible at the receptors location.

The plant proposed does not have an impulsive noise character and will be operating continuously, and therefore penalties for this character of noise are not deemed necessary.

Noise mitigation measures have been included in the design in form of:

- extensive attenuation packages for the heat rejection plant on level 11,
- Compressor acoustic boxes and a level of fan speed reduction for the chillers at Level 9
- Attenuators for the AHUs and limited maximum sound levels for external condensers,

All the mitigation measures included in the design demonstrate the use of BAT (Best Available Techniques) to minimise polluting noise emissions.

The table below present the predicted sound rating levels at the closest Noise-Sensitive Receptors (NSRs) in the area and compares them against the limits based on the lowest background levels measured during the sound survey, and previous site limits. The assessment has been carried out for the daytime and night-time period.

Table 12: Assessment of Noise Impact on Noise Sensitive Receptors

Location of closest Sensitive Receptor	Period	Rating Sound Level $L_{Ar,Tr}$ (dB)	Background Sound Level $L_{A90,15min}$ (dB	Excess of $L_{Ar,Tr}$ above Target Limit (dB) for planning	Noise Levels Reported in planning application PA/20/02509 Noise Assessment (dBA)	Significance
NSR1 Radisson Blue Hotel	Daytime (07:00-23:00)	48	60	-2	-	No Impact
	Night-time (23:00-07:00)	48	58	+0	-	No Impact
NSR2 Ontario Tower	Daytime (07:00-23:00)	48	60	-2	-	No Impact

	Night-time (23:00-07:00)	47	58	-1	-	No Impact
NSR3 Blackwall Yard Development	Daytime (07:00-23:00)	52	60	+2	-	Low Adverse Noise Impact
	Night-time (23:00-07:00)	51	58	+3	-	Low Adverse Noise Impact
Data Centre Building East Boundary	Daytime (07:00-23:00)	<60	-	-	82	Very Significant reduction in noise impact from the Data Centre to the future residential properties

The rating sound levels from the development are predicted to be well below the average background levels in the area, and therefore is predicted to have no impact or a low adverse noise impact at the nearest receptors to the site.

The plant operation would comply with the limits agreed during consultation with LBTH Environmental Protection Team at existing noise sensitive receptors to the west of the site.

The LBTH limits will be slightly exceeded for the future receptors NSR3. However, this noise impact should be considered in context. A comparison of the noise levels from the current existing plant reported in planning application PA/20/02509, and the predicted level from the proposed development is presented in the table above.

Based on the reviewed information available from Backwall Yard development planning application PA/20/02509 (Buro Happold report ref. 004787 dated 6 October 2020) the operational noise from the existing plant was reported as 82 dBA for full load operation of the existing chillers on the eastern side of the roof, and the impact at future residential receptors was predicted as significant.

It is clear that the re-development of the data centre site will reduce the noise impact at the future residential receptors to the east and therefore will be beneficial in terms of improving the noise conditions in the area.

It is also understood that the consented development was the ‘agent of change’ (as introduced in the National Planning Policy Framework) when the planning application was submitted and that this requires that the new residential development does not place in ‘unreasonable restrictions’ on existing businesses (the existing data centre building) and therefore the proposed new residential development should include ‘suitable mitigation’ for the currently existing external plant.

It should be also considered that the operational noise for the proposed development will be comfortably below the limit of 58 dB L_{Aeq} (free-field) at Blackwall Yard buildings façades, agreed between the applicant and Hadley developments.

In relation to the ambient noise levels measured during the survey, the sound from the new plant operation will be well below the ambient noise levels measured, and therefore is very unlikely to be audible.

Based on all the context above, the predicted impact at the future residential receptors to the east is deemed acceptable from a planning perspective.

In relation to EA guidance on noise, the use of BAT has been demonstrated. The outcome of the assessment at the noise-sensitive receptors shows that the noise impact will be well below the background sound levels in the area, and therefore the level of noise from the building operation will be classified as no noise, barely audible or detectable in terms of the EA guidance.

A noise map at 55 m height above ground (worst-case) for the operation of the external plant is shown in the image below:

Figure 13: Noise Map at 55 metres – Main Building Plant - Daytime

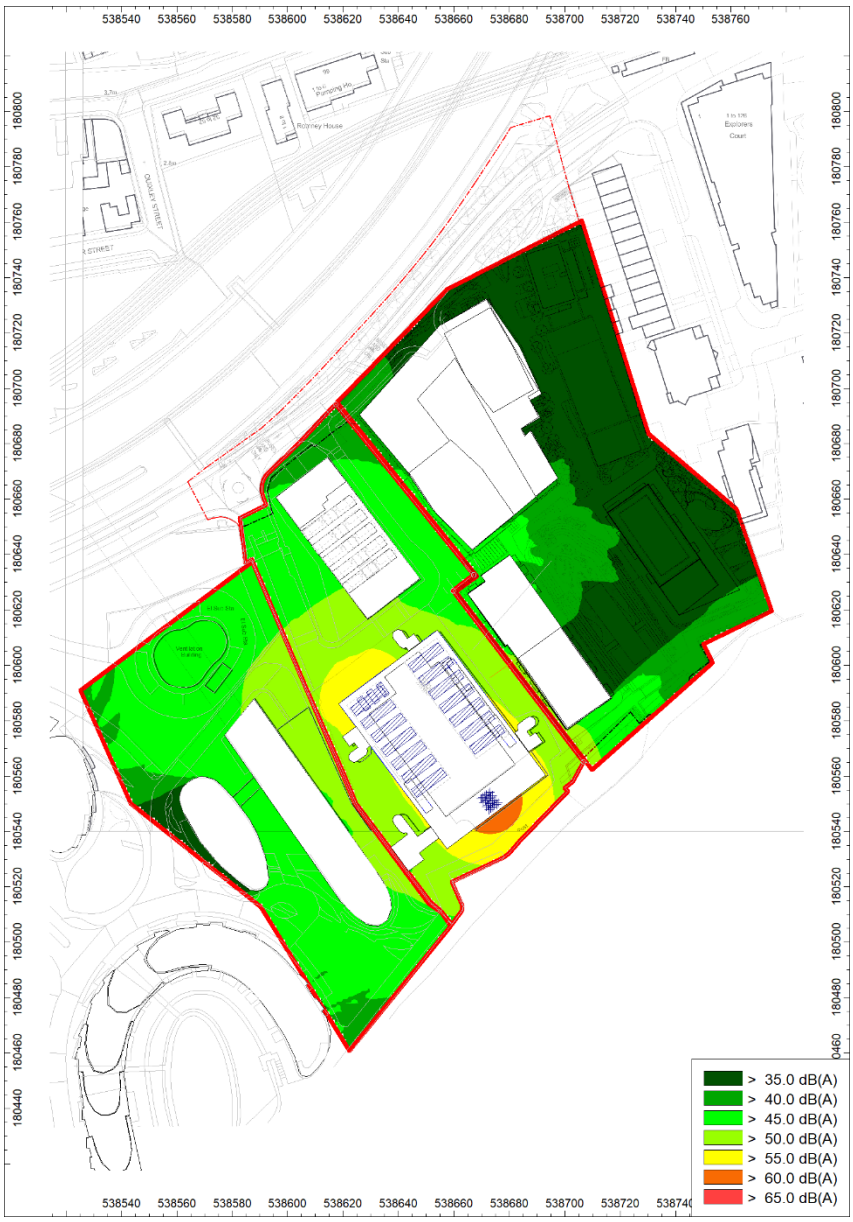


Figure 14: Noise Map at 55 metres – Main Building Plant – Night-time

5.5 SSB Emergency Operation (Power Outage and Testing)

The predictions for the emergency generators have been carried out for the proposed generators in the SSB. It should be noted that the predictions presented below only take into account the SSB plant.

The cumulative operation of the Main building external plant has been considered, and due the low impact of the main building external plant, the cumulative impacts are generally in line with the impact from the SSB generators, and in any case will not exceed the background levels at any receptor.

It has been assumed that all the plant will operate simultaneously during the daytime, as the testing regime will take place during the normal working hours. The night-time impact has also been considered although this scenario will be unlikely or of a short duration.

BS4142:2014 advises that when the noise contains a tonality, impulsivity, intermittency and other sound characteristics, then a correction depending on the grade of the aforementioned characteristics of the sound is added to the specific noise level to obtain the $L_{Ar,Tr}$ 'rating noise level'.

Based on the noise data assumed and the likely short-term operation for this plant, no penalties are considered necessary for intermittency, tonality or impulsivity of the sound arising from the SSB plant at this stage.

The table below presents the predicted sound rating levels at the closest Noise-Sensitive Receptors (NSRs) in the area and compares them against the limits based on the average background levels measured during the sound survey.

Predictions are subject to the supplier meeting the assumed levels in Section 5.2. It must be noted that there is no detailed information available at this stage, and that modelling is advised to be reviewed at further design when the plant has been selected to evaluate the final impact. However, this is considered sufficient for planning stage as the assumptions are based on historical data for comparable facilities

Table 13: Assessment of Noise Impact on Noise Sensitive Receptors – SSB Gensets

Location of closest Sensitive Receptor	Period	Rating Sound Level $L_{Ar,Tr}$ (dB)*	Background Sound Level $L_{A90,15min}$ (dB)	Excess of $L_{Ar,Tr}$ above Target Limit (dB) for planning	Significance
NSR1 Radisson Blue Hotel	Daytime (07:00-23:00)	55	60	-5	Low Adverse Noise Impact
	Night-time (23:00 – 07:00)	55	58	-3	Low Adverse Noise Impact
NSR2 Ontario Tower	Daytime (07:00-23:00)	51	60	-9	Low Adverse Noise Impact
	Night-time (23:00 – 07:00)	51	58	-7	Low Adverse Noise Impact
NSR3 Blackwall Yard Development Plot 4 (South)	Daytime (07:00-23:00)	57	60	-3	Low Adverse Noise Impact
	Night-time (23:00 – 07:00)	57	58	-1	Low Adverse Noise Impact

NSR4 Blackwall Yard Development Plot 1.1 (North)	Daytime (07:00-23:00)	61	>61	<0	Low Adverse Noise Impact
	Night-time (23:00 – 07:00)	61	61	+0	Low Adverse Noise Impact

The rating sound levels from the operation of the generators are not predicted to exceed the background levels in the area, and therefore are predicted to have a low impact at the nearest receptors to the site.

The background levels during the daytime periods at the proposed Blackwall Yard residential building to the north (Plot 1.1) will be higher than the 61 dBA measured during the night, and therefore it is clear that the generator operation will have a low adverse impact at the future residential receptors in the area.

It must be also noted that based on the sound survey results reported in the planning report for Blackwall Yard development (Buro Happold's Noise Impact Assessment report for Blackwall Yard, Doc. Ref 0040787 Revision 00 dated 6 October 2020) and undertaken during maintenance testing of the existing generators, the noise from the generators at 10 metres distance from the exhausts was between 63-64 dBA. The predicted worst case noise levels at the site boundary for the current proposals are 64 dBA and therefore, it can be concluded that the new proposals will not increase the ambient noise levels in relation to the current existing emergency power generation plant.

In relation to EA guidance on noise, the use of BAT for the backup generators has been demonstrated by means of high-performance attenuation packages for the generator enclosures, the ventilation and the silencers for the exhaust stacks. The outcome of the assessment at the noise-sensitive receptors shows that the noise levels will be below the background sound levels in the area, and therefore the level of noise from the proposal's operation will be barely audible or detectable in terms of EA guidance.

A noise map at 21 m height above ground (worst-case) for the operation of the emergency power generation plant is shown in the image below:

Figure 15: Noise Map at 21 metres – SSB Power Generation Plant

6 Conclusion

Sweco UK has been commissioned by Black and White Engineering to undertake a noise assessment at RIBA Stage 3 for the proposed data centre re-development located at 1 Blackwall Way, Paul Julius Cl, London, E14 2EH.

The scheme is being designed to meet the noise limit agreed during consultation with the LBTH Environmental Protection Team, and extensive noise mitigation measures have been included in the design.

Noise predictions have been carried out in the noise-modelling suite Cadna/A, in accordance with the ISO 9613 prediction methodology. The predicted noise levels at the nearest noise-sensitive receptors have then been assessed against the limits proposed by London Borough of Tower Hamlets for a planning application.

The limits are based on baseline sound surveys undertaken for previous assessments in January 2020 and May 2019.

The existing site noise conditions were established by others as part of the due-diligence assessments. The results from the baseline sound survey undertaken in January 2020 are presented in this report.

Noise data available from Backwall Yard development planning application PA/20/02509 has been used to add context to the predicted impacts at the future residential building to the east of the site.

The outcomes of the assessment identify that the proposed development is acceptable from a noise perspective, providing that plant is suitably selected and attenuated as per presented in this report.

The use of BAT has been demonstrated. The outcome of the assessment at the noise-sensitive receptors shows that the plant noise levels will be well below or below the background sound levels at the receptors, and therefore the level of noise from the proposal’s operation will be barely audible or detectable in terms of EA guidance.

Appendix A – Glossary of Acoustic Terminology

Sound is the vibration of particles in a medium, such as air, which may be detected by the human ear. This sound is defined as noise when it is audible and unwanted or undesirable to a listener.

The vibration, or oscillation, of particles about an equilibrium position results in local pressure fluctuations from the normal pressure. These local pressure fluctuations are described as sound pressure, and the number of oscillations per second is described as the frequency.

The human ear responds to an incredibly large range of sound pressure, from 0.00002 Pa to 200 Pa, and the perceived loudness is proportional to the logarithm of the sound pressure squared. For this reason, sound is measured in terms of a logarithmic parameter, the sound pressure level, to approximate the response of the ear. Sound pressure levels are quantified in decibels (dB) relative to the threshold of hearing.

The human ear responds to a wide range of sound frequencies, from the lowest perceptible bass note, around 20 Hz, to the highest perceptible treble note, around 20,000 Hz. The ear does not respond equally to each frequency - the ear is most sensitive to sound within the mid-frequency range of around 600 to 8000 Hz.

The response of the ear to each frequency also varies with the sound pressure level. For very loud sounds the difference in perceived loudness between each frequency is less pronounced than for low level sound.

Acousticians measure sound pressure levels using sound level meters, which incorporate a microphone.

A sound level meter approximates the response of the human ear to sound by using frequency filters. For typical environment sounds, the A-weighting filter is used to approximate the response of the ear at typical sound pressure levels. The sound pressure level, adjusted to approximate the response of the ear, is then quantified in A-weighted decibels, dB(A).

In a typical environment, the A-weighted sound pressure level will vary with time. For this reason, acousticians use statistical measurement parameters to describe the sound environment. The most common measurement parameters are as follows:

- dB $L_{Aeq,T}$: Equivalent continuous A-weighted sound pressure level - This is the energy-average sound pressure level during a measurement period, T.
- dB $L_{AFmax,T}$: Maximum A-weighted sound pressure level - This is the maximum sound pressure level during a measurement period, T, and measured in a way that approximates the time-response of the ear.
- dB $L_{A90,T}$: 90th percentile A-weighted sound pressure level - This is the sound pressure level exceeded for 90% of the measurement period, T, commonly used to quantify the background sound level.

The sound pressure level in typical environments are presented in Table A1.

Further definitions of acoustic parameters are presented in Table A2.

TABLE A1 – TYPICAL SOUND LEVELS FOUND IN THE ENVIRONMENT

Sound Level	Location
0dB(A)	Threshold of hearing
20 to 30dB(A)	Quiet bedroom at night
30 to 40dB(A)	Living room during the day
40 to 50dB(A)	Typical office
50 to 60dB(A)	Inside a car
60 to 70dB(A)	Typical high street
70 to 90dB(A)	Inside factory
100 to 110dB(A)	Burglar alarm at 1m away
110 to 130dB(A)	Jet aircraft on take off
140dB(A)	Threshold of Pain

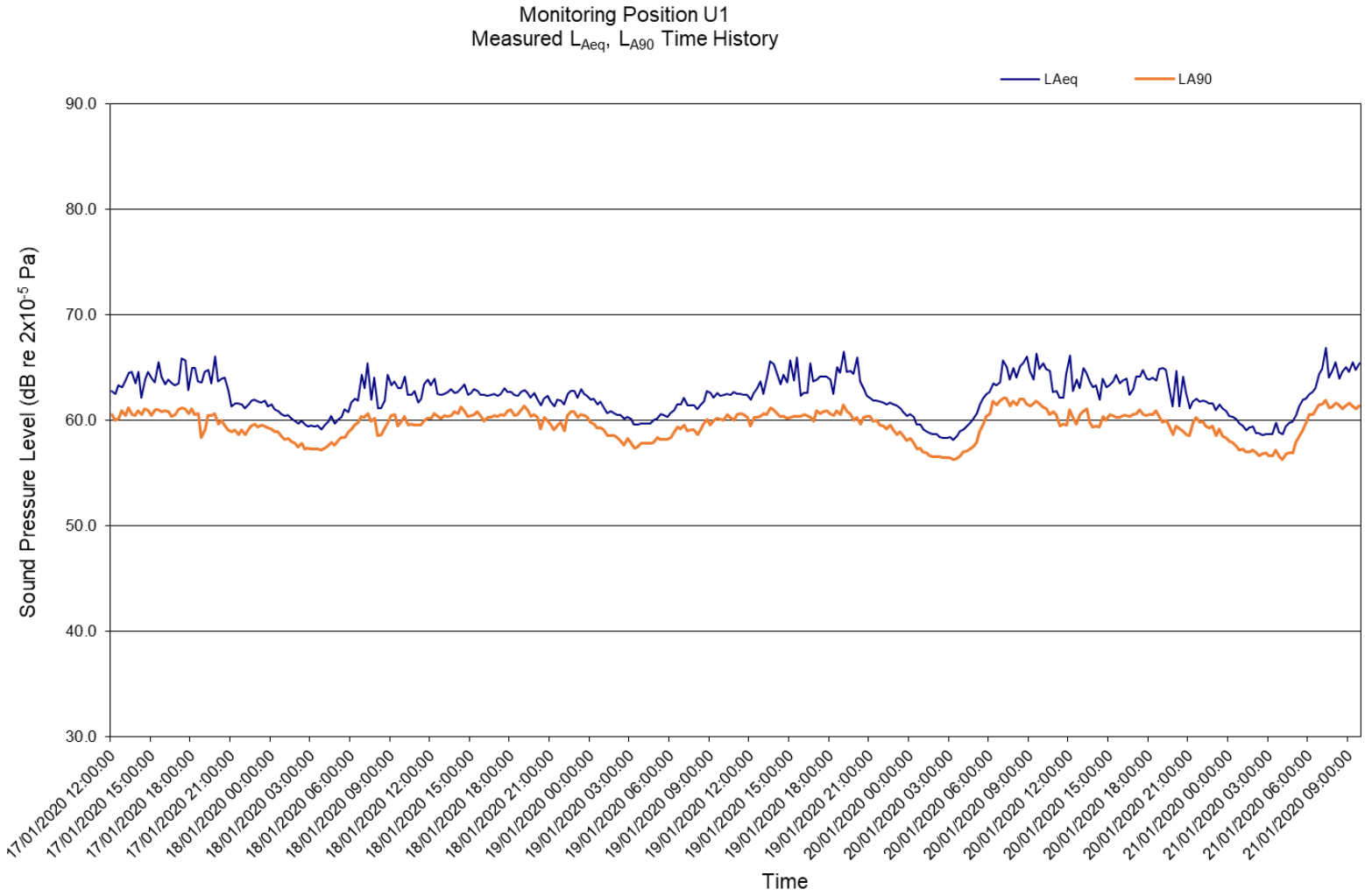
TABLE A2 – GLOASSARY OF ACOUSTIC TERMS

Terminology/Parameter	Definition
Ambient sound level	The total sound pressure level in a given position from all surrounding sources of noise, both near and far. Normally expressed as an equivalent continuous A-weighted sound pressure level, dB $L_{Aeq,T}$.
A-weighting	The process of weighting the observed sound pressure level at each frequency band, to approximate the sensitivity of the human ear to sounds of different frequencies. A-weighted sound pressure levels are expressed as dB(A) or dB L_{Ap}.
C_{tr}	Spectrum adaptation term No. 2 as defined in BS EN ISO 717-1. This term is a correction that applies to the weighted standardised level difference to account for how well a partition insulates against sound which has mainly low and medium frequency content (e.g. road traffic noise, amplified disco music).
Decibel	A logarithmic value quantifying the sound pressure at a specified position or sound power relative to a reference sound pressure or sound power (20 μPa for sound pressure, 10-12 W for sound power).
D	Sound level difference. The difference in energy-average sound pressure levels between a “source” room containing a loudspeaker and an adjacent “receiving” room. D = L(source) – L(receiving).
$D_{ne,w}$	Weighted element normalised sound level difference. The single-figure rating of the difference in sound level between rooms when sound is transmitted only through a small technical element only, such as a vent or grille, and normalised to a reference absorption area A0 of 10 m2. Measured in a laboratory in accordance with BS EN ISO 10140, with single figure rating determined in accordance with BS EN ISO 717-1.
$D_{nF,w}$	Weighted normalised flanking sound level difference. A single-figure rating of the difference in sound level between rooms when sound is transmitted only via a specified flanking path, such a via a flanking curtain wall system. Measured in a laboratory in accordance with BS EN ISO 10848, with single figure rating determined in accordance with BS EN ISO 717-1.
$D_{nT,w}$	Weighted standardised sound level difference. A single-figure rating of the sound insulation between adjacent rooms or spaces in real-world conditions in completed buildings. The rating is determined over a range of frequencies and normalised to a reference reverberation time of 0.5 seconds for dwellings. Measured in-situ in accordance with BS EN ISO 140-4, with single figure rating determined in

	accordance with BS EN ISO 717-1. The measurement includes the effects of sound transmission via flanking routes and weak points at junctions, interfaces, and penetrations.
Façade	A sound monitoring position is a “façade” position when it includes a strong reflection from an adjacent building or structure. This corresponds with a position that is between 1 and 2 metres away from a reflecting building or structure.
Flanking sound transmission	The transmission of sound between two spaces via an indirect path rather than via the separating element. Example would be sound transmission via a flanking corridor, or sound transmission via a flanking curtain wall.
Free-field	A sound monitoring position is a “free-field” position when it is not affected by sound reflections from surrounding buildings and structures. This corresponds with a position at least 3.5 metres away from reflecting buildings or structures.
Frequency	The number of oscillations per second of a vibrating particle in a medium, measured in Hertz (Hz) or cycles per second.
Impact sound	Sound due to impacts on a floor, such as due to footfall, as observed in the room below the floor.
$L_{n,w}$	Weighted normalised impact sound pressure level. A single-figure rating of the impact sound level in a lower room due to a standard impact sound source in laboratory conditions. The rating is determined over a range of frequencies and normalised to a reference absorption area of 10 m2. A single-figure rating of the impact sound insulation provided by the floor construction in idealised conditions over a range of frequencies. Measured in a laboratory in accordance with BS EN ISO 140-6 (or BS EN ISO 10140-3), with single figure rating determined in accordance with BS EN ISO 717-2.
$L'_{nT,w}$	Weighted standardised impact sound pressure level. A single-figure rating of the impact sound level in a lower room due to a standard impact sound source in real-world conditions in completed buildings. The rating is determined over a range of frequencies and normalised to a reference reverberation time of 0.5 seconds for dwellings. Measured in-situ in accordance with BS EN ISO 140-7, with single figure rating determined in accordance with BS EN ISO 717-2. The measurement includes the effects of impact sound transmission via flanking routes and weak points at junctions, interfaces, and penetrations.
$L_{A90,T}$	The A-weighted sound pressure level exceeded during 90% of the time interval, T. Typically used to quantify the background sound level at a specified position.
$L_{Aeq,T}$	The equivalent continuous A-weighted sound pressure level over a time interval, T. This is an energy-average sound pressure level over the specified time period.
$L_{AFmax,T}$	The maximum A-weight sound pressure level during a specified time interval, T. Measured with “fast” time-weighting (which approximates the time-response of the human ear).
Noise	Unwanted or undesirable sounds observed by a listener.
Octave band	A frequency band used in acoustical measurements. An octave is a frequency interval between two sounds where the frequency of the lower sound is half the frequency of the upper sound. The human hearing range is divided into ten logarithmically equal frequency divisions called octave bands, with centre-band frequencies as follows: (16 Hz, 32 Hz,) 63 Hz, 125 Hz, 250 Hz, 500 Hz, 1000 Hz, 2000 Hz, 4000 Hz, 16000 Hz.
Rating level, $L_{Ar,Tr}$	The specific sound level plus a correction accounting for acoustic features such as impulses, tones, intermittent features, or any other characteristics that draw more attention to the sound source.
Residual sound level	The equivalent continuous A-weighted sound pressure level of the ambient sound remaining at a specified position when the specific sound source (the sound source being assessed) does not contribute to the ambient sound.
Reverberation	The reflection of sound from room surfaces, resulting in the prolongation or persistence of a sound in a room.
Reverberation time	Time, in seconds, required for the sound pressure level in a room to decrease by 60 dB after a sound source has stopped. Long reverberation times are present in large empty rooms with hard surfaces (e.g.

	a cathedral); short reverberation times are present in smaller rooms with soft furnishing (e.g. typical living room, a recording studio).
R_w	The weighted sound reduction index of an architectural element. A single-figure rating of the sound insulation provided by the architectural element in idealised conditions over a range of frequencies. Measured in a laboratory in accordance with BS EN ISO 140-3 (or BS EN ISO 10140-2), with single figure rating determined in accordance with BS EN ISO 717-1.
Sound	The vibration, or oscillation, of particles in a medium, such as air, which may be detected by the human ear.
Sound absorption	The reduction of sound energy by transmission through an absorbing medium such an “acoustically soft” material or surface which results in a reduced reflection of incident sound.
Sound absorption class.	A classification system describing the ability of a specified material or surface to absorb sound. Typically measured in a laboratory in accordance with BS EN ISO 354, with class determined in accordance with BS EN ISO 11654.
Sound absorption coefficient, α	A fractional measure of the ability of a material or surface to absorb incident sound. Expressed as a value between 1.0 (total absorption of incident sound, no reflection) and 0.0 (no absorption, 100% reflection).
Sound insulation	The ability of architectural elements or structures to reduce the transmission of sound, predominantly due to the reflection of sound incident on the element or structure. Typically measured as the difference in sound pressure levels between a “source” room containing a loudspeaker and an adjacent “receiving” room.
Sound power level	A logarithmic measurement that quantifies the total sound power of a source emitted in all directions relative to a reference sound power (Wref = 1 pW or 10-12 W). Equal to 10 log10 (W / Wref) and expressed in decibels.
Sound pressure level	A logarithmic measurement that quantifies the sound pressure at a specified position relative to a reference sound pressure (pref = 20 µPa). Equal to 20 log10 (p / pref) and expressed in decibels.
Specific sound level	The equivalent continuous A-weighted sound pressure level at a specified position due to the specific sound source (the sound source being assessed).
Speech transmission index (STI)	The STI is a measurement of the intelligibility of speech content from a sound system or within a speech environment at a defined position and with defined background noise conditions and is a value ranging from 0 to 1. In practice this value varies from around 0.3 (poor intelligibility) to around 0.8 (excellent intelligibility).
STIPA	The STIPA (speech transmission index for public address systems) test method within BS EN 60268-16 is used to assess the speech transmission index within a speech environment. These involves broadcasting a modulated test sound within a space under defined background sound conditions to determine the STI value at defined positions within the space
Third-octave band	A higher-resolution frequency band used in sound measurements. One of three logarithmically equal parts of the corresponding octave frequency band. The upper band edge frequency is equal to the lower band-edge frequency multiplied by 21/3.

Appendix B – Sound Survey Graph


Monitoring Position U1
Measured L_{Aeq}, L_{A90} Time History
LAeq
LA90
Sound Pressure Level (dB re 2x10^{-5} Pa)
90.0
80.0
70.0
60.0
50.0
40.0
30.0
17/01/2020 12:00:00
17/01/2020 15:00:00
17/01/2020 18:00:00
17/01/2020 21:00:00
18/01/2020 00:00:00
18/01/2020 03:00:00
18/01/2020 06:00:00
18/01/2020 09:00:00
18/01/2020 12:00:00
18/01/2020 15:00:00
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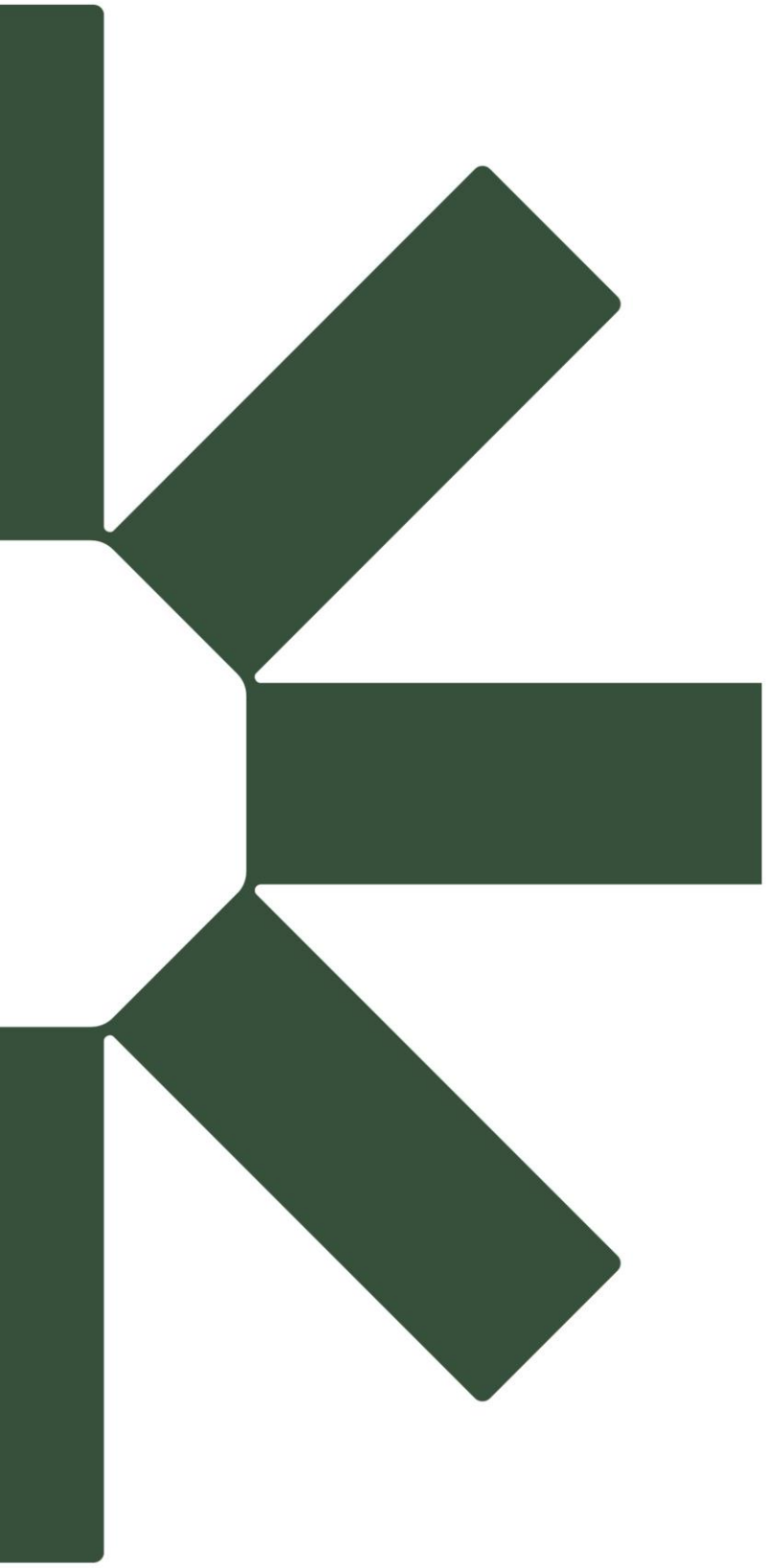
Time



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