Noise Impact Assessment

Reliance Street, Manchester

Presented to: Be.EV

Issued: April 2024

Lucion Delta-Simons Project No: 87687.544957

Protecting people and planet

Report Details

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Quality Assurance

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Executive Summary

Site and Report Context	Lucion Delta-Simons Limited ("Lucion Delta-Simons") was instructed by Be.EV to prepare a Noise Impact Assessment to inform a planning application for the development of an Electric Vehicle (EV) charging station consisting of 16 spaces, substation, and adjacent commercial space (the 'Proposed Development') located on land off Reliance Street, Manchester, M40 1EZ (the 'Site). This assessment has been informed by a baseline noise survey in order to quantify the existing background noise environment at the sensitive receptors. This assessment has been undertaken to identify the key noise sources associated with the proposal which may have the potential to impact upon the closest sensitive residential dwellings. Accordingly, this assessment has been completed with due regard to: • National Planning Policy Framework (NPPF) and its associated Planning Policy Guidance (PPG) • BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound', • BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' and • Calculation of Road Traffic Noise (CRTN) & Design Manual for Roads and Bridges (DMRB) LA 111 Noise and Vibration.
Summary	At the time of assessment, details and the sound emission of the substation and fixed plant associated with the Site are not available. Therefore, the assessment has set noise levels at the closest noise sensitive receptor in order to avoid adverse impacts at the sensitive receptors. Assessment of L_{AFmax} noise events associated with vehicle door slams has shown that predicted noise levels at the receptor would not exceed internal WHO and MCC noise level criteria when bays in the western half of the Site are used at night; however, in the context of the wider Site, it is predicted L_{AFmax} noise events associated with the Proposed Development will be lower than those already experienced at the receptor due to existing noise sources. Therefore it is concluded the Site will have a **negligible** impact on NSRs. Due to the small number of charging bays proposed and the surrounding arterial road network, it is considered that the development would not increase the number of vehicles on the A62 to perceptibly increase the noise level at NSRs, and therefore impacts from road traffic noise are considered to be **negligible**.
Recommendations	Noise from fixed plant should not exceed **46dB $L_{Ar,1hr}$** during daytime hours, and **37dB $L_{Ar,15min}$** during night-time hours at the receptor.
This is intended as a summary only. Further detail and limitations of the assessment is provided within the main body of the Report.	

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1.0 Introduction

1.1 Appointment

1.1.1 Lucion Delta-Simons Limited ('Lucion Delta-Simons') was instructed by Be.EV (the 'Client') to prepare a Noise Impact Assessment to inform a planning application for the development of an Electric Vehicle (EV) charging station consisting of 16 spaces, substation, and adjacent commercial space (the 'Proposed Development') located on land off Reliance Street, Manchester, M40 1EZ (the 'Site').

1.2 Site Location and Context

1.2.1 The Site is currently vacant. To the north and east of the Site are existing industrial and commercial premises with Oldham Road (A62) running the full length of the southern boundary.

1.2.2 The closest Noise Sensitive Receptors (hereafter referred to as NSRs) are residential receptors located to the west of the Site approximately 10m from the Site boundary.

1.2.3 Ambient noise levels in the area are dominated by road traffic on Oldham Road (A62).

1.2.4 The proposal has the potential to operate during day and night over a full week period.

1.2.5 The Site location is shown in **Figure 1** and the Site plan in **Figure 2**.

1.2.6 The standard limitations associated with this assessment are presented in **Appendix A**.

1.2.7 A glossary of terms used in this report is provided in **Appendix B**.

2.0 Legislation and Policy

2.1 Planning Policy

2.1.1 A summary of the national and local planning policy relevant to the Proposed Development is provided below.

National Planning Policy Framework and Planning Practice Guidance

2.1.2 The Government published the revised National Planning Policy Framework (NPPF) in July 2021, and the Noise section of Planning Practice Guidance (PPG) in February 2024[1]. Together, the NPPF and PPG set out what the Government expects of local authorities. The overall aim is to ensure the planning system allows land to be used for new homes and jobs, while protecting valuable natural and historic environments.

2.1.3 The PPG adds further context to the NPPF and it is intended that the two documents should be read together.

2.1.4 Noise needs to be considered when new developments may create additional noise and when new developments would be sensitive to the prevailing acoustic environment. When preparing local or neighbourhood plans, or taking decisions about new development, there may also be opportunities to consider improvements to the acoustic environment.

2.1.5 Local planning authorities' plan-making and decision making should take account of the acoustic environment and in doing so consider:

- Whether or not a significant adverse effect is occurring or likely to occur;
- Whether or not an adverse effect is occurring or likely to occur; and
- Whether or not a good standard of amenity can be achieved.

2.1.6 In line with the Explanatory Note of the Noise Policy Statement for England, this would include identifying whether the overall effect of the noise exposure (including the impact during the construction phase wherever applicable) is, or would be, above or below the significant observed adverse effect level and the lowest observed adverse effect level for the given situation.

2.1.7 The Observed Effect Levels are as follows:

- Significant observed adverse effect level: This is the level of noise exposure above which significant adverse effects on health and quality of life occur;
- Lowest observed adverse effect level: This is the level of noise exposure above which adverse effects on health and quality of life can be detected; and
- No observed effect level: This is the level of noise exposure below which no effect at all on health or quality of life can be detected.

2.1.8 **Table 1** summarises the noise exposure hierarchy, based on the likely average response.

[1] PPG was last updated in February 2024, however the section on Noise has not been updated since 2019

Table 1 - Noise Exposure Hierarchy

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Adverse Effect Level			
Not Noticeable	No Effect	No Observed Effect	No specific measures required
Noticeable and not intrusive	Noise can be heard but does not cause any change in behaviour or attitude. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Noticeable and intrusive	Noise can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Noticeable and disruptive	The noise causes a material change in behaviour and/or attitude, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Effect	Avoid
Noticeable and very disruptive	Extensive and regular changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or physiological effects, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

2.2 Local Planning Policy

Manchester's Local Development Framework – Core Strategy Development Plan

2.2.1 The Core Strategy Development Plan was adopted by Manchester City Council (MCC) on 11th July 2012. The document forms part of Manchester's Local Development Framework and covers the period 2012 up to 2027 setting out the vision for Manchester guiding decisions on planning, development and regeneration.

2.2.2 Strategic Policy DM 1: Development Management states the following regarding noise:

> "All development should have regard to the following specific issues for which more detailed guidance may be given within a supplementary planning document: -
>
> […]
>
> - Effects on amenity, including privacy, light, noise, vibration, air quality, odours, litter, vermin, birds, road safety and traffic generation. This could also include proposals which would be sensitive to existing environmental conditions, such as noise."

2.2.3 The Core Strategy was updated following the adoption of Places for Everyone (PfE) Joint Development Plan in March 2024, however this update has not resulted in any changes to policies relevant to this assessment.

Manchester City Council Planning and Noise Technical Guidance

2.2.4 The Manchester City Council Planning and Noise Technical Guidance was adopted in June 2022. This document provides guidance to applicants and consultants concerning the assessment and prediction of environmental noise associated with a particular development.

2.2.5 Section 3.7.1.5: Industrial / commercial developments states that:

> "Maximum noise levels should also be adequately controlled. Where particular uses generate high noise levels of a short duration (e.g. loud bangs) on a regular basis, these should aim to be controlled so as not to exceed 60 dB (L_{Amax}) at the façade of noise sensitive premises nearby in accordance with the recommendations of the WHO (section 3.6)."

2.2.6 Additionally, in regard to noise from fixed plant the document states:

> "Any noise assessment needs to consider not only the overall level of noise emitted, but also its particular characteristics. The noise assessment should be based on BS 4142, and any application for fixed plant, equipment or machinery must demonstrate that:
>
> 'Externally mounted ancillary plant, equipment and servicing shall be selected and/or acoustically treated in accordance with a scheme designed so as to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location'.
>
> By designing the sound pressure level of any plant items to generate a noise impact of at least 5dB below the existing background level, any plant noise impact should be of a negligible level which should not give rise to complaints from users or occupiers of existing noise-sensitive usages."

2.3 Consultation

2.3.1 A consultation exercise was undertaken with Environmental Health Officer (EHO) at Manchester City Council (MCC) on 9th August 2022 to discuss noise monitoring locations and assessment methodology. A response was received from the EHO, in which they stated to ensure that the assessment followed the MCC Planning and Noise Technical Guidance.

2.4 Guidance

BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound'

2.4.1 This Standard (hereafter referred to as 'BS 4142') describes methods for rating and assessing sound of an industrial or commercial nature which includes:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and / or commercial premises; and

- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from processes or premises, such as that from forklift trucks, or that from train or ship movements on or around an industrial or commercial Site.

2.4.2 The procedure detailed in the Standard compares the measured or predicted noise level 'the specific noise level' from any of the above detailed noise sources with the background sound level at a residential dwelling. The measured background sound level at a receptor should be reliable and should not necessarily ascertain a lowest measured background sound level, but rather to quantify what is 'typical'.

2.4.3 The specific noise level also acknowledges the following reference time intervals depending upon whether the noise source operates during daytime or night-time periods:

- Daytime (07:00 - 23:00): 1 hour; and
- Night-time (23:00 - 07:00): 15 minutes.

2.4.4 There are a number of 'character corrections' which can be attributed to the specific sound level, either subjectively or objectively, depending upon the 'acoustic features' of the sound level under investigation. These character corrections vary in their weighting depending upon the severity of the acoustic feature, as follows (with regards to the subjective method):

Table 2 – BS 4142 Subjective Character Correction

Acoustic Feature	Correction (dB)	Comments
Tonality	+2	Where the tonality is just perceptible
	+4	Where the tonality is clearly perceptible
	+6	Where the tonality is highly perceptible
Impulsivity	+3	Where the impulsivity is just perceptible
	+6	Where the impulsivity is clearly perceptible
	+9	Where the impulsivity is highly perceptible
Intermittency	+3	Where the intermittency is readily distinctive against the acoustic environment
Other sound characteristics	+3	Where a sound exhibits characteristics that are neither tonal nor impulsive, though is readily distinctive against the acoustic environment at the receptor

2.4.5 Where the assessment is carried out using the objective method, the tonality character correction is either 0dB or +6dB and the impulsivity character correction can range from 0dB up to +9dB in increments of 1dB, depending on the level of impulsivity identified.

2.4.6 BS 4142 goes on to state that the rating level is equal to the specific sound level if there are no such features present or expected to be present.

2.4.7 Assessment of the rating level relative to the background noise level can yield the following commentary:

- Typically, the greater this difference (between the rating level and the background sound level), the greater the magnitude of 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. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact.

2.4.8 Whilst the Standard does make various references to it not being intended to assess noise impacts at indoor locations, Section 1.1 of the Standard does state:

> 'The methods described in this British Standard use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident'.

2.4.9 Example 6 in the Standard states:

> 'In addition to the rating/background sound level comparison shown in Table A.6 [in the Standard], the primary concern is the potential for disturbance of residents who could be sleeping with open bedroom windows. Other guidance, such as BS 8233, might also be applicable in this instance'.

2.4.10 Furthermore, Example 8 in the Standard, which considers night-time commercial noise impacts at a dwelling, states:

> 'BS 8233 indicates that 40 dBA sound level from the plant, equating to an internal level of around 30 dBA or possibly lower, but with some acoustically distinguishing characteristics, may not be suitable for a bedroom.'

2.4.11 With the above in mind, and for a clear need to ensure that any potential commercial or industrial noise impacts do not give rise to sleep disturbance in bedrooms, this assessment will ensure that the predicted rating level (specific sound level including any character corrections) does not exceed 30dB in bedrooms.

BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings'

Noise Criteria Limits

2.4.12 This Standard (hereafter referred to as 'BS 8233') provides recommendations for the control of noise in and around buildings. It suggests appropriate criteria and limits for different situations, which are primarily intended to guide the design of new buildings or refurbished buildings undergoing a change of use, rather than to assess the effect of changes in the external noise climate.

2.4.13 The Standard suggests suitable internal noise levels within different types of buildings, including dwellings, as shown in **Table 3**.

Table 3 - BS 8233:2014 Internal Target Noise Levels

Criterion	Typical Situation	Design $L_{Aeq,T}$ (dB)
Suitable resting / sleeping conditions	Living Room	35
	Bedroom*	30
*For a Reasonable standard in bedrooms at night, individual noise evens (measured with fast time weighting) should not exceed 45dB L_{max}		

2.4.14 BS 8233 goes on to recommend noise levels for gardens as follows:

> 'It is desirable that the external noise level does not exceed 50dB $L_{Aeq,T}$, with an upper guideline value of 55dB $L_{Aeq,T}$ which would be acceptable in noisier environments. However, it is also recognised that these guideline values are not achievable in all circumstances where development might be desirable. In higher noise areas, such as city centres or urban areas

adjoining the strategic transport network, a compromise between elevated noise levels and other factors might be warranted'.

2.4.15 BS 8233 goes on to say:

'In such a situation, development should be designed to achieve the lowest practicable levels in these external amenity spaces but should not be prohibited'.

Ventilation Requirements

2.4.16 Where a partially open window cannot be relied upon to provide an adequate level of façade sound insulation performance, it is necessary to consider alternative ventilation for habitable rooms. Section 8.4.5.4 within BS 8233 states:

'The Building Regulations' supporting documents on ventilation [48, 49, 50] recommend that habitable rooms in dwellings have background ventilation. Where openable windows cannot be relied upon for this ventilation, trickle ventilators can be used, and sound attenuating types are available. However, windows may remain openable for rapid or purge ventilation, or at the occupant's choice.

Alternatively, acoustic ventilation units (see 7.7.2 [of the Standard] below) are available for insertion in external walls. These can provide sound reduction comparable with double glazed windows. However, ducted systems with intakes on the quiet side of the building might be required in very noisy situations, or where appearance rules out through-the-wall fans.'

2.4.17 Section 7.7.2 of the Standard states:

'NOTE 5 If relying on closed windows to meet the guide values, there needs to be an appropriate alternative ventilation that does not compromise the façade insulation or the resulting noise level.'

World Health Organisation (WHO) Guidelines for Community Noise 1999

2.4.18 The WHO Guidelines 1999 recommends that to avoid sleep disturbance, indoor night-time guideline noise values of 30 dB L_{Aeq} for continuous noise and 45 dB L_{AFmax} for individual noise events should be applicable. It is to be noted that the WHO Night Noise Guidelines for Europe 2009 makes reference to research that indicates sleep disturbance from noise events at indoor levels as low as 42 dB L_{AFmax}. The number of individual noise events should also be taken into account and the WHO guidelines suggest that indoor noise levels from such events should not exceed approximately 45 dB L_{AFmax} more than 10 – 15 times per night.

Calculation of Road Traffic Noise (CRTN) & Design Manual for Roads and Bridges (DMRB) LA 111 Noise and Vibration

2.4.19 The 'Calculation of Road Traffic Noise' (CRTN), produced by the Department of Transport / Welsh Office, provides a method for the prediction of noise from road traffic. DMRB LA 111, provides guidance on the assessment of noise impacts from roads and contains guidance for assessing the likely impact of noise generated by road traffic. The criteria from DMRB for short-term impact (at year of opening) are presented in **Table 4.**

Table 4 - DMRB criteria for determining magnitude of impact in the short-term

Change in noise level $L_{A10,18hr}$	Magnitude of impact
0 dB	No change
0.1 – 0.9 dB	Negligible
1 – 2.9 dB	Minor
3 – 4.9 dB	Moderate

Change in noise level $L_{A10,18hr}$	**Magnitude of impact**
5 dB or more	Major

3.0 Scope and Methodology

3.1 Scope

3.1.1 The scope of the assessment has been determined in the following way:

- Analysis of the Site and the surrounding area was completed using available aerial photography in order to identify the location of the closest existing noise sensitive receptors to the Site;
- A Baseline Noise Survey has been undertaken to establish the existing background sound environment at the closest NSRs;
- Measured sound levels have informed and assessment in line with BS 4142 whereby the rated level of noise is compared against the background sound level at the closest noise sensitive receptor to the Site;
- Assess the likely operational noise levels associated with door slams and any other significant sources at noise sensitive receptor locations; and
- Assess any likely traffic noise impacts as a result of the Proposed Development.

3.2 Plant Noise Limits

3.2.1 At this stage the exact details and details of the substation and fixed plant (e.g. air handling units and transformers) to be installed on the Site is not known. Therefore, as a conservative approach, a plant noise limit is provided that the development should not exceed when measured in free-field conditions at the NSR assuming continuous 24-hour operational noise.

3.3 Night-Time L_{AFmax} Event - BS 8233:2014 Assessment

3.3.1 Maximum noise events associated with operation during the night-time period attributable to doors shutting, clicks, and bangs are also considered within the assessment.

3.3.2 The following table details the L_{AFmax} noise levels associated with vehicle door slams as measured set out in Bayerisches Landesamt für Umwelt Parking Area Noise (2007):

Table 5 - Vehicle Door Slams Data

Event	Measurement Distance, m	Measured dB L_{AFmax}
Vehicle door slam	7.5	72.1

3.3.3 WHO Community Noise Guidelines recommend that individual noise events should not exceed 45dB L_{AFmax} internally more than 10 - 15 times at night.

3.3.4 In line with MCC EHO comments and guidance, it is assumed that a partially open window will provide around 12dB of noise attenuation, and therefore internal noise levels are predicted at the receptor locations.

3.4 Road Traffic Noise

3.4.1 The Site is located directly off an arterial route with an existing high level of traffic. Department for Transport (DfT) traffic count data[2] shows an estimated 23,092 daily vehicles on A62. For the Proposed Development to have a perceptible change in road traffic noise level it would need to increase the flow on A62 by approximately 5,600 vehicles per day. Due to the Proposed Development consisting of 16 charging bays, it is considered that the increased traffic would not exceed 5,600 vehicles per day and therefore would not increase the noise level on surrounding roads. It is therefore considered that the Proposed Development have a **negligible** impact on the receptors in terms of road traffic noise.

3.5 Significance Criteria

Noise Generated by the Site

3.5.1 Where the rated level of noise exceeds the adopted noise criteria level as per BS 4142, BS 8233 and WHO guidelines at the residential receptors, a substantial adverse impact will be observed depending on the context and level of exceedance.

[2] https://roadtraffic.dft.gov.uk/manualcountpoints/73781 (Link checked 22nd April 2024)

4.0 Baseline

4.1 Introduction

4.1.1 A noise monitoring survey was undertaken to characterise ambient and background noise levels currently experienced on the Site.

- Attended measurements were undertaken on the 25th August 2022 during the daytime, evening and night-time periods.
- Reference should be made to a map of the noise monitoring location shown in **Figure 1**.

4.2 Noise Measurement Equipment

4.2.1 The following noise monitoring equipment was used throughout the survey.

Table 6 - Noise Measurement Equipment

Measurement Position	Equipment	Model Type	Serial Number	Date of Last Laboratory Calibration before Survey
L1 Daytime and Evening (19:04-19:34)	Sound Level Meter	Rion NL-52	00510142	25th February 2022
	Pre-amplifier	Rion NH-25	319285	
	Microphone	Rion UC-59	02847	
	Calibrator	01dB CAL-31	93438	6th January 2022
L1 Evening (21:57-22:27) and Night-time	Sound Level Meter	01dB Fusion	12798	24th November 2020
	Pre-amplifier	01dB PRE22	2004238	
	Microphone	GRAS 40CD	367007	
	Calibrator	01dB CAL-31	93438	6th January 2022

4.2.2 The measurement equipment was checked against the appropriate calibrator at the beginning and end of the measurements, in accordance with recommended practice. Calibration certificates for which are available on request.

4.3 Meteorological Conditions

4.3.1 Weather conditions during the survey period were observed as generally being dry and overcast with low wind speeds.

4.4 Measured Baseline Noise Levels

4.4.1 The table below summarises the measured data at location L1.

Table 7 - L1 Baseline Summary

Period	Duration	$L_{Aeq,T}$ dB	$L_{AFmax,T}$ dB	$L_{A10,T}$ dB	$L_{A90,T}$ dB
Daytime (12:07-15:07)	3 hours	57.3	87.3	60.0	50.7
Evening (between 19:04-19:34 and 21:57-22:27)	1 hour	59.7	81.8	62.4	48.9
Night-time (00:54-01:24)	30 minutes	59.6	86.4	62.3	42.4

4.4.2 Full measurement data is included in **Appendix C**.

4.4.3 The L_{Aeq} levels presented in the table above are the logarithmic average of each measurement period. The L_{A90} and L_{A10} are the arithmetic average for each measurement period. The L_{AFmax} is the highest level measured during each measurement period.

4.4.4 The dominating noise source identified during the day, evening, and night-time measurements was Oldham Road (A62) where there was a frequent flow of HGVs and cars. During the daytime period frequent mechanical noises were noticed to be coming from the adjacent Manchester MOT Centre, this had closed during the evening and night periods. In periods of no passing traffic, birdsong could be heard.

5.0 Assessment

5.1 Plant Noise Limits

5.1.1 The details of the fixed plant associated with the Site were not available at the time of assessment. Therefore, plant noise limits at the receptor have been set to avoid adverse impacts.

5.1.2 To provide a worst-case assessment the closest receptor to the Site is chosen, identified to be a residential receptor approximately 10m west of the Site boundary.

5.1.3 In line with MCC Planning & Noise Technical Guidance, fixed plant should be designed to achieve a rating level of 5dB (L_{Aeq}) below the typical background (L_{A90}) level at the nearest noise sensitive location. Therefore, limits have been set by subtracting 5dB from the measured background sound level. These limits are set out in **Table 8.**

Table 8 - BS 4142 Assessment

Receptor	Period	Background Sound Level, $L_{A90,T}$ (dB)	Rating Level $L_{Ar,T}$ (dB)
R1	Daytime	51	46
	Night-time	42	37

5.1.4 The rating level limits set out above are inclusive of any applicable acoustic feature corrections. Therefore, the specific noise level of fixed plant items may need to be lower than the limits set out above.

5.1.5 Once the full detail of the proposed plant is known it is advised that a full detailed assessment be conducted to ensure the limits above are met.

5.2 Night-Time L_{AFmax} Event – BS 8233 Assessment

5.2.1 A typical L_{AFmax} noise event is assumed to occur when the Site is operational and would typically be attributable to vehicle door slams. The assessment uses the L_{AFmax} noise event level set out in **Table 5** and calculates the internal noise level from this.

5.2.2 As suggested by the EHO at MCC, it is assumed that a partially open window will provide 12dB attenuation.

5.2.3 **Table 9** calculates the internal noise level based on the L_{AFmax} noise event level for parking spaces at varying distances from R1. The location of these parking spaces is shown in **Figure 2**. Calculations have been undertaken for ground, first, second, and third floor apartments.

Table 9 - Highest Predicted L_{AFmax} Noise Level

Apartment Floor	Parking Bay Location[3]	External L_{AFmax} noise event level dB	Attenuation for partially open window dB	WHO Internal noise level criteria L_{AFmax}	Calculated internal noise level (dB L_{AFmax})[4]	Difference dB[5]
Ground	Closest	69.0	12	45	57.0	+12.0
	Middle	56.6	12	45	44.6	-0.4
	Furthest	50.0	12	45	38.0	-7.0
First	Closest	68.0	12	45	56.0	+11.0
	Middle	59.2	12	45	47.2	+2.2
	Furthest	51.4	12	45	39.4	-5.6
Second	Closest	66.6	12	45	54.6	+9.6
	Middle	59.0	12	45	47.0	+2.0
	Furthest	52.7	12	45	40.7	-4.3
Third	Closest	65.1	12	45	53.1	+8.1
	Middle	58.7	12	45	46.7	+1.7
	Furthest	53.7	12	45	41.7	-3.3

5.2.4 **Table 9** above shows that internal night-time criteria would exceeded when the closest bay to the residential receptors is used. Bays in the middle of the Site would also lead to an exceedance of WHO guidelines from the first floor upwards. Guideline levels would not be exceeded from bays furthest from the residential receptor.

5.2.5 During the night-time baseline noise survey at the Site the measured $L_{AFmax,T}$ was 86.4 dB. As presented in **Table 5**, the measured L_{AFmax} of a vehicle door slam is 72.1 dB. Therefore, existing L_{AFmax} levels recorded at the Site are higher than modelled vehicle door slams. Considering this, it is considered that, within the context of the wider Site, L_{AFmax} noise events associated with operation during the night-time period will have a **negligible** impact on receptors.

5.2.6 It is noted that Section 3.7.1.5 of MCC Planning and Noise Technical Guidance states that L_{AFmax} levels "*should aim to be controlled so as not to exceed 60 dB (L_{Amax}) at the façade of noise sensitive premises nearby*". Reviewing the external noise levels presented in the table above, this level is only exceeded when the bays closest to the receptor are used.

[3] Relative to Receptor R1
[4] The Calculated internal noise level is calculated by subtracting the Attenuation from a partially open window (12dB) from the External L_{AFmax} noise event level
[5] The Difference is calculated by subtracting the Internal noise level criteria from the Calculated internal noise level

6.0 Summary and Conclusions

6.1.1 Lucion Delta-Simons Limited ("Lucion Delta-Simons") was instructed by Be.EV (the 'Client') to prepare a Noise Impact Assessment to inform a planning application for the development of an Electric Vehicle (EV) charging station consisting of 16 spaces, substation, and adjacent commercial space (the 'Proposed Development') located on land off Reliance Street, Manchester, M40 1EZ (the 'Site').

6.1.2 This assessment has been informed by a baseline noise survey in order to quantify the existing background noise environment at the sensitive receptors.

6.1.3 This assessment has been undertaken to identify the key noise sources associated with the proposal which may have the potential to impact upon the closest sensitive residential dwellings.

6.1.4 Accordingly, this assessment has been completed with due regard to:

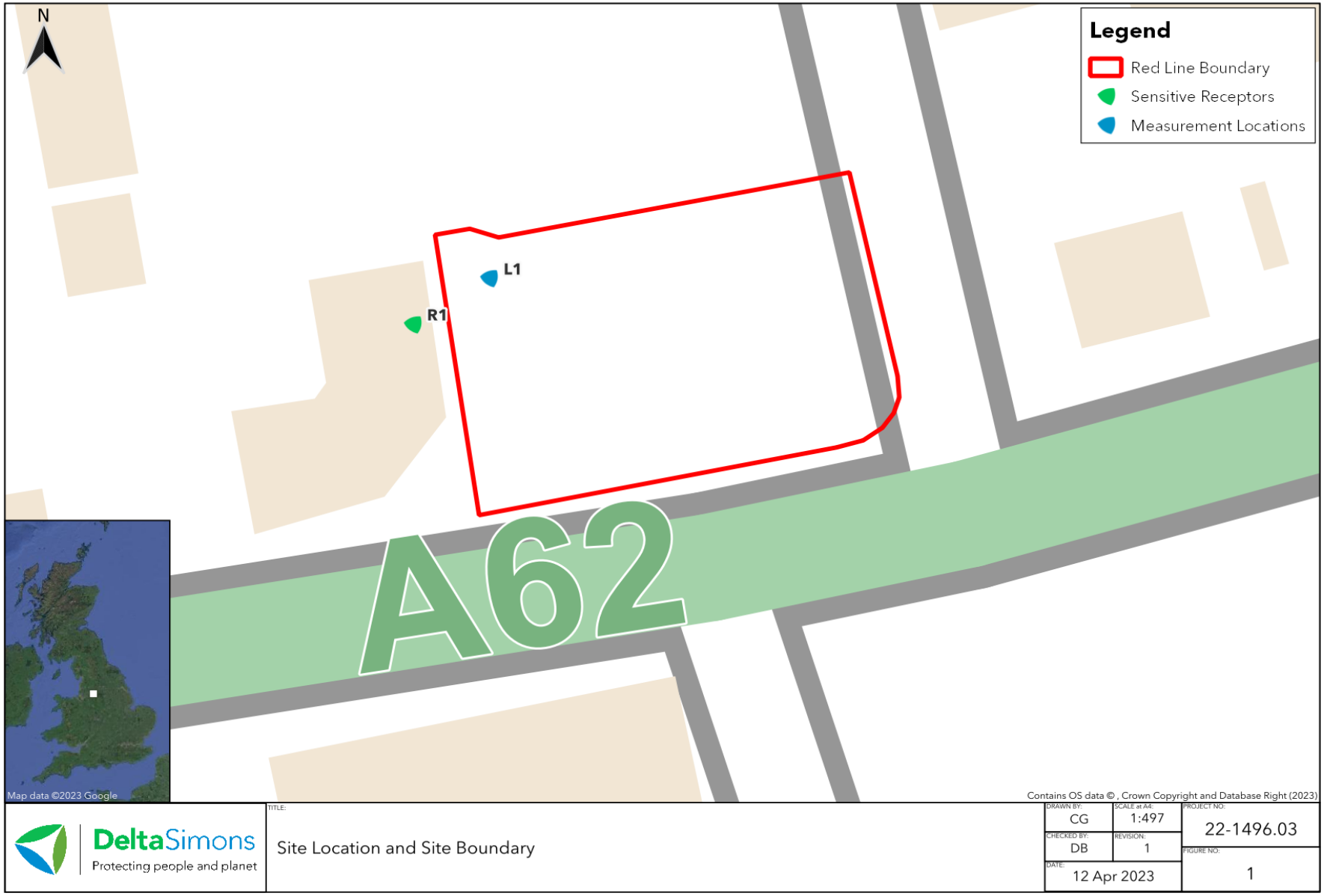
- National Planning Policy Framework (NPPF) and its associated Planning Policy Guidance (PPG)
- BS 4142:2014+A1:2019 'Methods for rating and assessing industrial and commercial sound',
- BS 8233:2014 'Guidance on sound insulation and noise reduction for buildings' and
- Calculation of Road Traffic Noise (CRTN) & Design Manual for Roads and Bridges (DMRB) LA 111 Noise and Vibration.

6.1.5 At the time of this assessment, details regarding the location and sound emission of fixed plant associated with the Site are not available. Therefore, the assessment has set noise levels at the receptor in order to avoid adverse impacts at the sensitive receptors. Noise from fixed plant should not exceed **46dB $L_{Ar,1hr}$** during daytime hours, and **37dB $L_{Ar,15min}$** during night-time hours at the receptor.

6.1.6 Assessment of L_{AFmax} noise events associated with vehicle door slams has shown that predicted noise levels at the receptor would not exceed internal WHO and MCC noise level criteria when bays in the western half of the Site are used at night; however, in the context of the wider Site, it is predicted L_{AFmax} noise events associated with the Proposed Development will be lower than those already experienced at the receptor due to existing noise sources. Therefore it is concluded the Site will have a **negligible** impact on NSRs.

6.1.7 Due to the small number of charging bays proposed and the surrounding arterial road network, it is considered that the development would not increase the number of vehicles on the A62 to perceptibly increase the noise level at NSRs, and therefore impacts from road traffic noise are considered to be **negligible**.

Figure 1 - Site Location and Site Boundary



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TITLE: Site Location and Site Boundary

DRAWN BY:	SCALE at A4:	PROJECT NO:
CG	1:497	22-1496.03
CHECKED BY:	REVISION:	FIGURE NO:
DB	1	1
DATE:		
12 Apr 2023		

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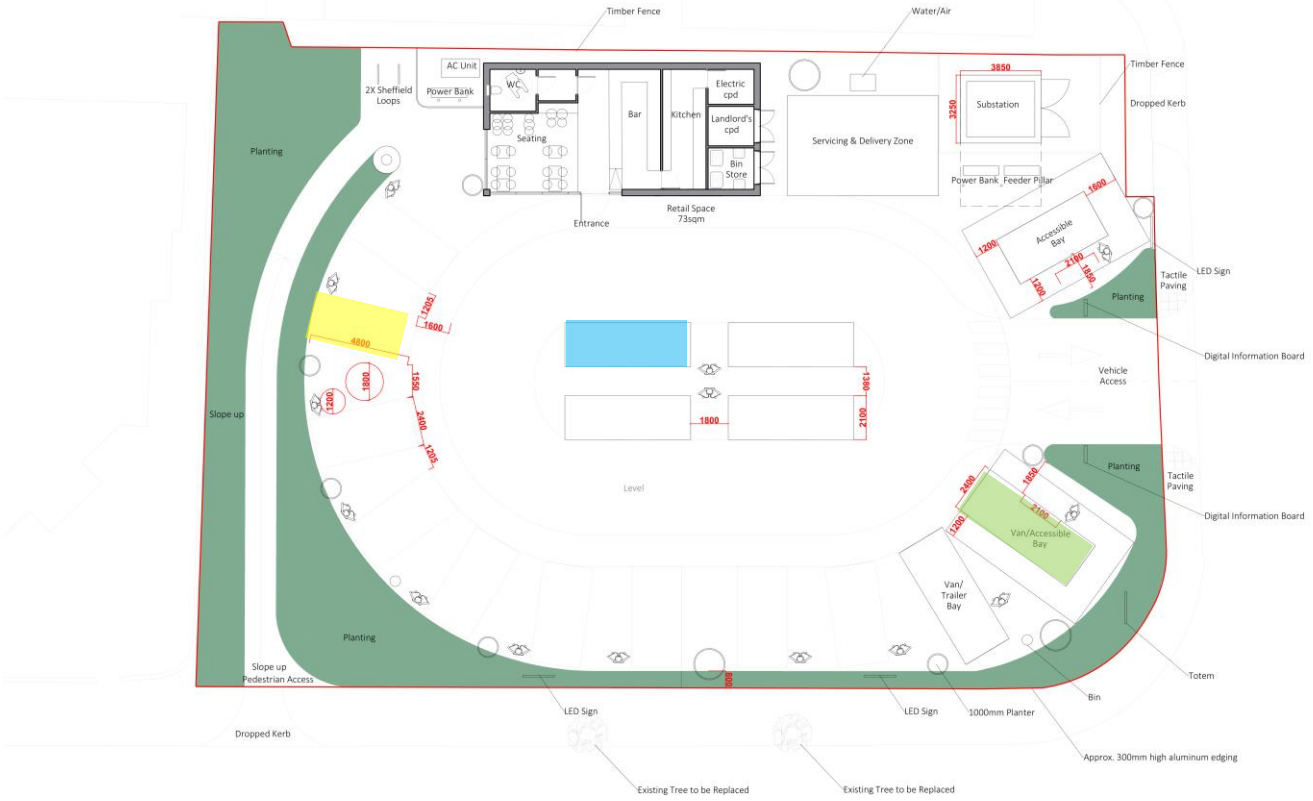
Figure 2 - Site Layout and L_{AFmax} Noise Source Modelling Locations



L_{AFmax} Calculation Bay Locations

- Closest Bay
- Middle Bay
- Furthest Bay

rev	date	description	revised by	audited by
P15	2024.04.12	Updated Plan	LL	EL
P14	2024.04.11	Updated Plan	LL	EL
P13	2024.04.11	Updated Plan	LL	EL
P12	2024.04.08	Updated Plan	HF	LL
P11	2024.04.08	Updated Retail Space	HF	LL
P10	2024.03.28	Updated Plan	HF	LL
P9	2024.03.27	ISSUE Planning Consultant	HF	LL
P8	2024.03.26	ISSUE Planning Consultant	HF	LL
P7	2024.03.22	Updated EV Equipment Layout	LL	EL
P6	2024.03.20	Issue to MES for EV Equipment Layout	LL	EL
P5	2024.03.14	Updated Proposal	LL	EL
P4	2023.05.12	Updated Site Boundary	LL	EL
P3	2023.05.03	Updated Waste Storage & Tactile Paving	LL	EL
P2	2023.04.25	Updated Bicycle Location	LL	EL
P1	2022.11.29	ISSUE Planning	LL	EL

stage: PLANNING
drawing title: PROPOSED Site Plan
suitability code: S2

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client: Be.EV
project: Reliance Street Oldham

scale	drawn by	audited by	job no.	originator	zone	level	type	role	drawing no.	revision
1:100@A1 1:200@A3	HF	LL	612	AT	ZZ	GR	DR	A	3.1001	P15

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Appendix A – Limitations

Limitations

The recommendations contained in this Report represent Lucion Delta-Simons professional opinions, based upon the information listed in the Report, exercising the duty of care required of an experienced Environmental Consultant. Lucion Delta-Simons does not warrant or guarantee that the Site is free of hazardous or potentially hazardous materials or conditions.

Lucion Delta-Simons obtained, reviewed and evaluated information in preparing this Report from the Client and others. Lucion Delta-Simons conclusions, opinions and recommendations has been determined using this information. Lucion Delta-Simons does not warrant the accuracy of the information provided to it and will not be responsible for any opinions which Lucion Delta-Simons has expressed, or conclusions which it has reached in reliance upon information which is subsequently proven to be inaccurate.

This Report was prepared by Lucion Delta-Simons for the sole and exclusive use of the Client and for the specific purpose for which Lucion Delta-Simons was instructed. Nothing contained in this Report shall be construed to give any rights or benefits to anyone other than the Client and Lucion Delta-Simons, and all duties and responsibilities undertaken are for the sole and exclusive benefit of the Client and not for the benefit of any other party. In particular, Lucion Delta-Simons does not intend, without its written consent, for this Report to be disseminated to anyone other than the Client or to be used or relied upon by anyone other than the Client. Use of the Report by any other person is unauthorised and such use is at the sole risk of the user. Anyone using or relying upon this Report, other than the Client, agrees by virtue of its use to indemnify and hold harmless Lucion Delta-Simons from and against all claims, losses and damages (of whatsoever nature and howsoever or whensoever arising), arising out of or resulting from the performance of the work by the Consultant.

Appendix B - Glossary

Glossary

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq}, L_{A90} etc., according to the parameter being measured.

The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

An indication of the range of sound levels commonly found in the environment is given in the following table.

Table B1 - Typical Sound Pressure Levels

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

Table B2 - Terminology

Descriptor	Explanation
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 ($2x10^{-5}$Pa).
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.
$L_{Aeq, T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} 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 Leq noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{10} & L_{90}	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.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and away from buildings.
Fast	A time weighting used in the root mean square section of a sound level meter with a 125 millisecond time constant.
Slow	A time weighting used in the root mean square section of a sound level meter with a 1000 millisecond time constant.

Appendix C – Measurement Data

Location L1 – Daytime

Table C 1 – L1 Daytime Measurement Data

Date/Time	Measured Level, dB			
	$L_{Aeq,10\text{-}min}$	$L_{Amax,fast}$	$L_{A10,10\text{-}min}$	$L_{A90,10\text{-}min}$
25/08/2022 12:07	58.0	87.3	60.3	50.1
25/08/2022 12:17	57.6	67.9	60.5	50.6
25/08/2022 12:27	57.0	66.1	60.0	51.7
25/08/2022 12:37	56.5	65.7	59.6	50.6
25/08/2022 12:47	57.3	69.7	60.2	50.4
25/08/2022 12:57	57.7	71.1	60.3	51.0
25/08/2022 13:07	57.1	68.2	59.9	51.7
25/08/2022 13:17	58.0	80.0	60.4	50.4
25/08/2022 13:27	57.8	70.7	60.5	51.3
25/08/2022 13:37	57.3	72.6	60.2	51.3
25/08/2022 13:47	57.4	67.1	60.3	52.0
25/08/2022 13:57	57.6	69.5	60.4	51.3
25/08/2022 14:07	56.7	65.9	60.0	48.7
25/08/2022 14:17	56.7	66.8	59.7	50.6
25/08/2022 14:27	57.0	67.0	59.8	49.8
25/08/2022 14:37	57.9	77.3	59.5	51.2
25/08/2022 14:47	57.0	68.5	60.0	50.7
25/08/2022 14:57	56.9	70.4	59.8	49.2
25/08/2022 15:07	57.3	71.6	59.5	49.9

Location L1 – Evening

Table C 2 - L1 Evening Measurement Data

Date/Time	Measured Level, dB			
	$L_{Aeq,10\text{-}min}$	$L_{Amax,fast}$	$L_{A10,10\text{-}min}$	$L_{A90,10\text{-}min}$
25/08/2022 19:04	56.3	70.6	59.3	49.3
25/08/2022 19:14	58.0	72.4	61.4	48.5
25/08/2022 19:24	61.7	76.6	65.1	52.6
25/08/2022 19:34	56.7	59.6	58.2	53.5
25/08/2022 21:57	60.4	71.6	64.1	45.3
25/08/2022 22:07	60.5	70.3	63.6	48.2
25/08/2022 22:17	60.9	81.8	63.8	46.0
25/08/2022 22:27	59.7	67.3	63.3	48.0

Location L1 – Night-time

Table C 3 – L1 Night-time Measurement Data

Date/Time	Measured Level, dB			
	$L_{Aeq,1\text{-}min}$	$L_{Amax,fast}$	$L_{A10,1\text{-}min}$	$L_{A90,1\text{-}min}$
26/08/2022 00:54	54.9	61.9	59.2	45.9
26/08/2022 00:55	58.1	65.6	62.0	45.7
26/08/2022 00:56	61.4	68.4	65.9	45.0
26/08/2022 00:57	59.0	69.3	63.1	41.2
26/08/2022 00:58	52.4	64.8	56.9	40.6
26/08/2022 00:59	55.1	65.8	59.8	41.1
26/08/2022 01:00	61.8	71.1	68.3	39.4
26/08/2022 01:01	57.8	67.6	62.9	42.3
26/08/2022 01:02	57.3	66.6	61.5	42.7
26/08/2022 01:03	67.2	83.0	70.4	45.1
26/08/2022 01:04	59.1	68.7	64.0	45.4
26/08/2022 01:05	56.9	65.9	62.4	42.6
26/08/2022 01:06	56.4	66.3	62.8	41.2
26/08/2022 01:07	62.8	71.9	68.0	43.9
26/08/2022 01:08	55.5	64.5	61.6	42.2
26/08/2022 01:09	61.6	68.2	65.8	48.3
26/08/2022 01:10	51.1	62.8	56.6	39.2
26/08/2022 01:11	67.6	86.4	66.4	46.4
26/08/2022 01:12	54.1	65.0	58.3	38.2
26/08/2022 01:13	55.4	65.6	60.9	39.3
26/08/2022 01:14	53.6	63.1	59.5	42.3
26/08/2022 01:15	50.3	63.6	54.3	39.7
26/08/2022 01:16	53.8	65.1	59.3	43.2
26/08/2022 01:17	60.2	69.1	66.7	40.3
26/08/2022 01:18	56.6	66.5	63.3	39.4
26/08/2022 01:19	57.3	65.7	62.6	41.9
26/08/2022 01:20	53.5	64.0	59.0	40.4
26/08/2022 01:21	57.1	66.8	63.0	41.4
26/08/2022 01:22	58.0	68.0	63.5	42.4
26/08/2022 01:23	61.8	71.0	65.6	47.4
26/08/2022 01:24	54.0	63.3	59.1	41.6
26/08/2022 01:25	53.9	65.3	60.6	41.9