



E Q U I N I X

Equinix UK Ltd, LD9 Environmental Permit Variation Application

Noise Impact Assessment and Noise
Management Plan

3 October 2022

Project No.: 0630390

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3 October 2022

Noise Impact Assessment and Noise Management Plan

Environmental Permit Variation Application



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Acronyms and Abbreviations

Name	Description
EA	Environment Agency
PG1	Powergate 1 – Southern building of the datacentre, opened in 2008
PG2	Powergate 2 – Northern building of the datacentre, opened in 2012
dB	Decibels.
dBA	A-weighted decibel value.
L _{Aeq}	Equivalent sound pressure level, in decibels, comparable to the total A-weighted sound energy measured over a stated period of time.

ERM Environmental Resources Ltd
UPS Uninterruptible power supply

1. INTRODUCTION

Equinix (UK) Limited (Equinix) operates a data centre on the Powergate Business Park in North West London (the Site) under the Environmental Permit (EP) EPR/TP3500PB, issued on 8th September 2020 and varied on 14th June 2021.

The data centre comprises two warehouse-style buildings (PG1 and PG2) containing data storage equipment and ancillary equipment designed to provide power in the event of the external power supply failing. The back-up power supply consists of multiple diesel-fuelled generators for each data storage building.

Equinix plans to install an additional four generators, enclosed in a building to the north of the site. An application to vary the existing EP is required, of which this Noise Impact Assessment (NIA) forms part.

The remainder of this report is set out as follows:

- **Section 2** presents the NIA. The assessment includes an update to the noise modelling study that was carried out as part of the previous permit applications. As the site operates continuously, it has been necessary to refer to background sound data from the original planning application for the site (P/2007/1369-ST) which was measured before the plant was operational.

A noise survey was carried out at the site by ERM in 2021. Sound level data from this site visit has, where appropriate, been used as a basis for the noise modelling.

- **Section 3** of this report presents the updated Noise Management Plan.

The equipment considered within this assessment report is not expected to generate significant levels of vibration off-site. Therefore a vibration assessment has not been included. In addition, as there are no protected areas for wildlife close to the site, no assessment of effects on wildlife has been included.

2. NOISE IMPACT ASSESSMENT

2.1 Noise Sources

The primary activity for the Site is data storage. The data centre consists of two main warehouse-style buildings (PG1 and PG2) containing customer data storage equipment and air-cooling equipment (chillers). The data centre also has multiple diesel-fuelled generators for use in the event of a complete grid power failure. Only the noise from the standby generators is regulated by the EA under the environmental permit and therefore only that noise is included in this assessment.

The previous permit variation included 29 generators. This assessment considers the existing 29 generators plus the proposed additional 4 generators. Figure 1 shows the site layout including the location of all 33 generators. Figure 2 shows the site layout in relation to the nearest identified noise sensitive receptors (NSRs). The site has been split into four areas to aid the discussion presented later in this report.

Normal operation for the site is grid power supply. Power emergencies are extremely rare and the site has Uninterruptible Power Supply (UPS) units to protect against very short outages or fluctuations in power. In the period since PG1 opened in 2008 and PG2 in 2012, there has been only a single event where backup generators have started in an emergency power supply capacity. With the exception of this single event, during which one generator operated for approx. 2 hours due to an issue with the site's uninterruptible power supply (UPS), all starts have been for maintenance and testing purposes, which is an integral part of Equinix's service commitment to their clients.

The generators normally only run for maintenance and testing. The procedures for testing emergency generators are described in *Section 3.3 of the EP Variation Application: Supporting Document*. All generator testing is carried out during the daytime.

2.1.1 PG1

Six generators are located externally to the south of the PG1 building within a screened compound (Area 1). Two further generators are located externally between PG1 and PG2 (Area 2). All eight generators are enclosed within acoustic containers. There are no proposed changes to the PG1 generators as part of this variation application.

2.1.2 PG2

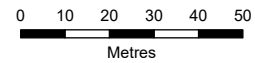
Eighteen generators are located inside the PG2 building in three rooms on the western side of the building called PM1, PM2 and PM3 (Area 3). Fresh air intake acoustic louvres are located at ground level whilst the generator exhausts and air outlets are located on top of the PG2 building.

A further three generators are located externally in acoustic containers to the north of the PG2 building (Area 4). Two of the containers are located at ground level whilst the third is stacked on top of one of them.

The proposed four new generators will be housed within a building, again to the north of the PG2 building and to the west of the three containerised generators (in Area 4). As for the generators in the PM rooms, fresh air intake acoustic louvres will be located at ground level whilst the generator exhausts and air outlets will be on top of the building.



- Area 1
 - Area 2
 - Area 3
 - Area 4
- Approximate Site Boundary



Overview of Site Equipment Layout

Figure 1

SCALE: See Scale Bar
 SIZE: A4
 PROJECT: 0630690
 DATE: 29/04/2022

VERSION: A01
 DRAWN: CB
 CHECKED: GB
 APPROVED: JH

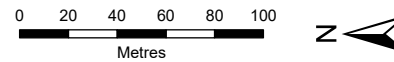


Note, areas shown are approximate



- Area 1
- Approximate Site Boundary
- Area 2
- Noise Sensitive Receptors
- Area 3
- Area 4

Note, areas shown are approximate



Overview of Site Layout and Nearest Noise Sensitive Receptors
Figure 2

SCALE: See Scale Bar
 SIZE: A4
 PROJECT: 0630690
 DATE: 29/04/2022

VERSION: A01
 DRAWN: CB
 CHECKED: GB
 APPROVED: JH



2.2 Noise Sensitive Receptors

The nearest NSR is the Bashley Road Travellers' Site (the Travellers' Site, shown as Receiver 1 in **Figure 2**). It is situated about 35 to 40 m east of the generator compound to the south of the PG1 building (in Area 1). The next nearest NSRs are on North Acton Road, some 250 m away from the site, with intervening buildings between the sources and receptors.

In addition, there is a recreation ground in between North Acton Road and the site; Wesley Recreation Ground.

2.3 Noise Modelling Methodology

Potential noise emissions from the site have been modelled using the widely recognised software package SoundPLAN, implementing the prediction method set out in ISO 9613-2.

The main buildings within and close to the Site have been represented in the model; these provide a level of acoustic screening. The ground is assumed to be acoustically hard, which is a conservative assumption. Topography has not been included in the model, which is therefore assumed to be flat.

Noise source data for the generators has been based largely on measurement, carried out by ERM in July 2021. In some cases, for noise sources that were either not measured or where there was significant uncertainty in the measured data (normally due to the proximity of other, more dominant noise sources), supplier data have been used. This includes some of the noise sources for the generators in Area 1 and Area 2. Noise source data from the NIA that was submitted as part of the original EP application (including Schedule 5 response (EPR/TP3500PB/A001)) have been re-used for these noise sources as no changes are being made as part of this variation.

Noise source data for the four new generators has been based on design data provided by the project team, who, in the absence of supplier data, have proposed achievable sound level limits. The main sources for these generators are as follows:

- fresh air intake acoustic louvres located at ground level; and
- rooftop generator exhausts and air outlets.

A summary of the modelling data inputs is provided in Appendix A.

2.3.1 Modelling Scenario

To represent a reasonable worst case modelling scenario, the quarterly generator 'building load' test has been assessed, as this is the most intense of the regular generator testing regimes. In it, generators are run in groups of up to 13, at 60% of maximum load, for one hour. Results are presented for the group of generators predicted to produce the highest noise level at each NSR. At the Travellers' Site, this is Group 3, which consists of 3 generators within Area 1. At the NSR representing properties on North Acton Road, this is Group 8, which consists of 13 generators within Areas 3 and 4 as well as the proposed 4 new generators (in Area 4).

Measurements of the generators were carried out during offload testing. To estimate noise source levels for 60% of maximum load, an adjustment has been made assuming the noise output is proportional to the electrical power output¹, so using a factor of 10x the log of the power setting divided by the offload power setting. At 60% maximum, an adjustment of +3 dB has been made.

The supplier noise data used to represent generators in Areas 1 and 2 is for typical operating conditions and it has been assumed that no adjustment is necessary.

¹ Engineering Noise Control. Bies and Hansen

2.4 Noise Mitigation Measures

The following noise control mitigation has been included in the noise model by virtue of carrying out measurements with the mitigation in place:

- For externally sited generators in Area 4;
 - enclosure within noise attenuating enclosures;
 - silencers fitted to generator exhausts; and
 - fresh air intake acoustic louvres.
- For generators located within the PM1,2 and 3 rooms (Area 3);
 - attenuation provided by the building envelope; and
 - fresh air intake acoustic louvres.

In terms of noise mitigation assumed for the noise sources modelled using supplier data, the original EP application made reference to a noise study by Applied Acoustic Design (AAD) (reference 07069/003/MB) for planning application P/2007/1369-ST, which considered the noise from equipment which was to be installed in Area 1. The noise study considered the following mitigation measures:

- enclosure of externally sited generators within noise attenuating enclosures;
- silencers fitted to generator exhausts;
- fresh air intake louvres; and
- generators in Area 1 are located in a compound enclosed by screens with a height of approximately 5.2 m. To the east (facing the Travellers' site) and south, these screens are solid. The AAD report notes they have a sound absorptive face towards the plant to reduce reflected sound energy within the plant compound. The remaining two sides are acoustic louvres. An additional 2.5 m acoustic louvre sits above this on all four sides making a total screen height of approximately 7.7 m, level with the top of the generator exhausts and air outlets. The noise modelling has ignored the effect of the louvres, which is conservative.

Site visits by ERM have confirmed (subject to access constraints) that these measures have been implemented.

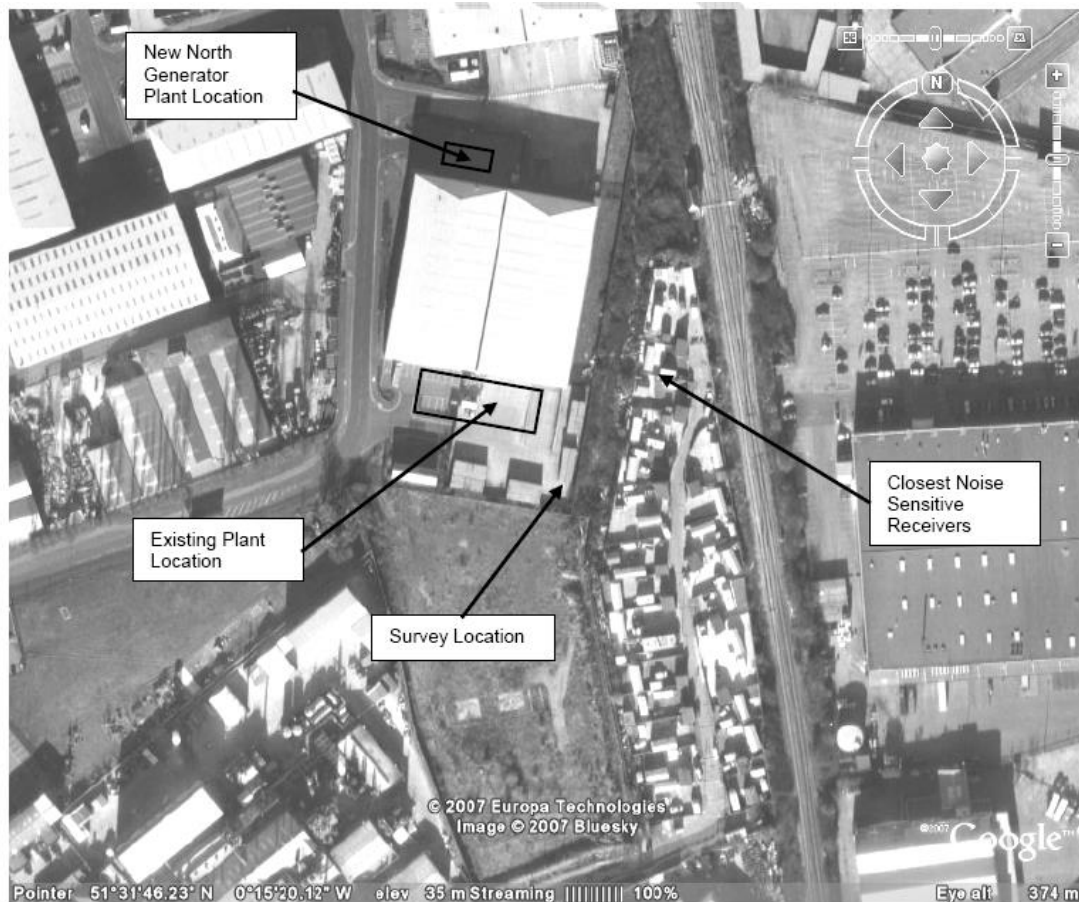
In terms of the new generators, the design includes acoustic louvres for the air inlet and silencers for the outlet / exhaust.

2.5 Background Noise Measurements

As discussed in the original application, the 2007 planning application noise study by AAD (Ref 07069/003/MB) included measurements of background noise over the period 14:15 on Thursday 8 March 2007 to 11:45 on Monday 12 March 2007. The measurements were taken at the corner of the service yard at a point near to the boundary of the Travellers' Site (see

Figure 3).

Figure 3: Noise Survey Location Figure, Extracted from AAD Report



The background noise was influenced by a mixture of industrial and commercial units, in particular from the adjacent Inco Europe processing plant located immediately to the south west of the site. The relatively small spread of noise results suggested that the plant operated on a 24-hour basis. The noise environment was, therefore, typical of a noisy urban area. A precautionary approach was taken and the typical lowest 15 minute measurement was used to represent background noise (L_{A90}). This value was 54 dB $L_{A90, 1 \text{ hour}}$ which has also been adopted for this variation application.

2.6 Predicted Noise Levels and Noise Impact Assessment

The results of the noise modelling for generator testing are presented in **Table 1** below along with an assessment in accordance with BS4142:2014+A1:2019. Separate predictions of noise are presented for the existing and the proposed equipment, as required by EA guidance ².

To identify whether acoustic character corrections for tonality or impulsivity are required for predicted noise at the traveller's site, measurements made outside the louvered area close to the Travellers' Site have been assessed using the objective methods in BS 4142:2014. No correction for impulsivity was found to be required.

Although the results for the Travellers' Site show a tone at 500Hz was present, measurements made close to equipment showed this tone was due to noise from the nearby chillers and was not likely to be due to noise from the generators. Therefore no character correction has been applied for the presence of tonality.

As the noise from the site is expected to be similar in character to the background sound level, which is industrial and urban in nature, no correction for other acoustic features is considered necessary.

Measurements of the highest contributing generator noise sources to NSRs on North Acton Road show no tones or impulsivity are present and, as for the Travellers' Site, no correction for other acoustic features is considered necessary.

As presented in the original EP application (including Schedule 5 response), background noise measurements were not made at North Acton Road, however, for the purposes of identifying potential noise impacts at this stage, the assumption has been made that background noise levels are similar to those at the Traveller's Site.

The anticipated effects as a result of changes to the existing soundscape due to the proposed installation of the new generators are not considered significant at the Travellers' Site due to the predominantly industrial nature of the surrounding area. At North Acton Road, predicted noise levels are very low and unlikely to significantly alter the current mix of sound sources.

² Environment Agency. Guidance. Noise and vibration management: environmental permits. Updated 31 January 2022

Table 1: BS 4142 Modelling Assessment Results, Generator Testing

Noise Sensitive Receptor	Predicted noise level, dB(A)				Background Level (day), $L_{A90,15mins}$ dB	Difference between background sound level and rating level	Consideration of Context	Significance of Effect
	Existing Site	Proposed Equipment	Specific Level, L_s	Rating Level, $L_{Ar,Tr}$				
Travellers Site	46	15	46	46	54	- 8	<ul style="list-style-type: none"> ■ The predicted rating level is well below the background noise level. ■ The standby generators only operate during emergencies or during routine testing. ■ Power emergencies are extremely rare (no reported events to date). ■ Testing is carried out during the daytime only. The generators that are closest to the Travellers' Site (Area 1) have a total annual testing duration of 13 hours. The overall annual testing duration is 40 hours. 	Barely audible or detectable noise. Not significant
North Acton Road ⁽¹⁾	41	21	41	41 ⁽²⁾	54 (assumed)	- 13		Barely audible or detectable noise. Not significant
Wesley Recreation Ground ⁽³⁾	44	39	40 ⁽²⁾	40 ⁽²⁾	54 (assumed)	-14		<ul style="list-style-type: none"> ■ Does not exceed the target level for external amenity space of 50 dB, L_{Aeq} ⁽⁴⁾ ■ Receptor less sensitive to noise at night than a residential receptor as it is not used for sleeping.

- 1) A range of predicted sound levels are presented. The higher predicted sound levels are predicted to affect only a small number of properties at the northern end of North Acton Road which are not well screened from noise from the Area 4 generators by the building on the opposite side of Volt Avenue to the Powergate site.
- 2) The specific (and rating) sound level is lower than the predicted noise level from the existing site. This is due to screening provided by the proposed building which will house the new generators in Area 4.
- 3) BS 4142 is not intended to be used to assess potential noise effects on non-residential receptors. However, current EA guidance requires noise effects to be assessed using this standard. Therefore predicted noise levels are provided in line with those used for a BS 4142 assessment and a contextual assessment of significance is presented which draws on standards relevant to the receptor type.
- 4) British Standard 8233 ⁽³⁾ provides a design target for external areas used for amenity space such as gardens of 50 dB $L_{Aeq,T}$ or 55 dB $L_{Aeq,T}$ in noisier environments.

(3) BS8233: 2014, Guidance on Sound Insulation and Noise Reduction for Buildings, BSI, 2014.

2.6.1 *Uncertainty*

Uncertainty in measuring and predicting sound levels can arise from a number of areas, including:

- uncertainty in any measured sound levels used in the predictions;
- uncertainty in the operation or sound emission characteristics of the specific sound source;
- sound power levels taken from supplier data;
- uncertainty in the calculation method; and
- simplifying the real situation to “fit” the model (user influence on modelling).

As the predicted rating levels are well below the background sound level, it is unlikely that the level of uncertainty would be enough to alter the conclusions of this assessment. No factor to account for uncertainty has been included in the results of the modelling.

There is in addition some uncertainty in relation to the background sound level adopted for NSRs on North Acton Road and Wesley Recreation Ground as measurements were not carried out at these locations. However, during generator testing, due to the distance and level of screening from intervening buildings between noise sources on-site and NSRs on North Acton Road, the predicted noise level range of 32 to 38 dB(A) is low and unlikely to be significant.

3. UPDATED NOISE MANAGEMENT PLAN

3.1 Introduction

Although the NIA (*Section 2*) predicts noise levels that correspond to 'barely audible or detectable noise' according to EA guidance, even in a conservative case assessment, it is considered prudent to provide an outline Noise Management Plan (NMP) to record the measures in place.

Equinix understands and accepts responsibility for controlling noise impacts from its site and will take reasonable steps to ensure that any noise control equipment is designed, operated and maintained appropriately to control noise effectively.

3.2 Risk Assessment of Noise

The severity of noise impact as well as the likelihood of the impact occurring has been considered for normal and abnormal situations, as follows:

- The normal situation involves testing the generators, as outlined above. The likely reasonable worst case noise which may arise from this situation has been assessed in Section 2 as barely audible or detectable noise, which is not significant.
- The abnormal or emergency situation which has been considered is a significant power outage which results in the emergency generators being used in a power supply capacity. The likelihood of this situation occurring is very low (it has not reported to have occurred since PG1 opened in 2008 and PG2 in 2012). Were it to occur, it may give rise to elevated noise levels at the nearest NSRs and it may occur during the night, when occupiers of residential properties are expected to be more sensitive to noise. However, it is likely that such a power outage would be short lived (a few hours) and would occur only extremely infrequently. Therefore, such an event is not considered significant in noise impact terms. As such, no additional controls are considered necessary to manage this risk.

3.3 Additional Information

The procedures for testing emergency generators during the day and on an infrequent basis are described in *Section 3.3 of the EP Variation Application: Supporting Document*. As noise impacts from the site are expected to be barely audible or detectable, and not significant, noise monitoring is not routinely carried out. If unexpected levels of noise are suspected (e.g. as a result of a complaint), Equinix will investigate the cause and identify appropriate measures to minimise or eliminate the source of noise.

3.4 Maintenance of Logs

The following logs will be maintained during operation of the facility.

Log of processes and checks carried out to minimise noise emission from normal operations.

This includes planned maintenance (when testing regime in *section 4.3 of EP Variation Application: Supporting Document* is carried out), visual inspections and checks (doors of container closed when operating for example).

Log of processes and checks carried out to minimise noise emission from failures and other factors. This includes maintenance where required to address increased noise or vibration emissions, replacement of equipment and the like.

Log of monitoring and compliance checks undertaken.

Note: The operational log should normally be completed within 14 days of taking the measurements or actions.

4. ANNEX A NOISE MODEL DATA INPUTS

Table 4 summarises the noise source data used in the noise modelling. As discussed in Section 2.3, a mix of measured data and supplier / design data have been used. Details regarding the measurement survey are provided in Section 4.0 whilst details of the supplier / design data are provided in Section 4.2.

Table 2: Noise Levels Used in the Noise Model

Generator Noise Sources	Equipment Dimensions, m	Broadband Noise Level, dB		Data source
		Measured L_{Aeq}	Calculated L_{WA}	
Area 1				
Casing ^{(2) (5)}	14.5*3.9	72	90	Equipment supplier
Air intake ⁽¹⁾	2.7*3.9	67	77	ERM measurements (at 1m)
Exhaust ⁽²⁾		69	84	Equipment supplier
Air outlet ⁽³⁾	n/a	n/a	n/a	n/a
Area 2				
Casing ^{(2) (5)}	12*3.8	72	92	Equipment supplier
Air intake ⁽¹⁾	2.7*2.3	77	85	ERM measurements (at 1m)
Exhaust ⁽²⁾		69	84	Equipment supplier
Air outlet ⁽¹⁾	2.4*1.2	74	89	ERM measurements (at 1m)
Fans ⁽¹⁾	7*2	85	97	ERM measurements (at 1m)
Area 3, PM 1				
Acoustic louvre ⁽¹⁾	13.8*3.6	64	81	ERM measurements (at 1m)
Air outlet ⁽¹⁾	5.5*4.8	61-65	75-79	ERM measurements (at 1m)
Exhaust ⁽⁴⁾	n/a	n/a	n/a	n/a
Area 3, PM 2				
Acoustic louvre ⁽¹⁾	6.2*3.6	73	86	ERM measurements (at 1m)
Air outlet ⁽¹⁾	5.5*4.8	65	79	ERM measurements (at 1m)
Air outlet ⁽¹⁾	9*4.8	63	80	ERM measurements (at 1m)
Exhaust ⁽⁴⁾	n/a	n/a	n/a	n/a
Area 3, PM 3				
Acoustic louvre ⁽¹⁾	6.2*3.6	71	84	ERM measurements (at 1m)

Generator Noise Sources	Equipment Dimensions, m	Broadband Noise Level, dB		Data source
		Measured L_{Aeq}	Calculated L_{WA}	
Air outlet ⁽¹⁾	9*4.8	61-63	78-80	ERM measurements (at 1m)
Exhaust ⁽⁴⁾	n/a	n/a	n/a	n/a
Area 4, in containers				
Casing side ^{(1) (5)}	15*4.4	72	90	ERM measurements (at 1m)
Casing roof ^{(1) (6)}	15*3	65	83	ERM measurements (at 1.8m)
Air outlet ^{(1) (7)}	3*4.4	72	83	ERM measurements (at 1m)
Air inlet ^{(1) (7)}	3*4.4	68	79	ERM measurements (at 1m)
Area 4, in proposed building				
Air inlet ⁽²⁾	4.2 x 4	75	87	Equipment supplier
Air outlet ⁽²⁾	4 x 2	75	84	Equipment supplier
Exhaust ⁽²⁾	3 x 0.6 diameter	65	80	Equipment supplier

1. As discussed in Section 2.3, measurements of the generators were carried out during offload testing. However, the modelling scenario adopted assumes the generators are operating at 60% of full load. An adjustment of +3 dB has been added to the sound levels presented in this table to account for this.
2. Supplier data used, see below.
3. Outlet not included in model due to lower contribution.
4. Source not audible during measurement survey, therefore not included.
5. Each side.
6. Includes some noise from exhaust. Treated as measurement of roof which is conservative.
7. Each item.

4.1 Measured Noise Data

Measurements were carried out close to external equipment on site on the 12th, 13th and 14th of July 2021.

Measurements were carried out using a Bruel & Kjaer 2250L Type 1 precision grade sound level meter (SLM). The SLM was calibrated before and after the survey using a Type 1 acoustic calibrator. No significant calibration drift was detected. Measurements of cooling fans on the roof of and associated with the operation of the packaged generators in Area 2 were carried out using a microphone extension cable and attaching the microphone to an extending pole. The SLM was calibrated before and after such measurements and again, no significant calibration drift was measured.

During the survey, 'A'-weighted continuous equivalent sound pressure levels (L_{Aeq}) were measured as well as other sound level metrics, broadband and octave band unweighted measurements and audio recordings. Since the noise sources measured were essentially constant, it was possible to obtain a representative sample of the noise levels with a short duration sample (normally of approximately 1 minute).

4.2 Supplier / Design Noise Data

The manufacturer⁴ noise level data for the generators in Area 1 and Area 2 are presented in **Table 3**. The major sources of noise are the casing and exhausts, and so these sources have been modelled.

Table 3: Supplier Data for Existing Generators

Generator Noise Sources	Broadband Noise Level, L_{Aeq} dB
Casing/Inlet	72
Outlet	63
Exhaust	69

Noise source levels and dimensions for the four proposed generators are based on design sound level limits at 1 m from equipment provided by the project team, as presented in **Table 4**.

Table 4: Design Data and Dimensions for Proposed Generators

Generator Noise Sources	Source Dimensions (m)	Plant Sound Level Limit at 1 m, L_{Aeq} dB	Calculated Sound Power Levels, L_w dB
Air inlet	4.2 x 4	75	87
Air outlet	4 x 2	75	84
Exhaust	3 x 0.6 diameter	65	80

⁴ Supplied to ERM by Equinix

5. ANNEX B CALIBRATION CERTIFICATES

Campbell Associates Ltd
 5b Chelmsford Road Industrial Estate
 GREAT DUNMOW, Essex, GB-CM6 1HD
www.campbell-associates.co.uk
 Phone 01371 871030 Facsimile 01371879106



0789

Certificate of Calibration and Conformance

Certificate number: U35850

Test object: Sound Level Meter, BS EN IEC 61672-1:2013 Class 1 (Precision) and associated Frequency Analyser BS EN IEC 61260:1996, Class 0

Producer : Brüel and Kjær
Type : 2250_4950
Serial No.: 3006497

Customer: ERM - Environmental Resources Management
Address: Eaton House, Wallbrook House,
 North Hinksey Lane, Oxford. OX2 0QS.
Contact Person: Jack Smith

Method :
 Calibration has been performed as set out in CA Technical Procedures TP01 & 02 as appropriate. These are based on the procedures for periodic verification of sound level meters as set out in BS EN IEC 61672-3:2013 and for electrical testing of frequency filters as set out in BS EN IEC 61260:1996. Results and conformance statement are overleaf and detailed results are in the attached Test Report.

Tested	Producer:	Type:	Serial No:	Certificate number
Microphone	Brüel & Kjær	4950	2940788	35849
Calibrator*	Brüel and Kjær	4231	1838911	U34578
Preamplifier	Brüel & Kjær	ZC0032	20925	Included

Additional items that also have been submitted for verification
 Wind shield -
 Attenuator -
 Extension cable -
 These items have been taken into account wherever appropriate.

Instruction manual: BE1853-11 March 2012 Firmware version: BZ7130 v4.6.3 / BZ7132 v4.6.3 The test object is a single channel instrument.

Conditions	Pressure	Temperature	Humidity
Reference conditions:	101.325 kPa	23.0 °C	50 %RH
Measurement conditions:	100.92 ±0.05 kPa	22.4 ±0.4 °C	43.3 ±0.7 %RH

Date received for calibration: 14/09/2020
 Date of calibration: 29/09/2020
 Date of issue: 29/09/2020
 Engineer

Supervisor

Palanivel Marappan B. Eng (Hons), M.Sc.

 Darren Batten Tech IOA

This certificate is issued in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service. It provides traceability of measurement to the SI system of units and/or to units of measurement realised at the National Physical Laboratory or other recognised national metrology institutes. This certificate may not be reproduced other than in full, except with the prior written approval of the issuing laboratory.
 *The sound calibrator was complete with the coupler specified in the instruction manual for the sound calibrator and the sound level meter as appropriate for the coupling of the microphone provided to the specified sound calibrator.

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6. ANNEX C PERSONNEL

The noise measurement survey was carried out by Jamie Hogg. Jamie also authored the noise impact assessment report and technically reviewed the noise modelling.

The noise impact assessment report has been technically reviewed by Mike Fraser.

The noise modelling was carried out by Eugénie Sainte Cluque.

Eugénie Sainte Cluque

Consultant, Acoustics

Eugénie has over 5 years professional experience in undertaking acoustic surveys and assessments for the built environment across multiple sectors.

Education

- MSc Acoustics, London South Bank University, UK, 2013
- BA Architecture, Oxford Brookes University, UK, 2012

Professional Affiliations and Registrations

- Associate Member of the Institute of Acoustics (AMIOA)

Fields of Competence

- Environmental acoustics/vibration
- Architectural acoustics/vibration
- Noise modelling
- Site surveys

Jamie Hogg

Senior Consultant, Acoustics

Jamie has over 14 years professional experience in undertaking environmental noise measurement surveys and assessments across multiple sectors.

Education

- Diploma in Acoustics and Noise Control, Institute of Acoustics, UK. 2007—2008
- MSc Music Technology, University of York, UK 1998—1999
- BSc (Hons) Environmental Science. University of Bradford, UK. 1993—1997

Professional Affiliations and Registrations

- Member of the Institute of Acoustics (MIOA)

Fields of Competence

- Environmental Impact Assessment (Sound, Noise and Vibration)
- Project Management
- Occupational Noise Assessment
- Design Noise Studies
- Noise and Vibration Control

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- Noise and Vibration Monitoring and Modelling / Prediction

Mike Fraser

Technical Director, Acoustics

Mike has over 30 years professional experience in undertaking environmental noise measurement surveys and assessments across multiple sectors.

Education

- BSc. Electroacoustic, University of Salford, UK, 1987

Professional Affiliations and Registrations

- Member of the Institute of Acoustics (MIOA)

Fields of Competence

- Environmental Impact Assessment (Sound, Noise and Vibration)
- Underwater Noise Assessment
- Occupational Noise Assessment
- Vibration Assessment