



Architectural & Environmental Acousticians
Noise & Vibration Engineers

PLANT NOISE ASSESSMENT

102 CAMLEY STREET, LONDON

UNITED LIVING (SOUTH) LTD

RP01-16413

PLANT NOISE ASSESSMENT

PROJECT: 102 CAMLEY STREET, LONDON

CLIENT: UNITED LIVING (SOUTH) LTD

CLIENT ADDRESS: MEDIA HOUSE
AZALEA DRIVE
SWANLEY
KENT
BR8 8HU

COMPANY ADDRESS: CASS ALLEN ASSOCIATES
BEDFORD I-LAB
PRIORY BUSINESS PARK
BEDFORD
MK44 3RZ

DOCUMENT CONTROL:

REVISION	ISSUE DATE	REPORT BY	CHECKED BY	NOTES
0	18 August 2017	Sam Bryant, MPhys MIOA, Senior Acoustics Consultant	Adam Bamford, BSc MIOA DipIOA, Senior Acoustics Consultant	Initial issue
1	15 June 2018	Sam Bryant, MPhys MIOA, Associate Director	Neil Morgan, BSc MIOA, Senior Acoustics Consultant	Update following site measurements

This report has been prepared by Cass Allen Associates Ltd with all reasonable skill, care and diligence, and taking account of the resources devoted to it by agreement with the client. Information reported herein is based on the interpretation of data collected and has been accepted in good faith as being accurate and valid at the time of collection. This report is for the exclusive use of the client named above; no warranties or guarantees are expressed or should be inferred by any third parties. This report may not be relied upon by other parties without written consent from Cass Allen Associates. Cass Allen Associates disclaims any responsibility to the client and others in respect of any matters outside the agreed scope of work.

TABLE OF CONTENTS

1. INTRODUCTION
2. DEVELOPMENT DESCRIPTION
3. PLANT NOISE IMPACT ASSESSMENT
4. CONCLUSIONS

APPENDIX 1 SURVEY RESULTS

APPENDIX 2 MODELLING RESULTS

1. INTRODUCTION

- 1.1 Cass Allen Associates has been instructed by United Living (South) Ltd to assess the acoustic design of a new development at 102 Camley Street, London.
- 1.2 The assessment has been carried out in accordance with the requirements of noise and vibration related planning conditions that have been imposed on the development and relate to mechanical plant at the site. The conditions are:

Condition 14

Prior to the use of the development:

a) Details shall be submitted to and approved in writing by the local planning authority, of the external noise level emitted from plant/machinery/equipment and mitigation measures as appropriate. The measures shall ensure that the external noise level emitted from plant, machinery/equipment will be lower than the lowest existing background noise level by 10dBA, as assessed according to BS4142:1997 at the nearest and/or most affected noise sensitive premises, with all machinery operating together at maximum capacity.

b) A post installation noise assessment shall be carried out to confirm compliance with the noise criteria and additional steps to mitigate noise shall be taken, as necessary. Approved details shall be implemented prior to occupation of the development and thereafter be permanently retained.

Condition 16

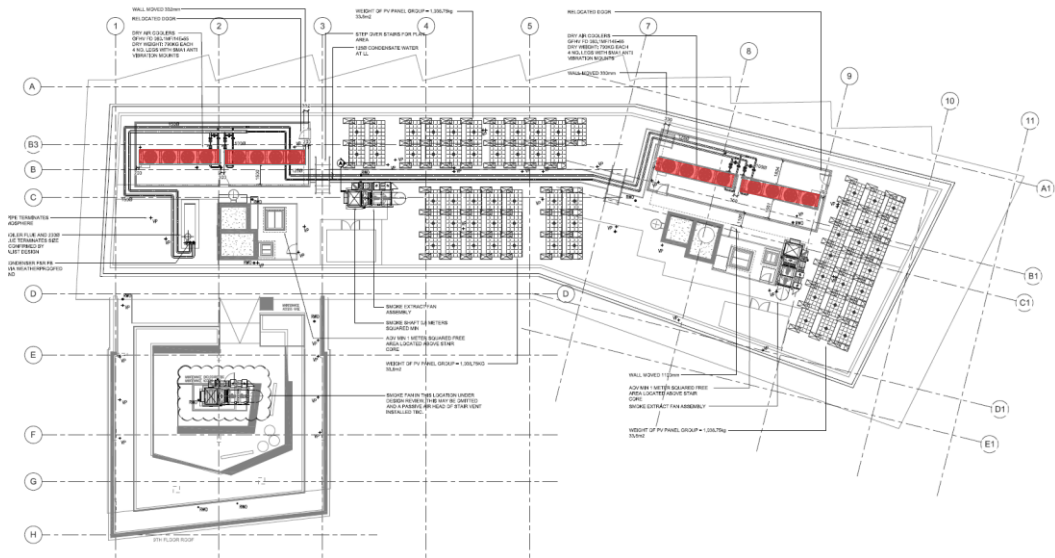
Noise levels from fixed plant associated with the development at a point 1 metre external to sensitive facades shall be at least 5dB(A) less than the existing background measurement (LA90), expressed in dB(A) when all plant/equipment (or any part of it) is in operation unless the plant/equipment hereby permitted will have a noise that has a distinguishable, discrete continuous note (whine, hiss, screech, hum) and/or if there are distinct impulses (bangs, clicks, clatters, thumps), then the noise levels from that piece of plant/equipment at any sensitive façade shall be at least 10dB(A) below the LA90, expressed in dB(A).

- 1.3 It can be seen from a comparison of Conditions 14 and 16 that there is some discrepancy between the requirements of these conditions. However, from discussions with the Council it is understood that the more stringent criteria in Condition 14 should be considered applicable for any pre-installation design whereas the criteria given in Condition 16 should be considered on-site compliance targets. As such the limits given in Condition 14 have therefore been adopted in this report.
- 1.4 Condition 14b also requires post installation testing of the mechanical plant. A site survey was carried out on 5th June 2018 to measure in-situ plant noise levels with the plant running at typical duty. This is discussed further below.
- 1.5 This report contains technical terminology; a glossary of terms can be found at www.cassallen.co.uk/glossary.

2. DEVELOPMENT DESCRIPTION

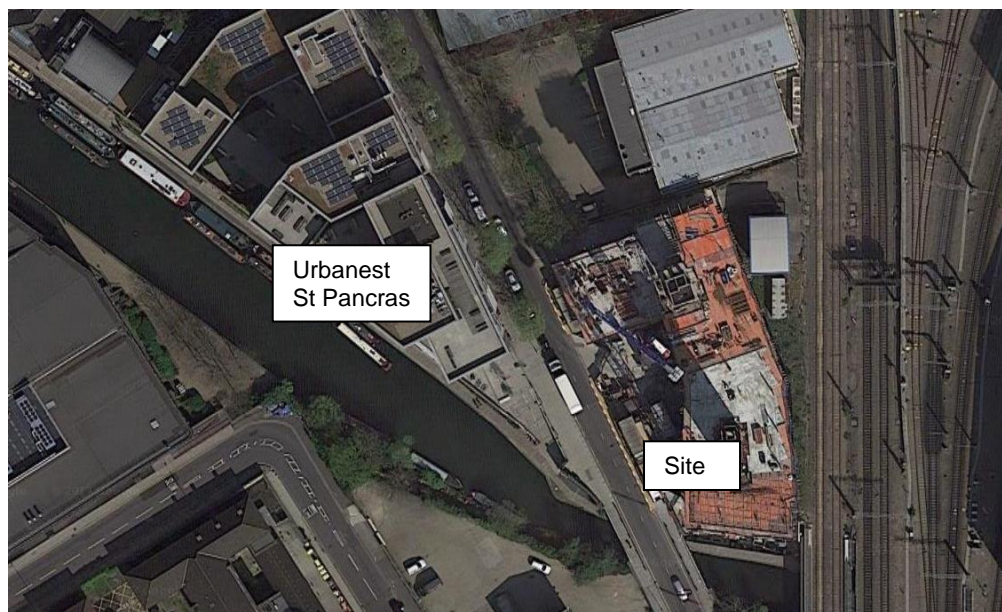
- 2.1 The development comprises a mix of residential and employment uses. It has been confirmed by the project team that the only significant mechanical plant at the site will be situated on the roof of the development in two enclosures. This plant is therefore the focus of this assessment and a drawing of the layout is shown in Figure 1 below (plant highlighted in red).

Figure 1 Proposed Plant Locations (red areas)



- 2.2 Figure 2 below shows the location of the identified nearest noise sensitive development (Urbanest St Pancras). It is considered that if plant noise levels are compliant with the above conditions at this location then they will also be compliant at more distant locations. It is, however, also appropriate to consider the effect of the mechanical plant on residents of the development itself. This is discussed further below.

Figure 2 Nearest Noise Sensitive Receptor



3. PLANT NOISE IMPACT ASSESSMENT

Design criteria – Mechanical plant noise

- 3.1 BS4142:2014 – *Methods for rating and assessing industrial and commercial sound* (BS4142) can be used to assess the impact of noise from external industrial and/or commercial noise sources on nearby sensitive receptors.
- 3.2 The BS4142 assessment methodology can be summarised as follows:
1. Measure the existing background noise levels (LA90,T dB) at the locations of nearby noise sensitive receptors during the quietest periods when the noise source(s) under investigation will operate;
 2. Predict or measure the noise emissions (LAeq,T dB) from the noise source(s) under investigation at the location(s) of the nearby sensitive receptors, including corrections for any distinguishable acoustic features (e.g. tones, whines, screeches, hisses etc);
 3. Subtract the measured background noise levels (item 1 above) with the measured or predicted rating noise levels (item 2 above) at each sensitive receptor. BS4142 states that:
 - a) *Typically, the greater this difference, the greater the magnitude of the impact.*
 - b) *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
 - c) *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
 - d) *The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context.*
- NOTE Adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact.*
- 3.3 Based on the requirements of Planning Condition 14, a design target of “10 dB below background” has been adopted for this assessment.
- 3.4 Background noise levels (LA90) at the site were measured as part of the site noise survey outlined in Appendix 1. The measured background noise levels have been used to develop limits for plant noise emissions from the new development at the positions of the surrounding residential properties in accordance with the BS4142 assessment methodology and the requirements of Condition 14. The limits are shown in Table 1 below.

Table 1 Plant Noise Limits – 1m from Façade of Nearest Noise Sensitive Receptor

Location	Period	
	Day-time/Evening (0700-2300hrs)	Night-time (2300-0700hrs)
Nearest residential properties to new building	37 dB LAeq	33 dB LAeq

Proposed mechanical plant design

3.5 Mechanical plant associated with the new building comprises the following rooftop air handling units located in the positions identified in Figure 1.

- 4No. Guntner GFHV FD 080.1MF/14E-55 AHU

3.6 A 3D model of the site and surrounding area was constructed using CadnaA 2018 noise modelling software. The 3D noise model was used to predict noise emissions from plant on the roof of the new building at the locations of surrounding noise sensitive positions. The predictions assumed that all plant items were running simultaneously and that the screens around the roof top plant areas were 2m high. This screen specification was observed to have been implemented on-site during on the visit of 5th June 2018.

3.7 During this site visit, measurements of the plant at the typical highest duty were also carried out. The measured noise levels within the enclosure (approx. 1m from side of chiller unit) were as follows:

- Day time duty – 72 dB LAeq,T
- Night time duty (including set-back mode) – 56 dB LAeq,T

These measured noise levels for the plant running at typical highest duties were also input into the model. Additionally, the noise output of the plant was not observed to contain any distinct tonal, impulsive or intermittent characteristics and as such it is not considered necessary to apply any ratings to the noise levels in this instance.

3.8 The results of the 3D noise modelling are shown in Table 2.

Table 2 Predicted Plant Noise Emissions from New Building

Location	Predicted Plant Noise Levels (dB LAeq)		BS4142 Criteria (dB LAeq)	
	Day	Night	Day-time/Evening (0700-2300hrs)	Night-time (2300-0700hrs)
Nearest and 'worst case' residential properties to new building (Urbanest St Pancras)	37	28	37	33
Residences within development	42	31	37	33

- 3.9 It can be seen from Table 2 that the calculated plant noise levels at the nearest existing residential properties is lower than the day and night-time noise criteria. The rooftop chillers and associated enclosures are therefore considered to be compliant with the design requirements of the noise related planning conditions at that location.
- 3.10 It can be seen that there is a small (5dB) exceedance of the more stringent day-time criterion for the uppermost dwellings of the development closest to the plant enclosures. Although this is not ideal, this is not considered to be unacceptable for the following reasons.
- This is based on the more stringent criteria given in Condition 14. As discussed above, the Council consider Condition 16 a “compliance condition” and, based on the measured noise levels, the plant is compliant with Condition 16.
 - Assessment of plant noise impact in accordance with BS4142 does not take into account façade treatments for proposed residences (i.e. glazing and ventilation). Even standard thermal double glazing and trickle ventilators are anticipated to provide adequate protection for future residents such that their amenity will not be affected by the proposed plant.
 - Plant noise levels are relatively low in absolute terms. As such, even if occupants were to open their windows, internal noise levels due to mechanical plant running at full duty would not exceed the guideline internal noise levels contained within BS8233:2014 *Guidance on sound insulation and noise reduction for buildings*.
- 3.11 With consideration of the above, it is considered that noise emissions from the fixed mechanical plant at the site are compliant with both the design and testing elements of Planning Conditions 14 and 16 and these conditions may be discharged for the site.

4. CONCLUSIONS

- 4.1 Cass Allen Associates was instructed by United Living (South) Ltd assess the acoustic design of the proposed mechanical plant as required by Planning Conditions 14 and 16.
- 4.2 Plant noise level design targets have been adopted based on the proposed conditions and current relevant British Standards and guidance.
- 4.3 Based on the installed mechanical plant and enclosure design, a 3D noise model was constructed in order to establish the plant noise levels at the position of the nearest existing noise sensitive receptors as well receptors within the development itself.
- 4.4 The noise modelling indicated that plant noise levels are compliant with the nominated criteria at the nearest noise sensitive receptors as well receptors within the development itself. This was confirmed with on-site measurements as required by Condition 14b.
- 4.5 It is considered that noise emissions from the fixed mechanical plant at the site are compliant with both the design and testing elements of Planning Conditions 14 and 16 and these conditions may be discharged for the site.

Appendix 1 Survey Results

Survey Summary:

The survey comprised unattended noise monitoring at the site. Noise levels at the site were generally dictated by road traffic on surrounding roads and noise from train passes on the adjacent railway. Construction was underway on the site during the site survey and as a result, portions of the day which were subject to construction noise have been excluded from analysis.

Survey Period:

15/08/2017 to 16/08/2017
05/06/2018

Survey Objectives:

- To identify noise sources that contribute to ambient noise levels at the site;
- To measure noise levels around the site over a typical day and night-time period
- To measure plant noise emissions

Equipment Used (Appendix 1, Table 1):

Type	Manufacturer	Model	Serial Number
Sound level meter ¹ (noise logger)	Rion	NL-32	00530374
Sound level meter ¹	Bruel & Kjaer	2250 (G4)	3007539

Note 1: All sound level meters were calibrated before and after measurement periods and no significant drift in calibration was found to have occurred. The results of the measurements are therefore considered to be representative.

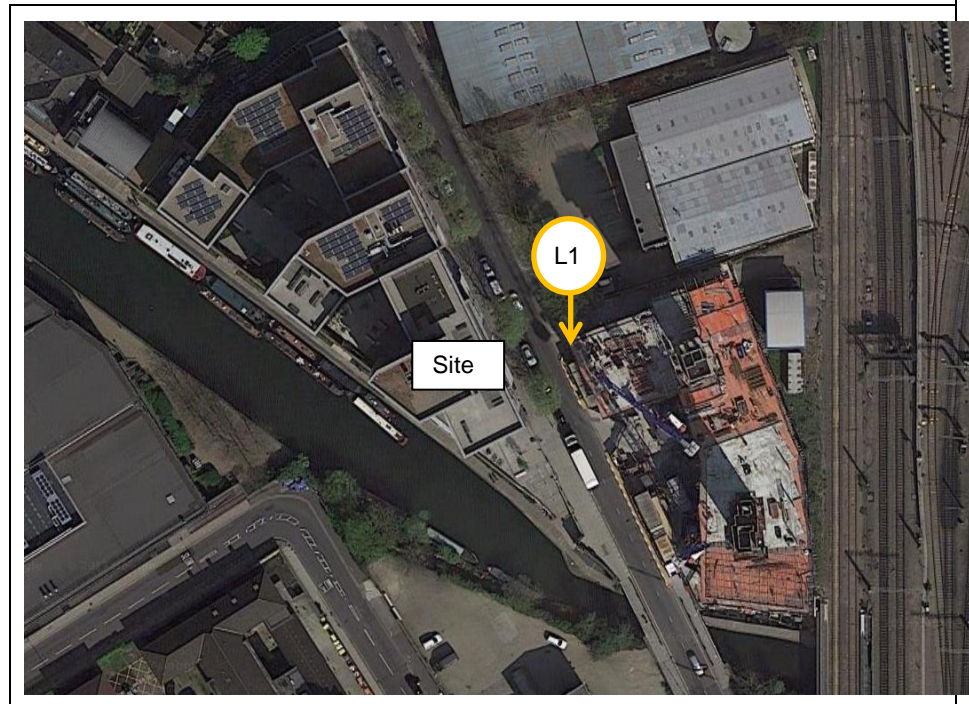
Weather Conditions:

Weather records for the area confirmed that weather conditions were also generally acceptable for acoustic measurement during the unattended monitoring.

Measurement Positions (Appendix 1, Table 2):

Position (refer plan below)	Description
L1	Unattended noise monitoring position. 2m above ground. Free-field. Direct line of sight to nearby roads
N1	Inside chiller enclosure – 1m from edge of plant. 1.5m above ground
N2	1m from outside of chiller enclosure. 1.5m above ground.
N3	3.5m from outside of chiller enclosure. 1.5m above ground.

Site Plan showing Measurement Positions (Appendix 1, Figure 3):



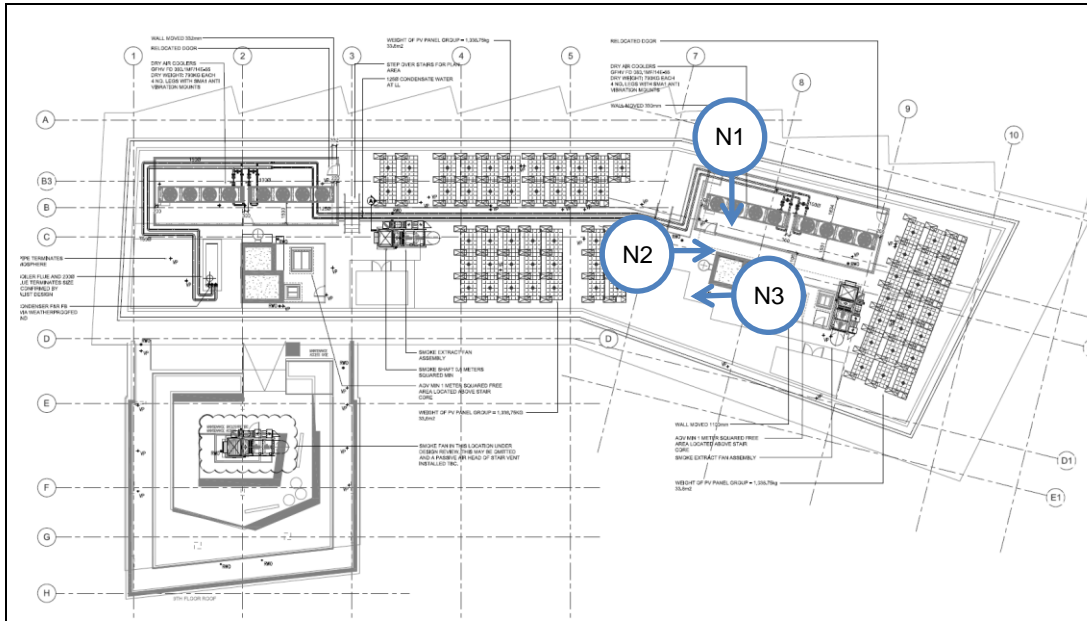
Unattended Noise Monitoring Results (Appendix 1, Table 3) – Construction Noise Excluded:

Meas. Period	Position	Daytime (0700-2300hrs)		Night-time (2300-0700hrs)		
		LAeq,16hr, dB	LA90,1hr dB ¹	LAeq,8hr, dB	LA90,5mins, dB ¹	LAm _{ax} , dB ²
15/08/2017 to 16/08/2017	L1	63	47	61	43	83

Note 1: Typical lowest measured during the period shown.

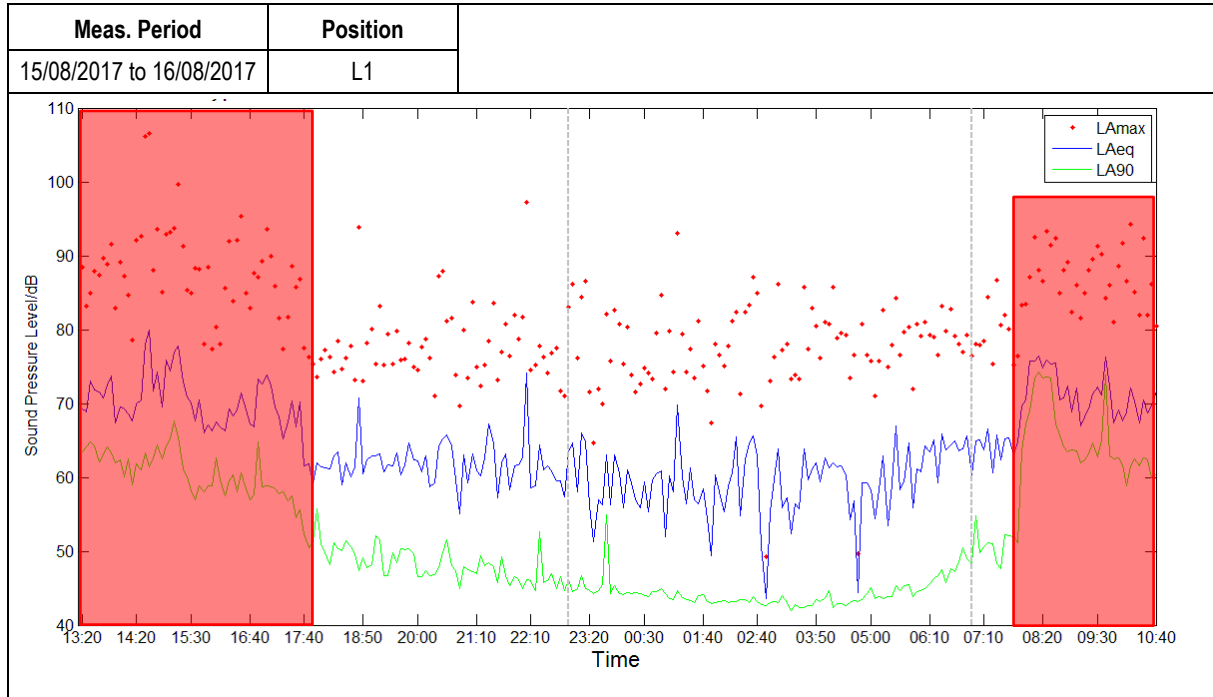
Note 2: Highest typical maximum noise level during the night-time (not exceeded more than 10-15 times per night).

Roof Plan Showing Plant Measurement Positions (Appendix 1, Figure 4):



Date	Position	Time	Duration	LAeq, dB	Notes
05/06/2018	N1	14:36	20 sec	71	Inside enclosure – day duty
	N2	14:38	10 sec	58	1m from enclosure – day duty
	N3	14:38	15 sec	56	3.5m from enclosure – day duty
	N1	14:44	15 sec	56	Inside enclosure – night duty
	N3	14:46	15 sec	54	3.5m from enclosure – night duty
	N3	14:52	15 sec	55	3.5m from enclosure – plant off

Unattended Noise Monitoring Results (Appendix 1, Figure 5) – Construction Periods Highlighted:



Appendix 2 Modelling Results

Modelling Software:

CADNA/A Version 2018

**Modelled
Scenarios:**

Plant Noise Emissions

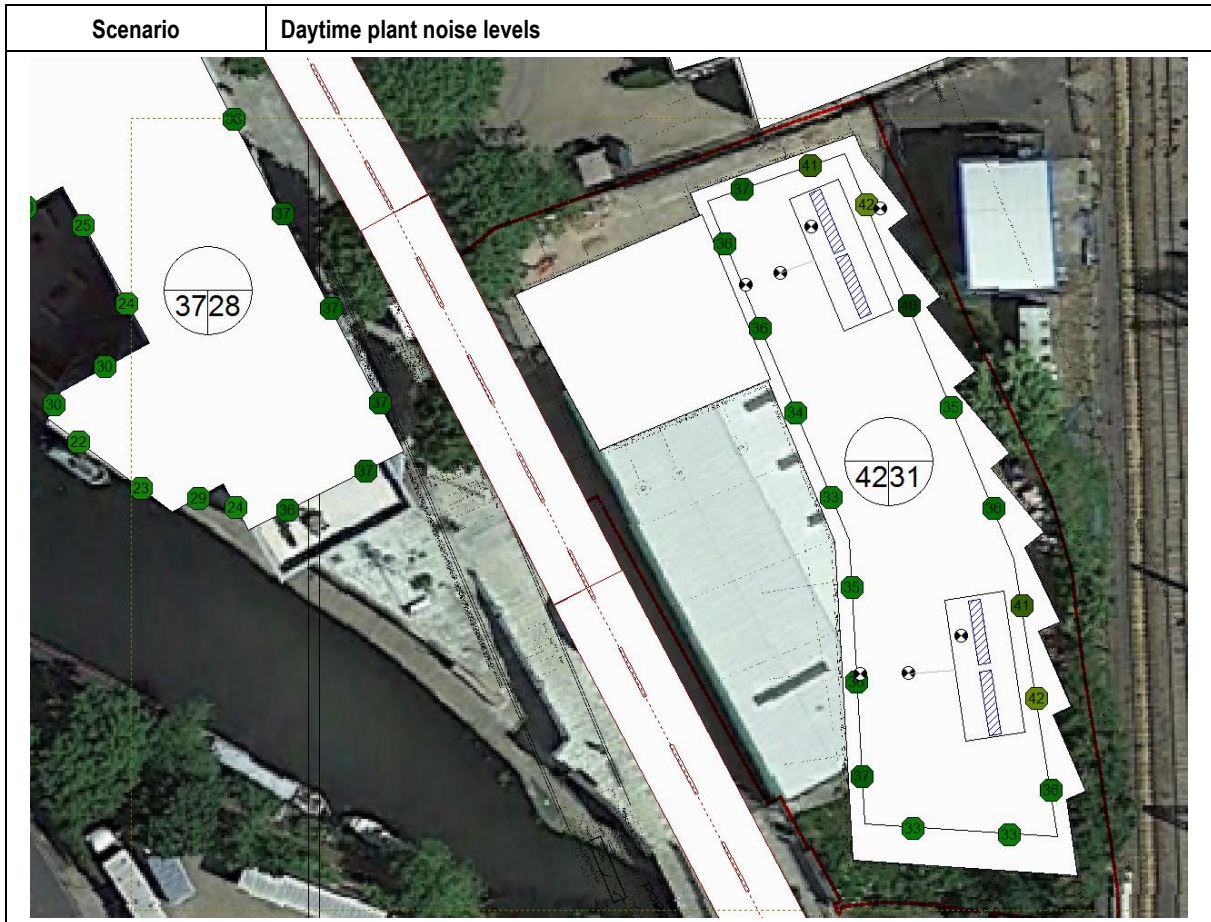
Data inputs:

- Plant Noise Data
- Topographical data for the site
- Development layout

**Calculation Algorithms
Used:**

- Calculation of Road Traffic Noise 1988 – Department of Transport
- ISO 9613-1:1993 Acoustics-Attenuation of sound during propagation outdoors – Part 1: Calculation of the absorption of sound by the atmosphere
- ISO 9613-2:1996 Acoustics-Attenuation of sound during propagation outdoors – Part 2: General method of calculation

Modelling Printout (Appendix 2, Figure 1):



Modelling Printout (Appendix 2, Figure 2):





www.cassallen.co.uk