RESULTS OF A 24-HOUR NOISE LEVEL SURVEY CARRIED OUT IN THE REAR GARDEN OF THE RESIDENTIAL HOUSE LOCATED AT 31 ELSWORTHY ROAD, LONDON NW3 AND A REPORT ON THE NOISE IMPACT OF THE PROPOSED NEW EXTERNAL PLANT

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Authorised for Release by : I J Marchant

Client	:	Carnell Warren Associates/Elsworthy Road (Investments) Ltd
Project	:	31 Elsworthy Road, London NW3
Emtec Ref.	:	QF10301/PF6859/RP1
Issue Date	:	11th January 2021

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1.0. INTRODUCTION

This report details the results of a 24-hour noise survey carried out in the rear garden behind the residential property located at 31 Elsworthy Road, London NW3.

The objectives of the survey were as follows:

- To assess the proposal to install new air cooled condensers in the rear garden of the property.
- To identify the nearest residential properties that would be affected by noise from the new plant.
- To establish the existing background noise level outside the nearest affected properties.
- To recommend noise limits and any necessary mitigating measures to ensure that the operation of the new plant does not disturb the occupants of the nearest affected properties and meets the planning directives of the local authority with regard to noise.

This report has been divided into the following sections for ease of analysis:

2.0. SITE DESCRIPTION

The house located at 31 Elsworthy three storey, detached building with brick facades under a pitched, slate roof. The building has a stone paved front garden area, which fronts onto Elsworthy Road. and has a substantial rear garden with a stone patio onto a grass lawn.

The house is in the residential area of Chalk Farm just north of Regents Park.

The front and rear façades of the building can be seen in the attached Photos A and C.

There are similar residential properties on either side No 31 as can be seen in the attached Photos C, D and E. An aerial overview of the site can be seen on the attached Photo F.

3.0. TEST INSTRUMENTATION

All measurement equipment used during the survey complied with the requirements of BS4142:2014 "Method for Rating Industrial Noise Affecting Mixed Residential and Industrial Areas". Details of the equipment are as follows:

Integrating Sound Level Meter: Rion type NL-52 class 1 Sound Level Meter fitted with a Rion type UC-59 ½ inch condenser microphone. Serial No.: 01121380

Statistical Analysis Modules: Built in module capable of computing the percentile levels LA_1, LA_{10}, LA_{50}, LA_{90} and LA_{99} and also the LA_{eq} level.

Acoustic Calibrator: Bruel & Kjaer type 4231 electronic calibrator. Serial No.: 1934160

Calibration was performed before and after the survey and was +/- 0.1 dB from the reference source.

3.1. Existing Noise Climate

Road traffic travelling on surrounding roads could be heard at the start and end of the survey, so the noise levels measured will include contributions from road vehicles.

Commercial jet aircraft were observed at medium and high altitude during the manned periods at the start and the end of the survey, so it is possible that the noise levels measured could include contributions from medium altitude jet aircraft. However aircraft movements may be less than normal due to the current Covid 19 travel restrictions.

There are no overland railways nearby, so the noise levels measured will not include contributions from rail noise.

Construction works were not observed being carried out in the vicinity during the manned periods at the start and end of the survey so the sound levels recorded should be typical of normal daytime background noise levels.

4.0. TEST PROCEDURE

The survey was conducted during a continuous 24-hour period from 11:03 am on Monday the 21st of December 2020 to 11:03 am on Tuesday the 22nd of December 2020.

Data was continuously acquired throughout the measurement period with the individual averaging time for statistical noise data set to 15 minutes. The following 'A' weighted statistical measurements were recorded concurrently: -

LA_1 - The Sound Pressure Level exceeded for 1% of the measurement period.

LA_{10} - The Sound Pressure Level exceeded for 10% of the measurement period.

LA_{50} - The Sound Pressure Level exceeded for 50% of the measurement period.

LA_{90} - The Sound Pressure Level exceeded for 90% of the measurement period. LA_{90} is considered to represent the "background noise level" during the measurement period and is used for the assessment of noise to determine the likelihood of complaints (See BS 4142:2014).

LA_{99} - The Sound Pressure Level exceeded for 99% of the measurement period.

LA_{eq} - The continuous steady state Sound Pressure Level that has the same acoustic energy as the real fluctuating level.

4.1. Measurement Positions

The microphone was mounted on a tripod and was positioned on the back edge of the stone patio at the rear of the house. The microphone was approximately in the centre of the width of the garden. The location of the microphone can be seen on the attached Photos B, C, D and E.

The microphone was connected by a low impedance cable to the associated instrumentation which was contained within a weatherproof housing.

4.2 Weather Conditions

The weather conditions prevailing during the measurement period were in line with those recommended in BS 4142:2014: -

Weather daytime: -	Overcast	Weather night time: -	Overcast
Wind daytime: -	Calm	Wind night time: -	Calm

The microphone was protected during the survey by an acoustically transparent wind balloon.

5.0. RESULTS AND EVALUATION OF NOISE CRITERIA

The raw test data, gathered during the noise survey, is given in Appendix 'A 'of this report.

The 'A' Weighted L_{eq} levels measured over each 15 minute interval throughout the 24-hour period, denoted by LA_{eq}, (15 mins), are displayed as a bar graph on the attached Sketch No QF/10301/T1 at the back of this report.

The 'A' Weighted percentile levels measured over each 15 minute interval throughout the 24-hour period, denoted by LA_{10} (15 mins), LA_{50} (15 mins) and LA_{90} (15 mins) are displayed as line graphs on the attached Sketch No QF/10301/T2 at the back of this report.

5.1. Summary of Results

The table QF/10301/D1 below summarises the noise levels taken over the 24-hour period in terms of the maximum and minimum Sound Pressure Levels recorded.

Table QF/10301/D1 – Summary of Maximum and Minimum Noise Levels

	LA_{eq}	**LA_{1}**	**LA_{10}**	**LA_{50}**	**LA_{90}**	**LA_{99}**
Minimum	39dBA	45dBA	42dBA	37dBA	34dBA	33dBA
Maximum	54dBA	67dBA	57dBA	47dBA	46dBA	45dBA

The table QF/10301/D2 below states the minimum LA_{90} noise levels recorded during the time periods of 7.00am to 23.00pm (Daytime / Evening) and between 23.00pm and 7.00am (Night time)

Table QF/10301/D2 – Minimum LA_{90} Noise Levels – Daytime/Evening and Night time

	Minimum LA_{90}
Daytime/Evening (7am to 11pm)	35dBA
Night Time (11pm to 7am)	34dBA

5.2. Summary of the Local Authority's planning requirements regarding noise for noise sensitive properties

The local planning authority is the London Borough of Camden.

The Camden Local Plan sets out the Council's planning policies and replaces the Core Strategy and Development Policy planning documents (adopted in 2010). It ensures that Camden continues to have robust, effective and up-to-date planning policies that respond to changing circumstances and the borough's unique characteristics and contribute to delivering the Camden Plan and other local priorities.

The Local Plan will cover the period from 2016-2031. Policy A4 of The Local Plan is entitled Noise and Vibration and states:

The Council will seek to ensure that noise and vibration is controlled and managed. Development should have regard to Camden's Noise and Vibration thresholds (Appendix 3). We will not grant planning permission for a) a development likely to generate unacceptable noise and vibration impacts or b) a development sensitive to noise in locations which experience high levels of noise, unless appropriate attenuation measures can be provided and will not harm the continued operation of existing uses. We will only grant permission for noise generating development, including any plant and machinery, if it can be operated without causing harm to amenity. We will also seek to minimise the impact on local amenity from deliveries and from the demolition and construction phases of development.

The parts of Appendix 3 that we have identified as relevant to this application are as follows:

Appendix 3: Noise thresholds

The significance of noise impact varies dependent on the different noise sources, receptors and times of operation presented for consideration within a planning application. Therefore, Camden's thresholds for noise and vibration evaluate noise impact in terms of various 'effect levels' described in the National Planning Policy Framework and Planning Practice Guidance:

- *NOEL – No Observed Effect Level*
- *LOAEL – Lowest Observed Adverse Effect Level*
- *SOAEL – Significant Observed Adverse Effect Level*

Three basic design criteria have been set for proposed developments, these being aimed at guiding applicants as to the degree of detailed consideration needed to be given to noise in any planning application. The design criteria outlined below are defined in the corresponding noise tables. The values will vary depending on the context, type of noise and sensitivity of the receptor:

- *Green – where noise is considered to be at an acceptable level.*
- *Amber – where noise is observed to have an adverse effect level, but which may be considered acceptable when assessed in the context of other merits of the development.*
- *Red – where noise is observed to have a significant adverse effect.*

Table C: Noise levels applicable to proposed industrial and commercial developments (including plant and machinery)

Existing Noise sensitive receptor	*Assessment Location*	*Design Period*	*LOAEL (Green)*	*LOAEL to SOAEL (Amber)*	*SOAL (Red)*
*Dwellings***	*Garden used for main amenity (free field) and Outside living or dining or bedroom window (façade)*	*Day*	*'Rating level' 10dB* below background*	*'Rating level' between 9dB below and 5dB above background*	*'Rating level' greater than 5dB above background*
*Dwellings***	*Outside bedroom window (façade)*	*Night*	*'Rating level' 10dB* below background and no events exceeding 57dB L_{Amax}*	*'Rating level' between 9dB below and 5dB above background or noise events between 57dB and 88dB L_{Amax}*	*'Rating level' greater than 5dB above background and/or events exceeding 88dB L_{Amax}*

**10dB should be increased to 15dB if the noise contains audible tonal elements (day and night). However, if it can be demonstrated that there is no significant difference in the character of the residual background noise and the specific noise from the proposed development then this reduction may not be required. In addition, a frequency analysis (to include, the use of Noise Rating (NR) curves or other criteria curves) for the assessment of tonal or low frequency noise may be required.*

***levels given are for dwellings, however, levels are use specific and different levels will apply dependent on the use of the premises.*

The periods in Table C correspond to 0700 hours to 2300 hours for the day and 2300 hours to 0700 hours for the night. The Council will take into account the likely times of occupation for types of development and will be amended according to the times of operation of the establishment under consideration.

There are certain smaller pieces of equipment on commercial premises, such as extract ventilation, air conditioning units and condensers, where achievement of the rating levels (ordinarily determined by a BS:4142 assessment) may not afford the necessary protection. In these cases, the Council will generally also require an NR curve specification of NR35 or below, dependant on the room (based upon measured or predicted L_{eq} (5mins) noise levels in octave bands, 1 metre from the façade of affected premises, where the noise sensitive premise is located in a quiet background area.

5.3. Determination of noise sensitive property design criteria

We believe that the sound produced by the new plant will not be intermittent or contain tones. To comply with a green rating from the table above the new plant should therefore have a Sound Pressure Level 10dB below the lowest LA_{90} background noise level at 1 metre from the nearest noise sensitive window.

The lowest recorded LA_{90} background noise levels measured during the 24 hour survey period are given in Table QF/10301/D2 above.

Applying the above criteria gives limiting rating levels as listed in table QF/10301/D3 below:

Table QF/10301/D3 – Proposed Design Rating Levels (LA_{eq})

Existing Noise sensitive receptor	*Design Period*	*Lowest measured background level*	***Proposed rating level***	*Proposed Local Authority criteria*
Dwellings	*Day*	35*dBA*	***25dBA***	*Green*
	Night	*34dBA*	***24dBA***	*Green*

5.4. Summary of external noise criteria

Based upon the lowest measured LA_{90} background noise levels during the survey and the Council's requirements outlined above we summarise the design rating levels to be adopted for this project in table QF/10301/D4:-

Table QF/10301/D4 – recommended design rating levels $L_{Ar,T}$

Type of premises	**$L_{Ar,T}$ (7am - 11pm)**	**$L_{Ar,T}$ (11pm - 7am)**
Noise sensitive	25dBA	24dBA

6.0. DISCUSSION OF RESULTS

It is proposed to place two Daikin RXYSQ10TY1 air cooled condensers at the bottom of the rear garden of the property.

The Table QF/10301/D5 below lists the free field Sound Pressure levels of the condensers and the natural and required attenuation in order to achieve a noise level below 24dBA at 1 metre from the nearest neighbour's window.

Table QF/10301/D5 – Noise Level of Condensers and natural and required attenuation to 1 metre from the Nearest Neighbour's Window

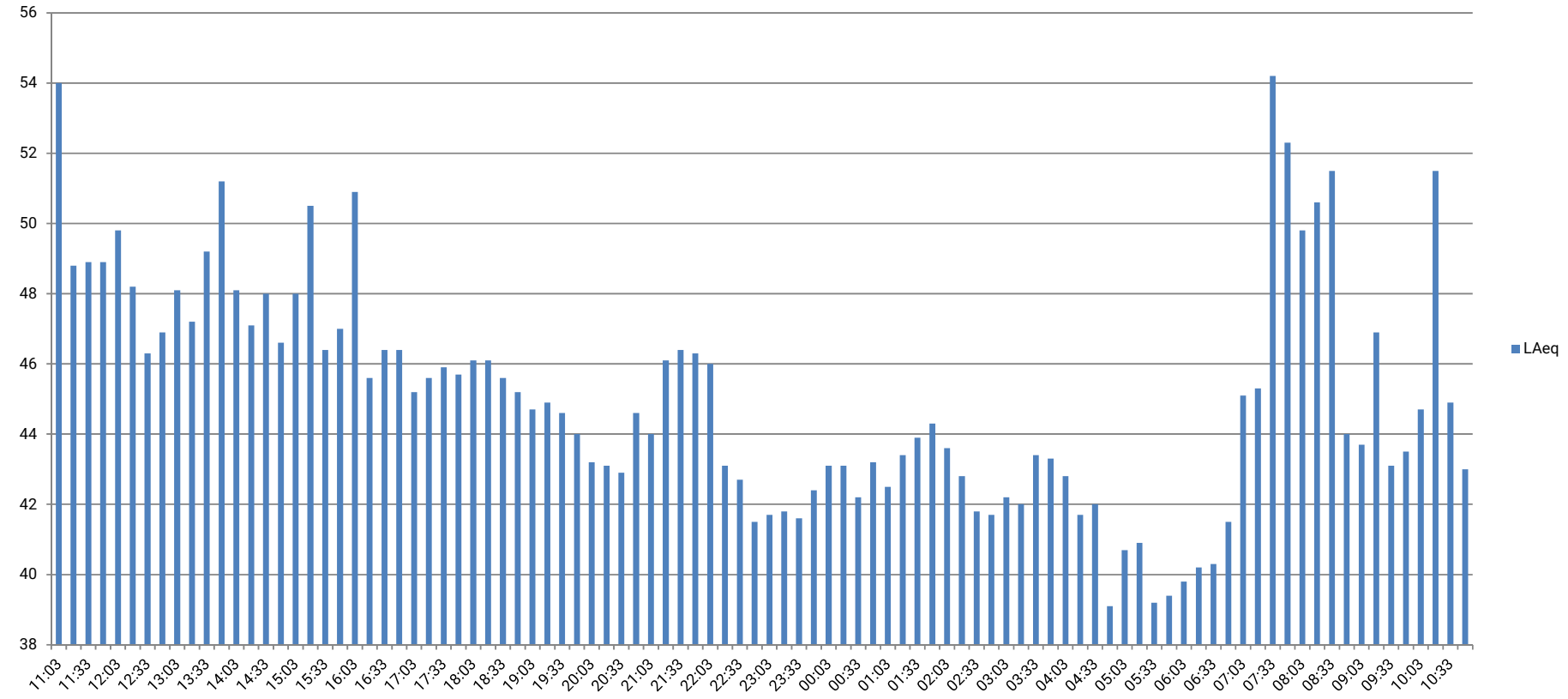
Equipment/Attenuation	Sound Pressure Level (dB ref 2 x 10^{-5} N/m^2)								dBA
	63	125	250	500	1k	2k	4k	8k	
Daikin RXYSQ10TY1 SPL at 1 metre (free field)	65	58	54	53	50	47	41	33	55
2 Units	+3	+3	+3	+3	+3	+3	+3	+3	
Reverberation	+3	+3	+3	+3	+3	+3	+3	+3	
Distance attenuation to 31 metres (10log(A_{30}/A_1))	-25	-25	-25	-25	-25	-25	-25	-25	
Resultant SPL @ 1m from nearest residential window	46	39	35	34	31	28	22	14	36
Emtec LAAC30-105 Acoustic louvres	-5	-7	-8	-12	-26	-34	-32	-22	
Attenuated Resultant SPL at 1 metre from nearest window	41	32	27	22	5	-	-	-	23

The above calculation shows that if an Emtec LAAC30-105 acoustic louvred enclosure is installed around the two Daikin RXYSQ10TY1 condensers then the night time limiting LAeq noise level of 24dBA will not be exceeded at 1 metre from the nearest neighbour's window. This will allow operation of the condenser on a 24 hour basis. The layout of this enclosure is shown on the attached sketch No QF/10301/GA1.

The condensers, within the enclosure, should be mounted onto neoprene-in-shear, anti-vibration mountings having a minimum static deflection of 6mm, so as to isolate any structural borne noise. The outlets from the condensers onto the discharge acoustic louvres should also be fitted with flexible duct connections so as to further isolate the units and ensure no short circuiting of the hot condenser discharge air.

If the above recommendations are followed the installation of the new condensers will have be in line with Camden council's planning requirements with regard to noise and will be highly unlikely to lead to any justifiable complaints under the guidelines of BS4142:2014.

Emtec Products Ltd
11th January 2021



TITLE: *LAeq Levels*	*ISSUE DATE:* *4th January 2021*				*DRAWN BY:* *MGR*	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*
CLIENT: *Carnell Warren Associates*	*PF No: 6859*				*APPROVED BY:* *MGR*	*REVISION*							
PROJECT: 31 Elsworthy Road, London NW3	*Q*	*A*	*M*	*I*	*DESIGN AUTH:* *MGR*	*SKETCH No. QF/10301/T1*							

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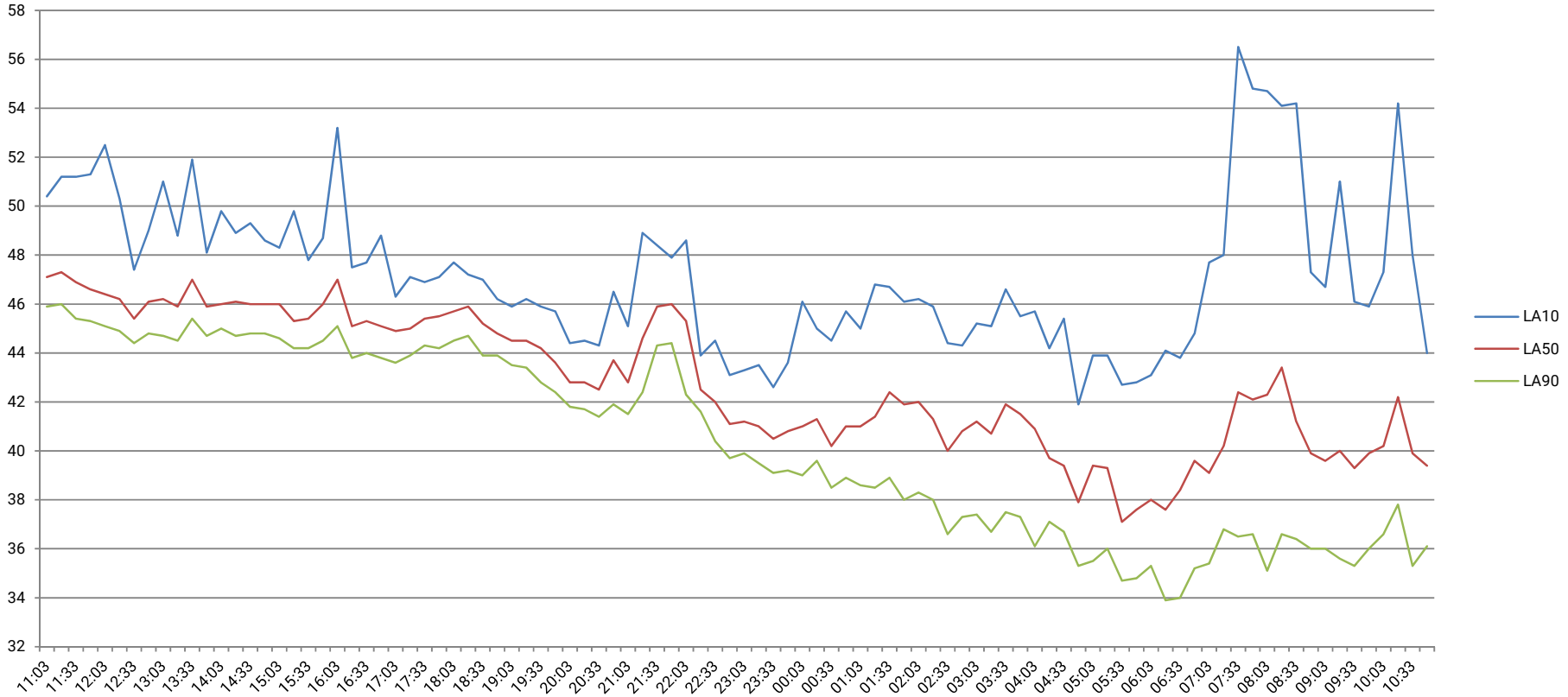

TITLE: *LA10; LA50 & LA90 Levels*	*ISSUE DATE:* *4th January 2021*				*DRAWN BY:* *MGR*	*A*	*B*	*C*	*D*	*E*	*F*	*G*	*H*
CLIENT: *Carnell Warren Associates*	*PF No: 6859*				*APPROVED BY:* *MGR*	*REVISION*							
PROJECT: 31 Elsworthy Road, London NW3	*Q*	*A*	*M*	*I*	*DESIGN AUTH:* *MGR*	*SKETCH No. QF/10301/T2*							

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APPENDIX 'A'

Raw Data – Noise Survey

21st of December 2020 to 22nd of December 2020

EMTEC PRODUCTS LTD.

Project: 31 Elsworthy Road, London NW3
Client: Carnell Warren Associates/Elsworthy Road (Investments) Ltd
Date: 21st to 22nd December 2020
Serial No: 01121380

Address	Start Time	LA_{eq}	LE	Lmax	Lmin	LA_{1}	LA_{10}	LA_{50}	LA_{90}	LA_{99}
1	11:03	54	84	85	44	61	50	47	46	45
2	11:18	49	78	63	44	56	51	47	46	45
3	11:33	49	79	62	44	58	51	47	45	45
4	11:48	49	79	65	44	58	51	47	45	45
5	12:03	50	79	68	44	59	53	46	45	44
6	12:18	48	78	65	44	57	50	46	45	44
7	12:33	46	76	65	43	53	47	45	44	44
8	12:48	47	77	57	43	52	49	46	45	44
9	13:03	48	78	59	43	55	51	46	45	44
10	13:18	47	77	66	43	54	49	46	45	44
11	13:33	49	79	67	44	57	52	47	45	45
12	13:48	51	81	74	43	66	48	46	45	44
13	14:03	48	78	66	44	57	50	46	45	44
14	14:18	47	77	60	43	54	49	46	45	44
15	14:33	48	78	68	43	57	49	46	45	44
16	14:48	47	76	57	43	51	49	46	45	44
17	15:03	48	78	69	43	54	48	46	45	44
18	15:18	51	80	70	43	63	50	45	44	44
19	15:33	46	76	58	43	54	48	45	44	44
20	15:48	47	77	61	43	54	49	46	45	44
21	16:03	51	81	70	43	62	53	47	45	44
22	16:18	46	75	56	42	50	48	45	44	43
23	16:33	46	76	62	42	55	48	45	44	43
24	16:48	46	76	61	43	52	49	45	44	43
25	17:03	45	75	57	42	50	46	45	44	43
26	17:18	46	75	55	43	51	47	45	44	43
27	17:33	46	76	58	43	52	47	45	44	43
28	17:48	46	75	53	42	49	47	46	44	43
29	18:03	46	76	53	43	50	48	46	45	44
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31	18:33	46	75	53	43	51	47	45	44	43
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33	19:03	45	74	53	41	48	46	45	44	42
34	19:18	45	75	53	42	49	46	45	43	43
35	19:33	45	74	59	41	49	46	44	43	42
36	19:48	44	74	53	41	48	46	44	42	42
37	20:03	43	73	54	40	46	44	43	42	41
38	20:18	43	73	50	41	47	45	43	42	41
39	20:33	43	73	53	40	47	44	43	41	40
40	20:48	45	74	56	40	52	47	44	42	41
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53	00:03	43	73	55	37	51	46	41	39	38
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55	00:33	42	72	54	36	51	45	40	39	37
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64	02:48	42	71	52	34	48	44	41	37	36
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66	03:18	42	72	52	34	48	45	41	37	35
67	03:33	43	73	55	34	50	47	42	38	36
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91	09:33	43	73	65	32	53	46	39	35	34
92	09:48	44	73	62	32	54	46	40	36	34
93	10:03	45	74	67	33	55	47	40	37	35
94	10:18	52	81	70	34	64	54	42	38	36
95	10:33	45	75	63	32	56	48	40	35	33
96	10:48	43	73	63	33	54	44	39	36	34

APPENDIX ‘B’

Photos and Drawing

Photo A: View of front façade of property at 31 Elsworthy Road, London NW3

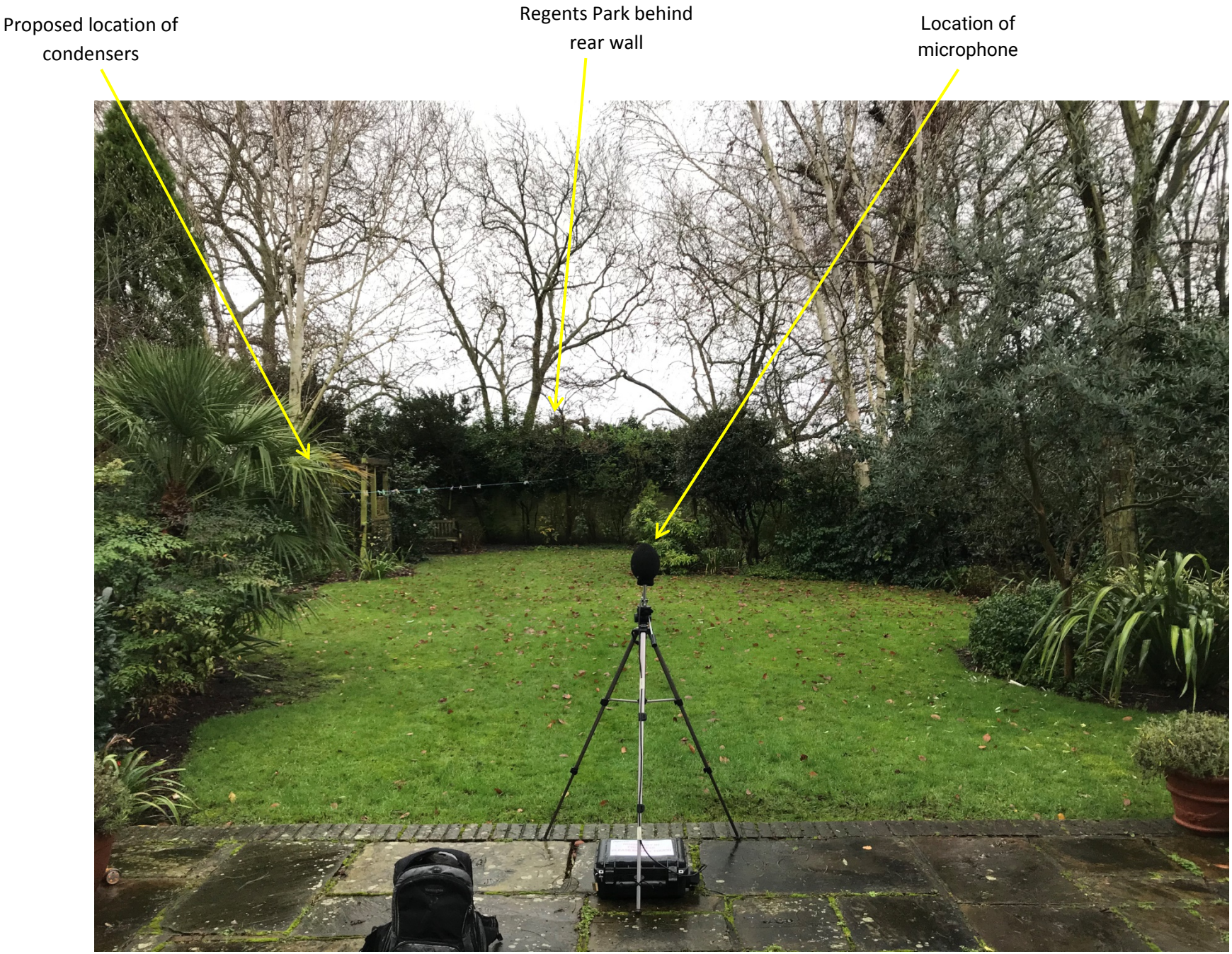


Photo B: View of rear garden of property at 31 Elsworthy Road, London NW3

Photo C: View of rear facade of property at 31 Elsworthy Road, London NW3

Photo D: View looking to the south west from rear of property at 31 Elsworthy Road, London NW3

Photo E: View looking to the north east from rear of property at 31 Elsworthy Road, London NW3

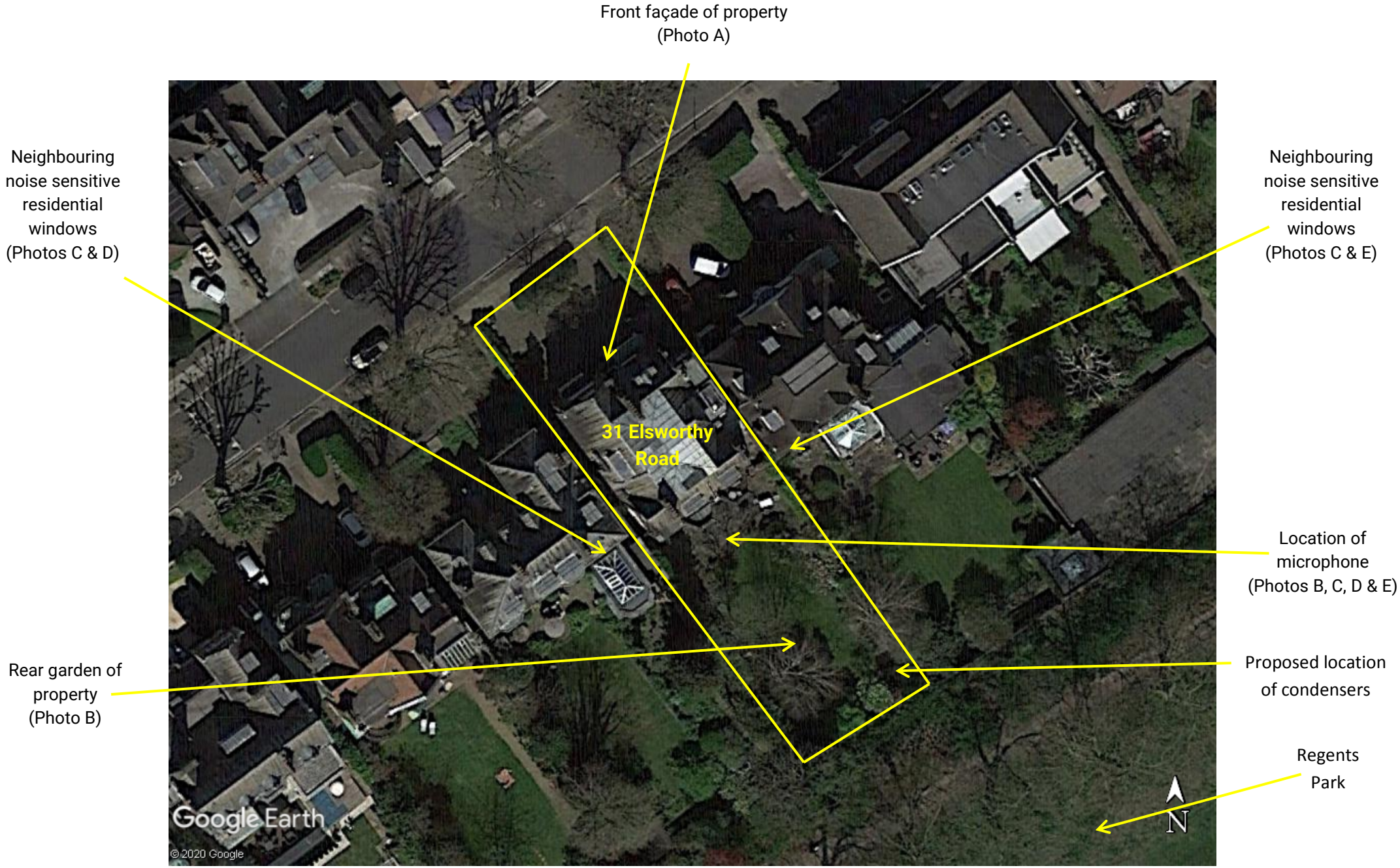
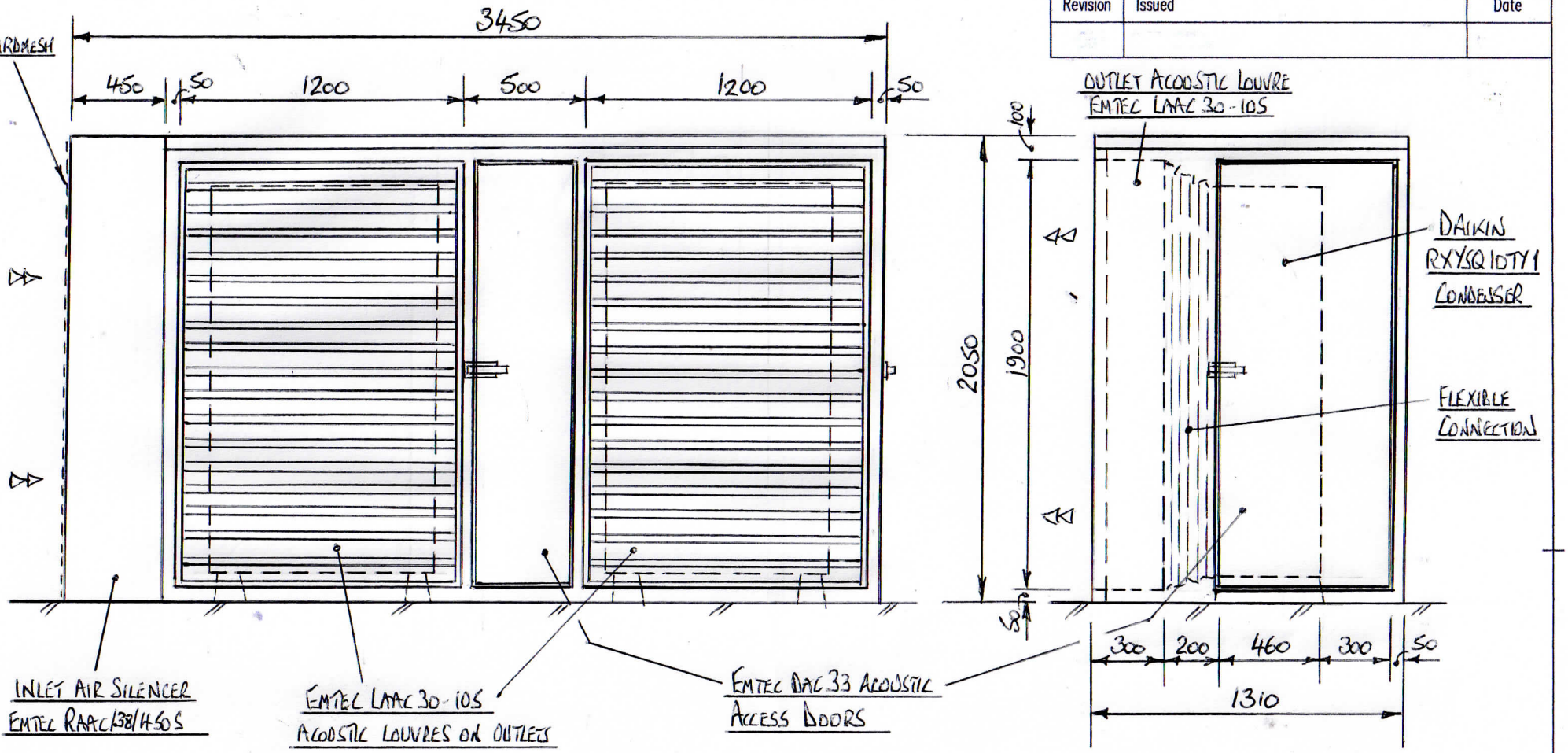


Photo F: Aerial view of site and the surroundings at 31 Elsworthy Road, London NW3

Revision	Issued	Date



Project	31 ELSWORTHY ROAD LONDON NW3					
Client	CARNELL WARREN ASSOCIATES.					
Designed by	Checked by	Approved by - date	Filename	Date drawn	Scale	
MGR	MGR	11/1/21.	QF10301	11/1/2021	NTS	

Title

ALL DIMENSIONS IN mm UNLESS STATED

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Drawing Number QF/10301/GA1.

Revision –

Works order No. PF