Sound Advice
ACOUSTICS LTD

Report Reference: SA – 3709
Report Date: 21st April 2015

# EXTERNAL PLANT
# NOISE ASSESSMENT

## CLIENT

Mildren Construction
120 Matcham Lane
Hurn
Christchurch
Dorset
BH23 6AN

## SITE

Daedalus Park
Daedalus Drive
Lee on Solent
Hampshire
PO13 9FU

## SURVEY DATE (S)

19th – 24th March 2015


Report By

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## Introduction:

Sound Advice Acoustics Ltd has been instructed by Mildren Construction, to carry out the relevant noise assessments and calculations for the proposed commercial development at Daedalus Park, Daedalus Drive, Lee on Solent, Hampshire, PO13 9FU.

Therefore, this external noise assessment has been carried out in order to identify the background noise level at the nearest affected noise sensitive premises which is understood to be directly adjacent to the proposed commercial units.

Calculations and assessments are to be made within this report to generate a maximum noise level criteria to which all plant should be selected to. The maximum noise level calculated is to be achieved at 1.0m from the units in situ with all units operating under normal load. The reflections, screening correction and distance calculations have been taken into account and will result in the proposed units having a sound pressure level at the nearest affected noise sensitive window of at least -10 dB below the recorded background noise level.

British Standard 4142: 2014 is to be adopted for the basis of this background noise level assessment. A BS 4142: 2014 noise assessment will be carried out in order to demonstrate that any externally mounted plant units associated with the site will not have a significant and demonstrable adverse impact on the nearest noise sensitive premises in accordance with the National Planning Policy Framework.

References and evaluations are to be made to the National Planning Policy Framework 2012 (NPPF) and the Noise Policy Statement for England 2010 (NPSE). The purpose of this document is to include all aspects of environmental noise within assessments i.e. environmental noise, neighbour noise and neighbourhood noise.

Noise is to be considered alongside other relevant issues relating to the site and should not be considered in isolation, according to the NPSE.

There are several key phrases within the NPSE aims and these are discussed below.

**"*Significant adverse" and "adverse"***

*There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:*

***NOEL – No Observed Effect Level***

*This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.*

***LOAEL – Lowest Observed Adverse Effect Level***

*This is the level above which adverse effects on health and quality of life can be detected.*

*Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.*

***SOAEL – Significant Observed Adverse Effect Level***

*This is the level above which significant adverse effects on health and quality of life occur.*

*It is not possible to have a single objective noise-based measure that defines SOAEL that is applicable to all sources of noise in all situations. Consequently, the SOAEL is likely to be different for different noise sources, for different receptors and at different times. It is acknowledged that further research is required to increase our understanding of what may constitute a significant adverse impact on health and quality of life from noise. However, not having specific SOAEL values in the NPSE provides the necessary policy flexibility until further evidence and suitable guidance is available.*

BS 4142: 2014 supersedes the 1997 version and has been developed to move more in-line with the National Planning Policy Framework 2012 (NPPF) and the Noise Policy Statement for England 2010 (NPSE).

External noise levels are to be recorded over, what has been considered for the site, an average / typical time period in order to assess the daytime and night time noise levels. Levels have been recorded over more than one night in order to ensure the uncertainty of measurement aspects of BS 4142 : 2014 have been satisfied and that the data recorded is representative for the purpose of a robust assessment.

The purpose of this assessment is to ensure the acoustic protection of noise sensitive premises within the close proximity of the proposed commercial units. Noise sensitive premises are not restricted to residential dwellings as offices can be affected by unwanted external noise. However, the site is surrounded with residential properties within the immediate vicinity and therefore the residential properties neighbouring the site have been considered the most noise sensitive to that of the proposed plant.

## Procedure:

External noise levels were recorded over a typical weekend and weekday period including 19th March – 24th March 2015 at position 1 and 2 as detailed on the attached plan sketch layout.

Position 1 was located at the front of the site in order to capture noise levels from the nearby commercial activity.

Position 2 was located at the rear of the site in order to capture the lowest recorded noise levels.

Sample measurements were recorded over continuous 15 minute samples and from this data the hourly LAeq daytime values have been evaluated. Sound Pressure Levels were recorded on the following setting along with a full octave band frequency analysis measured simultaneously and between 31.5 Hz and 16.0 kHz.

| **Daytime 07:00 – 23:00** | | **Night Time 23:00 – 07:00** | |
|---|---|---|---|
| $L_{Aeq\ 1\ HOUR}$ dB | $L_{A10\ 1\ HOUR}$ dB | $L_{Aeq\ 15\ MINUTES}$ dB | $L_{A10\ 15\ MINUTES}$ dB |
| $L_{AMAX\ 1\ HOUR}$ dB | $L_{A50\ 1\ HOUR}$ dB | $L_{AMAX\ 15\ MINUTES}$ dB | $L_{A50\ 15\ MINUTES}$ dB |
| $L_{AMIN\ 1\ HOUR}$ dB | $L_{A90\ 1\ HOUR}$ dB | $L_{AMIN\ 15\ MINUTES}$ dB | $L_{A90\ 15\ MINUTES}$ dB |

Measurement procedures are to be adopted from BS 4142: 2014 and the representative background sound level for the assessment location determined over the period of interest. Determination of background sound levels for daytime and night time analysis has been carried out in accordance with section 8 of BS 4142: 2014.

From the downloaded recorded results both the daytime and night time were assessed and used within the above calculations as $L_{Aeq\ 1\ HOUR}$ dB levels for daytime and $L_{Aeq\ 15\ MINUTES}$ dB for night time.

## Apparatus:

The equipment was calibrated using a sound pressure level of 114.0 dB at an octave band centre frequency of 1000Hz with reference to 2 x $10^{-5}$ $Nm^{-2}$ before and after the tests and the equipment set to have no inaccuracy greater than 0.2 dB.

All the following equipment was calibrated in accordance with the laboratory accreditation requirements of the United Kingdom Accreditation Service (UKAS) on the following dates. Calibration schedules are implemented within Sound Advice Acoustics Ltd in accordance with UKAS directive LAB 23.

| Description | Make | Type | Serial No. | Calibration Intervals | Last Calibrated | Next Due Calibration |
|---|---|---|---|---|---|---|
| Integrated Sound Level Meter | Norsonic | 118 | 31471 | 2 YEARS | 08.08.2014 | 08.08.2016 |
| 12.5mm Microphone (with windshield) | Norsonic | 1220 | 41075 | 2 YEARS | 08.08.2014 | 08.08.2016 |
| Microphone Pre – Amplifier | Norsonic | 1201 | 30327 | 2 YEARS | 08.08.2014 | 08.08.2016 |
| Integrated Sound Level Meter | Norsonic | 118 | 31632 | 2 YEARS | 06.03.2014 | 06.03.2016 |
| 12.5mm Microphone (with windshield) | Norsonic | 1220 | 57535 | 2 YEARS | 06.03.2014 | 06.03.2016 |
| Microphone Pre – Amplifier | Norsonic | 1201 | 30687 | 2 YEARS | 06.03.2014 | 06.03.2016 |
| Calibrator | Norsonic | 1251 | 31310 | 1 YEAR | 16.06.2014 | 16.06.2015 |
| The above equipment was calibrated using a sound pressure level of 114.00 dB at an octave band centre frequency of 1000Hz with reference to 2 x $10^{-5}$ $Nm^{-2}$ before and after the tests and the equipment set to have no inaccuracy greater than 0.5 dB. | | | | | | |

Full Calibration certificates are available upon request.

## Environmental Conditions:

The following weather conditions have been recorded in accordance with requirements of BS 4142: 2014 using a Davis Vantage Pro 2 weather station model number 6152UK.

| Date | Time | Temp External | Wind Speed | Wind Direction | Barometric Pressure | Rain Fall |
|---|---|---|---|---|---|---|
| 19/03/2015 | 07:00 | 6.3 | 0 | --- | 1034.2 | 0 |
| | 08:00 | 7.6 | 0 | --- | 1036.4 | 0 |
| | 09:00 | 9.9 | 0 | --- | 1036.6 | 0 |
| | 10:00 | 9.7 | 2.7 | SSW | 1036.1 | 0 |
| | 11:00 | 9.4 | 3.6 | SW | 1036 | 0 |
| | 12:00 | 10.7 | 4.5 | SW | 1035.5 | 0 |
| | 13:00 | 9.7 | 4.5 | SSW | 1035.1 | 0 |
| | 14:00 | 8.7 | 4 | SW | 1034.7 | 0 |
| | 15:00 | 8.1 | 4 | SSW | 1034.4 | 0 |
| | 16:00 | 7.9 | 4 | SSW | 1034 | 0 |
| | 17:00 | 7.6 | 4 | SW | 1033.8 | 0 |
| | 18:00 | 7.4 | 3.1 | S | 1034 | 0 |
| | 19:00 | 7.3 | 1.8 | S | 1034.3 | 0 |
| | 20:00 | 7.1 | 1.8 | S | 1034.4 | 0 |
| | 21:00 | 6.9 | 1.8 | S | 1034.3 | 0 |
| | 22:00 | 6.8 | 1.8 | S | 1034.1 | 0 |
| | 23:00 | 6.7 | 1.8 | S | 1034.1 | 0 |
| | 00:00 | 6.6 | 2.2 | S | 1034 | 0 |
| | 01:00 | 6.2 | 2.7 | SW | 1033.4 | 0 |
| | 02:00 | 6 | 2.2 | S | 1033 | 0 |
| | 03:00 | 5.8 | 2.7 | S | 1032.2 | 0 |
| | 04:00 | 5.7 | 2.2 | SSE | 1032.2 | 0 |
| | 05:00 | 5.4 | 2.2 | SSW | 1032 | 0 |
| | 06:00 | 5.2 | 1.8 | SW | 1032 | 0 |
| 20/03/2015 | 07:00 | 5.4 | 1.8 | SSW | 1032.1 | 0 |
| | 08:00 | 5.8 | 2.2 | SW | 1032.2 | 0 |
| | 09:00 | 5.6 | 2.2 | SW | 1032.1 | 0 |
| | 10:00 | 6.3 | 1.8 | SSW | 1031.6 | 0 |
| | 11:00 | 7.6 | 2.2 | S | 1031.2 | 0 |
| | 12:00 | 8.9 | 1.8 | SW | 1030.4 | 0 |
| | 13:00 | 10.1 | 2.2 | SSW | 1029.6 | 0 |
| | 14:00 | 11.4 | 1.3 | SW | 1028.7 | 0 |
| | 15:00 | 12.1 | 0.9 | SSW | 1028.1 | 0 |
| | 16:00 | 11.8 | 1.3 | NNE | 1027.4 | 0 |
| | 17:00 | 9.6 | 1.3 | N | 1027.2 | 0 |
| | 18:00 | 7.2 | 0.4 | NNW | 1027.1 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 19:00 | 6 | 0.9 | ENE | 1027.1 | 0 |
| | 20:00 | 5 | 0.9 | ENE | 1027 | 0 |
| | 21:00 | 4.7 | 0.4 | E | 1026.7 | 0 |
| | 22:00 | 3.3 | 0 | E | 1026.4 | 0 |
| | 23:00 | 3.1 | 0 | E | 1025.9 | 0 |
| | 00:00 | 2.1 | 0 | E | 1025.6 | 0 |
| | 01:00 | 1.6 | 0 | E | 1025.6 | 0 |
| | 02:00 | 1.3 | 0 | E | 1025.3 | 0 |
| | 03:00 | 1.8 | 0 | E | 1025.6 | 0 |
| | 04:00 | 2.6 | 0.4 | SSE | 1025.8 | 0 |
| | 05:00 | 2.9 | 1.3 | SSW | 1026.5 | 0 |
| | 06:00 | 1.8 | 0 | S | 1027.1 | 0 |
| | 07:00 | 4.9 | 0.9 | SSW | 1028 | 0 |
| | 08:00 | 7.6 | 2.2 | S | 1028.3 | 0 |
| | 09:00 | 9.8 | 3.6 | S | 1028.9 | 0 |
| | 10:00 | 9.3 | 4 | S | 1029.1 | 0 |
| | 11:00 | 10.3 | 4 | SW | 1029 | 0 |
| 21/03/2015 | 12:00 | 9.6 | 4.5 | SW | 1029.2 | 0 |
| | 13:00 | 10.5 | 4.5 | SW | 1028.9 | 0 |
| | 14:00 | 10.1 | 4.5 | SSW | 1028.7 | 0 |
| | 15:00 | 9.3 | 4.9 | S | 1028.8 | 0 |
| | 16:00 | 8.9 | 4.9 | SW | 1029 | 0 |
| | 17:00 | 7.8 | 4.9 | S | 1029.5 | 0 |
| | 18:00 | 7.2 | 4.5 | SW | 1030.2 | 0 |
| | 19:00 | 6.9 | 4 | SW | 1030.7 | 0 |
| | 20:00 | 6.8 | 4 | SW | 1030.8 | 0 |
| | 21:00 | 6.8 | 3.6 | SW | 1030.8 | 0 |
| | 22:00 | 6.7 | 3.6 | SSW | 1030.8 | 0 |
| | 23:00 | 6.2 | 2.7 | SW | 1031.1 | 0 |
| | 00:00 | 5.9 | 1.8 | SW | 1031 | 0 |
| | 01:00 | 5.6 | 2.7 | SW | 1031 | 0 |
| | 02:00 | 5.6 | 2.2 | SW | 1030.9 | 0 |
| | 03:00 | 5.2 | 2.7 | SW | 1030.7 | 0 |
| | 04:00 | 4.1 | 2.2 | SW | 1030.4 | 0 |
| | 05:00 | 4.1 | 2.7 | SW | 1030.4 | 0 |
| | 06:00 | 4.3 | 1.3 | SSW | 1030.8 | 0 |
| | 07:00 | 4.8 | 2.2 | SW | 1030.9 | 0 |
| | 08:00 | 6.4 | 3.1 | SW | 1031 | 0 |
| | 09:00 | 7.6 | 3.6 | SSW | 1030.8 | 0 |
| | 10:00 | 9.6 | 3.1 | SW | 1030.1 | 0 |
| 22/03/2015 | 11:00 | 9.9 | 1.8 | SW | 1029.2 | 0 |
| | 12:00 | 11.9 | 1.3 | SW | 1028.4 | 0 |
| | 13:00 | 12.1 | 0.9 | SSW | 1027.6 | 0 |
| | 14:00 | 12.2 | 1.3 | WSW | 1026.8 | 0 |
| | 15:00 | 11.6 | 1.3 | SW | 1026.1 | 0 |
| | 16:00 | 10.6 | 1.3 | W | 1025.8 | 0 |
| | 17:00 | 8.9 | 0.9 | WNW | 1025.6 | 0 |
| | 18:00 | 6.3 | 0.4 | NW | 1025.4 | 0 |
| | 19:00 | 5.8 | 0.4 | WNW | 1025.5 | 0 |
| | 20:00 | 4.3 | 0.4 | WNW | 1025.5 | 0 |
| | 21:00 | 4.5 | 0 | WNW | 1025.5 | 0 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 22:00 | 5.2 | 0.4 | NNW | 1024.9 | 0 |
| | 23:00 | 5.3 | 0.4 | NNW | 1024.5 | 0 |
| | 00:00 | 4.6 | 0.4 | N | 1023.4 | 0 |
| | 01:00 | 5.4 | 0.4 | NNW | 1022.8 | 0 |
| | 02:00 | 4.8 | 0 | N | 1022.4 | 0 |
| | 03:00 | 4.8 | 0 | N | 1021.9 | 0 |
| | 04:00 | 5.3 | 0 | E | 1021.5 | 0 |
| | 05:00 | 5.8 | 0.4 | ENE | 1021.3 | 0 |
| | 06:00 | 5.8 | 0.4 | ESE | 1021.4 | 0 |
| | 07:00 | 6.1 | 0.9 | E | 1021.3 | 0 |
| | 08:00 | 6.7 | 0.9 | ESE | 1021.2 | 0 |
| | 09:00 | 7.3 | 0.9 | E | 1020.9 | 0 |
| | 10:00 | 8.2 | 1.3 | ENE | 1020.8 | 0 |
| | 11:00 | 8.7 | 1.3 | ENE | 1020.4 | 0 |
| 23/03/2015 | 12:00 | 12.3 | 1.3 | ENE | 1019.7 | 0 |
| | 13:00 | 13.4 | 1.8 | NE | 1018.7 | 0 |
| | 14:00 | 12.8 | 2.2 | NNE | 1018 | 0 |
| | 15:00 | 9.8 | 2.7 | NE | 1017.6 | 0 |
| | 16:00 | 8.4 | 3.1 | ENE | 1017.1 | 0 |
| | 17:00 | 8.4 | 2.7 | ENE | 1016.8 | 0 |
| | 18:00 | 7.4 | 2.7 | ENE | 1016.7 | 0 |
| | 19:00 | 7.2 | 3.1 | ENE | 1016.9 | 0 |
| | 20:00 | 6.7 | 1.3 | E | 1016.6 | 0 |
| | 21:00 | 6.7 | 1.3 | E | 1016.3 | 0 |
| | 22:00 | 7.1 | 1.3 | ENE | 1015.7 | 0 |
| | 23:00 | 6.9 | 0.9 | ENE | 1015.1 | 0 |
| | 00:00 | 6.4 | 0.4 | ENE | 1014.6 | 0 |
| | 01:00 | 6.7 | 0.9 | S | 1014.4 | 0 |
| | 02:00 | 5.7 | 2.7 | SSW | 1014.1 | 0 |
| 24/03/2015 | 03:00 | 5.2 | 1.3 | SSW | 1014 | 0 |
| | 04:00 | 5 | 0 | S | 1013.9 | 0 |
| | 05:00 | 4.3 | 0 | SSE | 1013.5 | 0 |
| | 06:00 | 3.9 | 0 | SE | 1013.7 | 0 |

## Results:

$L_{Aeq,t}$ - The equivalent A weighted sound pressure level recorded over a time interval of 1 hourly daytime and 15 minute night time.

$L_{A90,t}$ - The A weighted sound pressure level that is exceeded for 90% of the time period 1 hourly daytime 15 minute night time.

$L_{A50,t}$ - The A weighted sound pressure level that is exceeded for 50% of the time period 1 hourly daytime 15 minute night time..

$L_{A10,t}$ - The A weighted sound pressure level that is exceeded for 10% of the time period 1 hourly daytime 15 minute night time..

$L_{Amax}$ - The maximum A weighted sound pressure level recorded over a time interval of 1 hourly daytime 15 minute night time..

$L_{Amin}$ - The minimum A weighted sound pressure level recorded over a time interval of 1 hourly daytime 15 minute night time..

See attached figures for full downloaded results.

The following lowest recorded noise level has been evaluated at position 1 which is considered to be relevant to the assessment of noise levels within the close proximity

RECORDED BACKGROUND NOISE LEVELS

| **POSITION 1** | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Date / Time | LAeq | LA90 | Octave Band Centre Frequency (Hz) | | | | | | | | | |
| | | | 31.5 | 63 | 125 | 250 | 500 | 1.0 k | 2.0 k | 4.0 k | 8.0 k | 16.0 k |
| 07:00 - 23:00 DAYTIME $L_{A90\ 1\ HOUR}$ | 38.0 | 38.0 | 44.0 | 47.7 | 42.2 | 36.8 | 32.9 | 34.0 | 29.5 | 25.3 | 20.2 | 4.6 |
| 23:00 - 07:00 NIGHT TIME $L_{A90\ 15\ minute}$ | 23.0 | 21.0 | 37.8 | 33.8 | 29.0 | 20.4 | 16.7 | 15.4 | 15.4 | 16.6 | 8.9 | -1.0 |

## Calculations:

The following calculations have been based on the recorded LA90 background noise level over a typical 24 hour period at the measurement position 1 and include the possibility of night time operations. Nearest residential has been assumed to be no closer than 5.0m.

DAYTIME 07:00 – 23:00

| Octave Band Centre Frequency (Hz) | | | | | | | | | | dB(A) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 31.5 | 63 | 125 | 250 | 500 | 1.0k | 2.0k | 4.0k | 8.0k | 16.0k | | |
| 44.0 | 47.7 | 42.2 | 36.8 | 32.9 | 34.0 | 29.5 | 25.3 | 20.2 | 4.6 | | Recorded Background Noise Levels |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | Reflection at Residential |
| 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | | -10 Below Background |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | | BS 4142 : 2014 Corrections |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | LAeq - LA90 |
| 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | | Distance Correction |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | Barrier Attenuation |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | Reflection at Source |
| 28.0 | 31.7 | 26.2 | 20.8 | 16.9 | 18.0 | 13.5 | 9.3 | 4.2 | -11.4 | **22.0** | **Target Level at Residential** |
| 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | | Reflections |
| 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | | Distance and Barriers |
| 36.0 | 39.7 | 34.2 | 28.8 | 24.9 | 26.0 | 21.5 | 17.3 | 12.2 | -3.4 | **30.0** | **Calculated Noise Source Level @ 1.0m** |
| 16.0 | 19.7 | 14.2 | 8.8 | 4.9 | 6.0 | 1.5 | -2.7 | -7.8 | -23.4 | **10.0** | **Calculated Noise Source Level @ 10.0m** |

NIGHT TIME 23:00 – 07:00

| Octave Band Centre Frequency (Hz) | | | | | | | | | | dB(A) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 31.5 | 63 | 125 | 250 | 500 | 1.0k | 2.0k | 4.0k | 8.0k | 16.0k | | |
| 37.8 | 33.8 | 29 | 20.4 | 16.7 | 15.4 | 15.4 | 16.6 | 8.9 | -1 | | Recorded Background Noise Levels |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | Reflection at Residential |
| 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | 10 | | -10 Below Background |
| 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | 6 | | BS 4142 : 2014 Corrections |
| 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | 2 | | LAeq - LA90 |
| 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | | Distance Correction |
| 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | | Barrier Attenuation |
| 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | 3 | | Reflection at Source |
| 19.8 | 15.8 | 11 | 2.4 | -1.3 | -2.6 | -2.6 | -1.4 | -9.1 | -19 | **5.1** | **Target Level at Residential** |
| 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | 6.0 | | Reflections |
| 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | 14.0 | | Distance and Barriers |
| 27.8 | 23.8 | 19.0 | 10.4 | 6.7 | 5.4 | 5.4 | 6.6 | -1.1 | -11.0 | **13.1** | **Calculated Noise Source Level @ 1.0m** |
| 7.8 | 3.8 | -1.0 | -9.6 | -13.3 | -14.6 | -14.6 | -13.4 | -21.1 | -31.0 | **-6.9** | **Calculated Noise Source Level @ 10.0m** |

The above calculations have demonstrated that in order to meet the criteria of -10 dB below the recorded background noise level, the following external noise level plant criteria should be achieved at 1.0m and 10.0m from all units operating at the same time under normal load.

DAYTIME 07:00 – 23:00

| Octave Band Centre Frequency (Hz) | | | | | | | | | | dB(A) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 31.5 | 63 | 125 | 250 | 500 | 1.0k | 2.0k | 4.0k | 8.0k | 16.0k | | |
| 36.0 | 39.7 | 34.2 | 28.8 | 24.9 | 26.0 | 21.5 | 17.3 | 12.2 | -3.4 | **30.0** | **Calculated Noise Source Level @ 1.0m** |
| 16.0 | 19.7 | 14.2 | 8.8 | 4.9 | 6.0 | 1.5 | -2.7 | -7.8 | -23.4 | **10.0** | **Calculated Noise Source Level @ 10.0m** |
| Sound Pressure Level at 1.0m from plant (ref 2 x $10^{-5}$ Pa) | | | | | | | | | | | |

NIGHT TIME 23:00 – 07:00

| Octave Band Centre Frequency (Hz) | | | | | | | | | | dB(A) | Comments |
|---|---|---|---|---|---|---|---|---|---|---|---|
| 31.5 | 63 | 125 | 250 | 500 | 1.0k | 2.0k | 4.0k | 8.0k | 16.0k | | |
| 27.8 | 23.8 | 19.0 | 10.4 | 6.7 | 5.4 | 5.4 | 6.6 | -1.1 | -11.0 | **13.1** | **Calculated Noise Source Level @ 1.0m** |
| 7.8 | 3.8 | -1.0 | -9.6 | -13.3 | -14.6 | -14.6 | -13.4 | -21.1 | -31.0 | **-6.9** | **Calculated Noise Source Level @ 10.0m** |
| Sound Pressure Level at 1.0m from plant (ref 2 x $10^{-5}$ Pa) | | | | | | | | | | | |

The above calculations have been made on the worst case scenario with the plant being positioned no closer than 5.0m (linear) to the nearest affected window.

Based on the above being achieved, the following noise assessment can be concluded and are detailed in the following BS 4142 : 2014 Noise Assessment.

## BS 4142: 2014 Noise Assessment:

This standard provides a method for measurement and rating of industrial and commercial sound. The rating level (defined in BS 4142:2014) is used to rate the noise source outside residential dwellings and this is defined as the "specific noise source". This level is obtained by adding a rating penalty for tonal or impulsive characteristics to the equivalent continuous A-weighted sound pressure level of the specific noise source.

**Tonality** For sound ranging from not tonal to prominently tonal the Joint Nordic Method gives a correction of between 0 dB and +6 dB for tonality. Subjectively, this can be converted to a penalty of 2 dB for a tone which is just perceptible at the noise receptor, 4 dB where it is clearly perceptible, and 6 dB where it is highly perceptible.

**Impulsivity** A correction of up to +9 dB can be applied for sound that is highly impulsive, considering both the rapidity of the change in sound level and the overall change in sound level. Subjectively, this can be converted to a penalty of 3 dB for impulsivity which is just perceptible at the noise receptor, 6 dB where it is clearly perceptible, and 9 dB where it is highly perceptible.

**Other sound characteristics** Where the specific sound features characteristics that are neither tonal nor impulsive, though otherwise are readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

**NOTE 2** Where tonal and impulsive characteristics are present in the specific sound within the same reference period then these two corrections can both be taken into account. If one feature is dominant then it might be appropriate to apply a single correction. Where both features are likely to affect perception and response, the corrections ought normally to be added in a linear fashion.

**Intermittency** When the specific sound has identifiable on/off conditions, the specific sound level ought to be representative of the time period of length equal to the reference time interval which contains the greatest total amount of on time. This can necessitate measuring the specific sound over a number of shorter sampling periods that are in combination less than the reference time interval in total, and then calculating the specific sound level for the reference time interval allowing for time when the specific sound is not present. If the intermittency is readily distinctive against the residual acoustic environment, a penalty of 3 dB can be applied.

The procedure defined in BS 4142: 2014 for predicting the likelihood of inverse impacts to noise sensitive premises is based on establishing the difference between the rating level and the background noise level at the assessment position. The greater the difference, the greater the magnitude of impact.

1. A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.
2. A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.
3. 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.

The assessment of noise nuisance explicitly falls outside the scope of BS 4142: 2014. A statutory noise nuisance requires the consideration of both relative and absolute noise levels, material loss of amenity, mitigation options and other non acoustic factors. Section 80, part III of the Environmental Protection Act 1990 provides a defence of “best practicable means” against any nuisance proceedings.

However, it must also be recognised that the simple use of an overall A-weighted noise level can underestimate the degree of disturbance caused by relatively low levels of environmental noise with low frequency components or other discrete characteristics such as tonal, impulsive and / or irregular temporal features.

Therefore the overall approach suggested in BS 4142: 2014 is an important indicator of the acceptability of noise from industrial and commercial premises.

The background noise level recorded has been considered to be representative of the recorded background noise level associated with this site at each of the positions and therefore the following BS 4142 assessment could be expected.

**BS 4142: 2014 Noise Assessment**

| Results | Daytime (07:00 – 23:00) | Night Time (23:00 – 07:00) |
|---|---|---|
| Predicted Ambient Sound Level | $L_{Aeq}$ = 22 dB | $L_{Aeq}$ = 5 dB |
| Residual Sound Level | $L_{Aeq}$ = 38 dB | $L_{Aeq}$ = 23 dB |
| Background Sound Level | $L_{A90}$ = 38 dB | $L_{A90}$ = 21 dB |
| Specific Sound | $L_{Aeq}$ = 22 dB | $L_{Aeq}$ = 5 dB |
| Acoustic Feature Correction Impulsivity 3 dB Intermittency 3 dB | +6 dB | +6 dB |
| Rating Level | $L_{Aeq}$ = 28 dB | $L_{Aeq}$ = 11 dB |
| Background Sound Level | $L_{A90}$ = 38 dB | $L_{A90}$ = 21 dB |
| Excess of Rating Over Background Sound Level | -10 dB | -10 dB |
| Assessment Indicates | Low Adverse Impact | Low Adverse Impact |

It can be seen from the above assessments that the proposed plant is likely to return an assessment conclusion of Low Adverse Impact

BS 4142: 2014 suggests that Care is necessary in circumstances where background sound levels are low to ensure that self-generated and electrical noise within the measurement system does not unduly influence reported values, which might be the case if the measured background sound levels are less than 10 dB above the noise floor of the measuring system. The floor of a typical class 1 noise meter is in the region of 14 dB(A) and therefore measurements of less than 24 dB(A) should be assessed with care.

The above design criteria has been set to ensure resultant noise levels are at least -10 dB below the resultant prevailing background noise level. However, the background noise level is unusually low and therefore the maximum noise level criteria set within this report may be unachievable and further discussions with the local council's Environmental Health Officers may result in a more realistic criteria being set for this particular site.

The following is a proposed criteria for them to adopt, based on the very low background noise levels

Daytime $L_{Aeq\ 1\ HOUR}$ 30 dB
Night Time $L_{Aeq\ 15\ MINUTE}$ 25 dB

This is a more realistic plant design criteria for a development to achieve. Please note this is the maximum noise level with all external plant operating under normal load from all the industrial units combined.

The end users are unknown at this time of application and therefore no assessment can be made with regards to traffic or delivery noise as any assessment would be unpredictable and unsubstantiated at this time.

## NPPF & NPSE:

The National Planning Policy Framework 2012 (NPPF) and assessments to the Noise Policy Statement for England 2010 (NPSE) should be made in conjunction with each other. Paragraph 123 of the National Planning Policy Framework (NPPF) states the following:

Planning polices and decisions should aim to:

- ✓ avoid noise from giving rise to significant adverse impacts on health and quality of life as a result of new development;
- ✓ mitigate and reduce to a minimum other adverse impacts on health and quality of life arising from noise from new development, including through the use of conditions;
- ✓ recognise that development will often create some noise and existing businesses wanting to develop in continuance of their business should not have unreasonable restrictions put on them because of changes in nearby land uses since they were established; and
- ✓ identify and protect areas of tranquillity which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

The Noise Policy Statement for England gives various levels of effect as detailed within this report.

With the proposed plant installed generally as detailed within this report, the development can be implemented within the guidelines of the aforementioned documents and ensure a development conclusion of **NOEL – No Observed Effect Level** This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.

## Conclusion:

Sound Advice Acoustics Ltd has been instructed by Mildren Construction, to carry out the relevant noise assessments and calculations for the proposed commercial buildings at Daedalus Park, Daedalus Drive, Lee on Solent, Hampshire, PO13 9FU.

With regards to the proposed external plant, a maximum noise level criteria for the plant has been set to which all M & E plant should be selected to. The noise criteria will ensure that the proposed M & E plant will not have a detrimental acoustic effect on the proposed nearest noise sensitive premises directly adjacent to the proposed commercial units.

Section 14 of the National Planning Policy Framework 2012 suggests that planning permission should be granted unless any adverse impacts of doing so would significantly and demonstrably outweigh the benefits, when assessed against the policies in the framework taken as a whole, or specific policies in the framework indicate the application should be restricted.

Based on the calculations and assessments made within this report it is the professional opinion of Sound Advice Acoustics Ltd that the proposed plant can operate within the requirements of BS 4142: 2014, the National Planning Policy Framework 2012, NPPF & NPSE and that, with regards to sound, planning permission can be granted.

**Plan Sketch Layout:**

