

Technical Memorandum

Project : MFG Civic Centre, Manchester
Date : 26 February 2021
Ref : EC18126-2
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TITLE : Noise Impact Assessment for EV Charging Stations

This Technical Memorandum presents the results of a noise impact assessment of the proposed installation of six new Electric Vehicle (EV) charging stations at MFG Civic Centre Service Station, Manchester. This new plant, consisting of power units, charging posts, substation and LV panel, is to be located at the southern boundary of the site.

The plant noise impact has been assessed against current British Standards/World Health Organisation guidance. It has not been felt to be of practical benefit to undertake a noise survey under the current Government enforced lockdown due to the effect the restriction on peoples' movement is having on the current noise climate.

The following plant items are proposed to be installed at the site. A copy of the proposed site layout is included in Appendix A for reference.

Unit	Published Noise Emissions
6 No. Raption 150 Charging Stations (consisting of a charging post and power pack)	<55 dBA at 1m each
Max 1500kVA Transformer Substation	56 dBA Sound Power Level

Table 1 – Proposed plant including manufacturer's published noise data.

From the manufacturer's datasheet for the charging stations, it is understood that the noise emitted from the charging post is not perceptible; the 55 dBA figure therefore applies to the power packs only. The exact specification of the substation is currently not known but will be no larger than 1500kVA and we have used library noise data for typical 1500kVA substations within a GRP housing. The LV panel does not produce any noise.

The plant will be installed within a new Timber enclosure. We have currently assumed that this will be a 'hit and miss' construction and so is expected to offer a negligible level of acoustic screening.

It is expected that these charging stations will be available at any time over a 24-hour period. This assessment has been completed on the worst-case basis of all charging stations being operational simultaneously.

MFG Civic Centre is located in a mixed commercial and residential area of Wythenshawe, Manchester, with Road and Rail routes to the south. The below aerial view of the site and surroundings has been annotated showing the proposed new services location as well as the nearest identified residential dwellings.

The nearest and most affected existing noise sensitive receivers have been identified as the following:

- The residential dwellings of Robinswood Road at no less than 100m to the south of the site; and
- The Wythenshawe Methodist Church approximately 170m to the east.

Other noise sensitive receptors are at a greater distance from the proposed plant or are protected by greater level of screening from intervening structures and so will be subject to lower levels of noise.

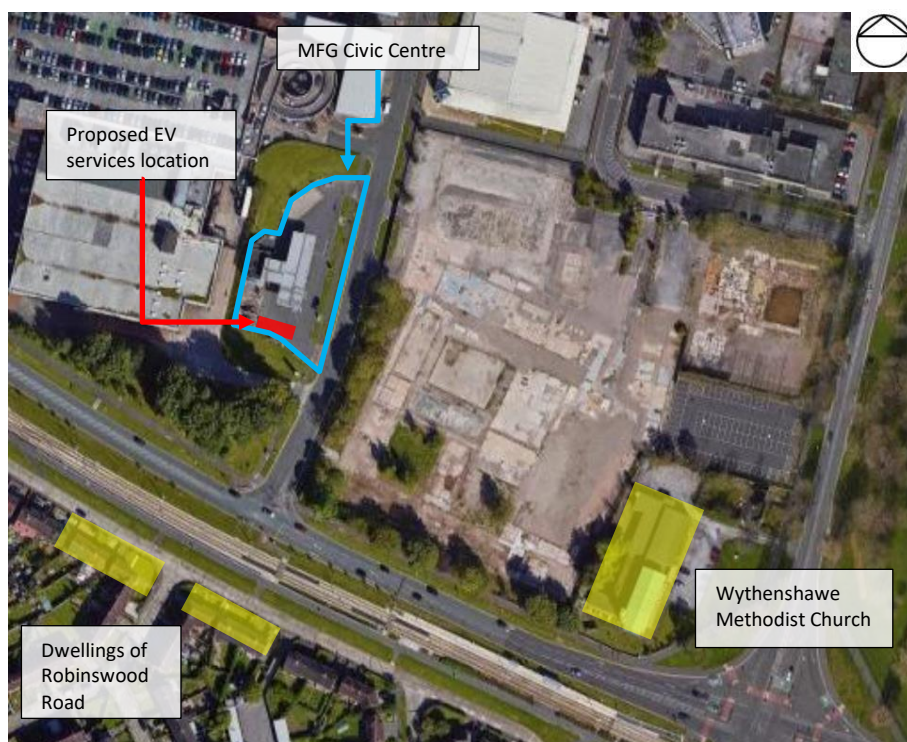


Figure 1 – Aerial view of the site and surroundings.

Figures 2 and 3 below present the results of acoustic modelling of noise emissions from the site and resultant noise immission levels. Calculations have been completed using industry standard acoustic modelling software Datakustik CadnaA, in accordance with the general calculation procedure outlined in ISO 9613.

Results are based on the worst-case simultaneous operation of all six charging bays and assume a line of sight between the new services and the nearest receiver locations.

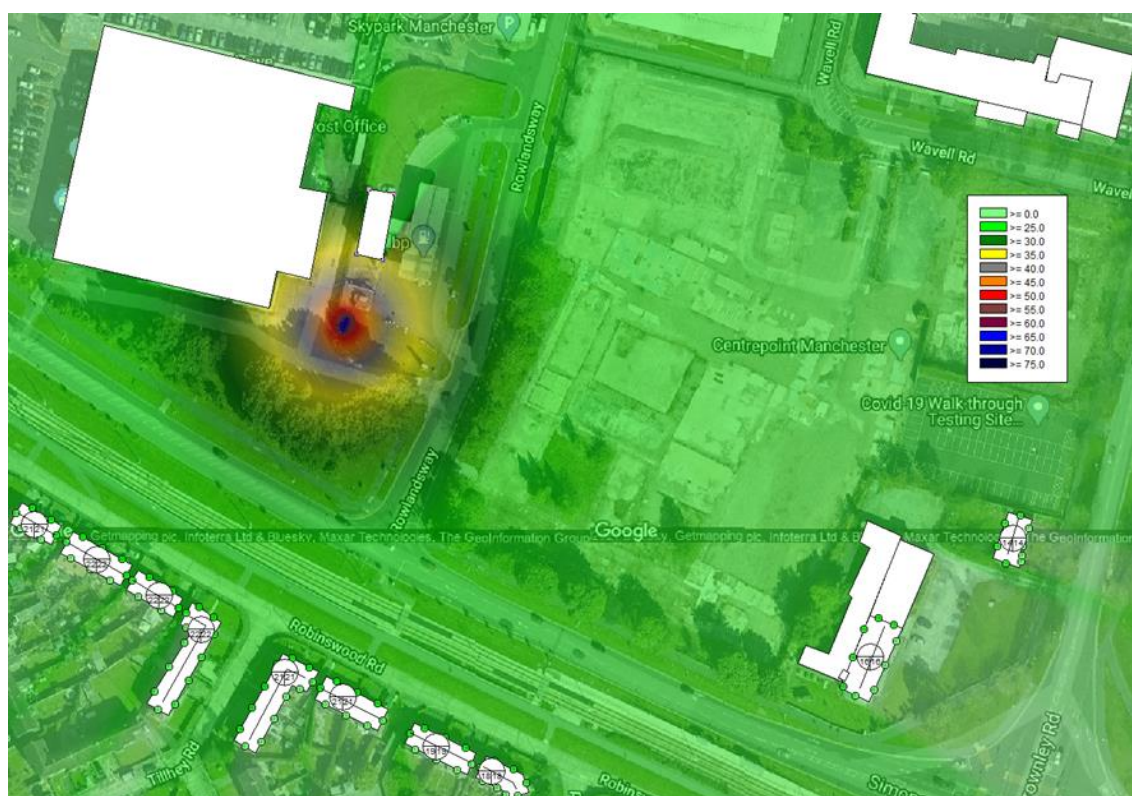


Figure 2 – Plan view of noise emissions from the site (CadnaA); all EV charging services operational.



Figure 3 – ISO view of noise emissions from the site (CadnaA); all EV charging services operational.

Receiver Location	Immission level, dB $L_{Aeq,T}$
Dwellings of Robinswood Road	22
Methodist Church	16

Table 2 – Resultant immission level at nearest noise sensitive receivers.

The calculated noise levels are based on the simultaneous operation of all charging bays. In practice, it is expected that usage will reduce significantly overnight and so noise immissions will also be reduced.

World Health Organisation's (WHO) 'Night Noise Guidelines for Europe – 2009' includes guidance on the effects of external night-time noise on the population's health. Table 5.4 of that document outlines the health effects associated with different external average, yearly night time (23:00 – 07:00) noise levels based on levels outside of bedroom windows ($L_{night,outside}$). For external noise levels up to 30dBA, although individual sensitivities and circumstances may vary, no substantial biological effects are observed. Thus, 30dBA is equivalent to the No Observed Effect level (NOEL) for night noise.

Based on the calculated worst-case resultant noise levels from the EV charging bays outside of the nearest windows being below 30dBA even during daytime hours, the operation of this new services plant could therefore be classified as achieving the NOEL.

We have also undertaken a review of the resultant noise levels expected within the most-affected residential dwellings.

BS8233:2014, 'Guidance on sound insulation and noise reduction for buildings', section 7, gives guidance on acoustic criteria and noise levels appropriate for various internal spaces that have different functions. Section 7.7 relates specifically to buildings having a residential purpose and offers guidance on appropriate internal ambient noise levels for dwellings (when unoccupied) with specific consideration:

- i. for bedrooms, the acoustic effect on sleep; and
- ii. for other rooms, the acoustic effect on resting, listening and communicating.

The guidance applies to external noise as it affects the internal acoustic environment from sources without a specific character.

Table 4 of section 7.7.2 recommends the following internal noise limits for private dwellings based on the presence of steady, external noise sources:

Table 4 Indoor ambient noise levels for dwellings

Activity	Location	07:00 to 23:00	23:00 to 07:00
Resting	Living room	35 dB $L_{Aeq,16hour}$	—
Dining	Dining room/area	40 dB $L_{Aeq,16hour}$	—
Sleeping (daytime resting)	Bedroom	35 dB $L_{Aeq,16hour}$	30 dB $L_{Aeq,8hour}$

The guidance criteria are based upon research and existing guidelines provided by the World Health Organisation and is based upon steady noise of an anonymous nature.

It is generally considered that the sound insulation provided by a partially open window will be 10-15dB, dependent on window type, extent of opening and source frequency content. Adopting a minimum reduction of 10dB in this context will ensure that most assessments are as robust as possible.

It can be seen that in the worst case, with a partially open window reduction of 10dB, an internal ambient noise level of no more than 12 dB $L_{Aeq,T}$ will be achieved within the Robinswood Road dwellings due to the operation of the EV charging stations. This is significantly below the 30 dBA figure outlined for bedrooms and can be described as achieving the NOEL.

On the basis of this assessment, it is considered that noise does not pose a material constraint to the operation of the new proposed EV charging stations at MFG Civic Centre, Manchester.

Appendix A

PROPOSED SITE LAYOUT

quietly moving forward

