ACOUSTIC CONSULTANTS LTD

Noise Impact Assessment

Proposed Renal Dialysis Centre
Acacia Avenue, Port Talbot

Reference: 10927/FD/JA

Client

Sandycroft Projects Limited

SPL

Document Control					
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1.0	First Issue	26/07/2024	Fergal Denman	James Abbass	James Abbass
2.0	Site description & Assessment text	26/07/2024	Fergal Denman	James Abbass	James Abbass
3.0	Plant area design	29/07/2024	Fergal Denman	James Abbass	James Abbass

The report has been prepared in good faith, with all reasonable skill and care, based on information provided or available at the time of its preparation and within the scope of work agreement with the Client. We disclaim any responsibility to the Client and others in respect of any matters outside the scope of the above. The report is provided for the sole use of the named Client and is confidential to them and their professional advisors. No responsibility is accepted to other parties.

The report limits itself to addressing solely on the noise, acoustic, and vibration aspects as included in this report. We provide advice only in relation to noise, vibration and acoustics. It is recommended that appropriate expert advice is sought on all the ramifications (e.g. CDM, structural, condensation, fire, legal, etc.) associated with any proposals in this report or as advised and concerning the appointment. It should be noted that noise predictions are based on the current information as we understand it and, on the performances noted in this report. Any modification to these parameters can alter the predicted level. All predictions are in any event subject to a degree of tolerance of normally plus or minus three decibels. If this tolerance is not acceptable, then it would be necessary to consider further measures.

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1. Introduction

Sandycroft Projects Limited appointed Acoustic Consultants Limited to undertake a noise impact assessment for proposed new plant associated with the redevelopment of Stationery House, Acacia Avenue, Port Talbot.

Details of the proposed plant are not finalised at this early stage. However, we have been informed that there is a similar renal dialysis unit that our client has recently worked on serving a similar number of patients. We have been informed that it is likely the HVAC selection will be the same, as our client aims to keep continuity across the similar schemes.

We have used noise data of the units from the similar site, at the request of our client, to form the basis of this assessment. In the event that selected units are different from those noted, then we have provided plant limits that will need to be met.

Plant noise limits derived from on-site measured noise data are provided. Noise limits are set in accordance with PPW, TAN11, and British Standard 4142:2014+A1:2019 (BS4142).

This report has been prepared by a Technician Member of the Institute of Acoustics (TechIOA). This report has been reviewed and approved by a full Member of the Institute of Acoustics (MIOA) with 6 years' experience in the field of acoustics.

2. The Site

2.1. General Proposals

Proposed redevelopment of Stationary House, including the part demolition of existing factory building and rebuilding work, change of use from vacant factory (Use Class B1 & B8) to form a Satellite Dialysis Unit (Use Class D1), including alterations to the existing building, with associated car parking, landscaping, refuse storage and engineering works.

Proposals are for the site to operate between 06.30- and 20.30-hours Monday to Saturday.

New plant associated with the proposals is understood to be located within a dedicated plant area on the north of the site.

The proposed layout plan is provided below.

Figure 1: Proposed site plan

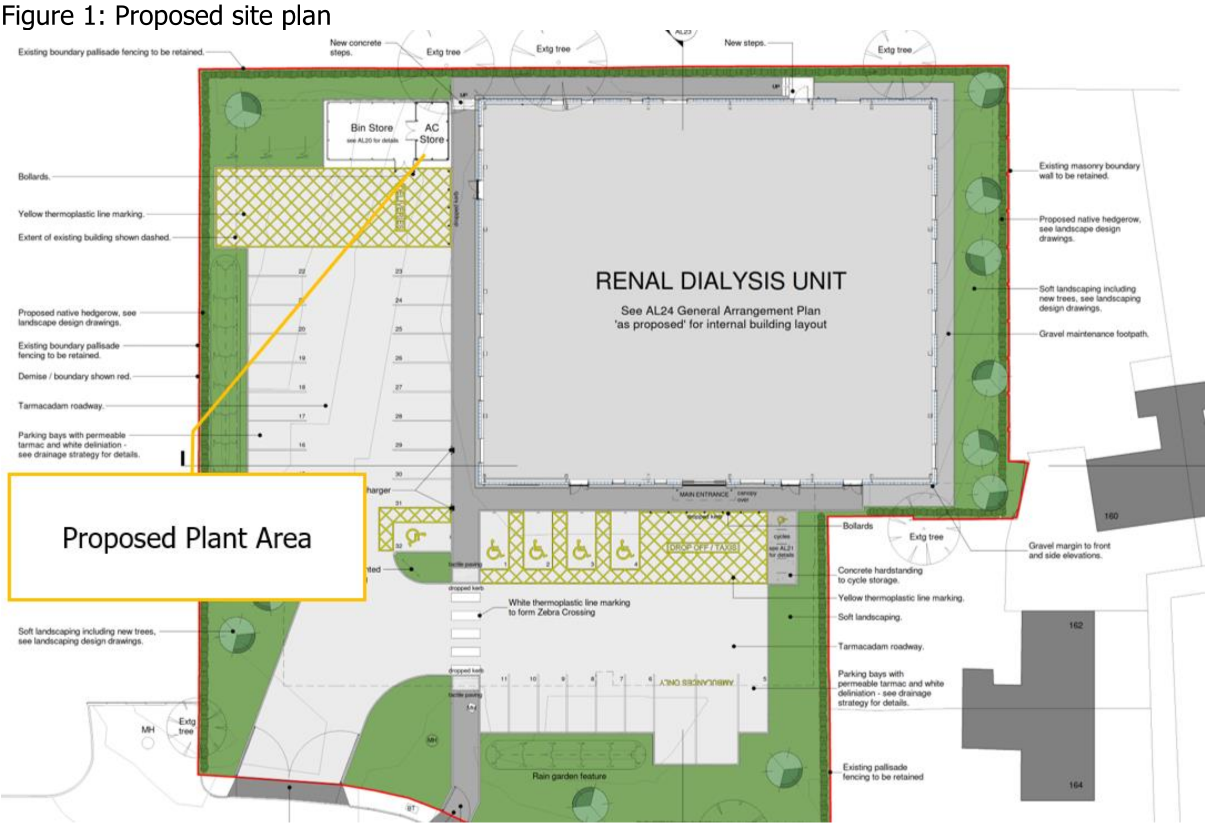
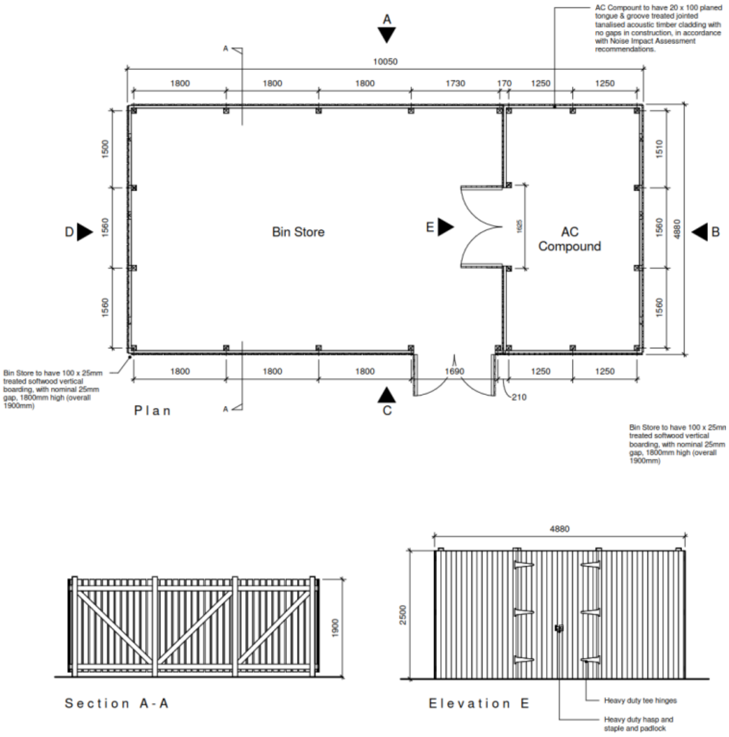


Figure 2: Proposed plant area layout



Since initial discussions, the design team have altered the layout of the plant area to shield the access door to the plant, from direct line of sight to the NSRs.

2.2. Plant from Similar Scheme

At the time of writing, a schedule of plant is not available. However, our client has requested that we base the assessment on fixed plant used at a recent, similar scheme. This is due to the client aiming to provide the same plant specification at the application site in question. Details of the recently installed plant are provided below.

2.2.1. External Plant

The proposed external plant is 2no. Mitsubishi PURY-P350YNW-A2 condenser units. We have been advised by the client that the plant would typically operate around 75% duty, and only in extreme weather conditions could operate at 90% duty. The manufacturer's stated sound power levels for the plant at both duties are as follows:

Table 1: Proposed plant noise levels

Make and Model	Duty	Quantity	Sound Power Level
Mitsubishi PURY-P350YNW-A2 (Heating)	75%	2	77
	90%	2	81

2.2.2. **Internal Plant with External Ducts**

At the recent scheme, 5no. internally located AHUs have been installed, which have atmospheric ducts terminating at louvres on the external façades of the building.

The manufacturer has provided octave-band sound power levels for these units. However, the only in-duct sound levels available are the room side supply fan.

There are no design layouts or proposals for the internal plant that will be ducted to the atmosphere at the Port Talbot application site. For the basis of this assessment, we have considered the atmospheric side sound levels to be equal to the manufacturer stated room-side sound levels. These could, in reality, be slightly lower due to losses through the system.

The AHU make and models and the in-duct sound power levels used in the assessment are shown on the table below:

Table 2: Monitoring Equipment

Make and Model	No.	Sound power Level (dB) per Octave Band (Hz)								dB
		63	125	250	500	1k	2k	4k	8k	L_{WA}
Mitsubishi LGH-150-RVTX-E	2	75	74	69	64	57	45	47	41	66
Mitsubishi LGH-200-RVTX-E	2	75	76	71	66	64	48	45	34	67
Mitsubishi LGH-250-RVTX-E	1	76	78	74	70	65	56	56	48	72

Please note the above noise levels would be expected to be reduced due to losses through the duct work and end reflection loss. To assess fully, we will need a full schedule of plant and duct work.

To provide outline guidance, we would advise that all noise generating atmospheric terminals are located on the *north-east façade facing away from the residential sensitive receivers.*

3. Planning and Noise

3.1. Planning Policy Wales (PPW)

Planning Policy Wales (PPW) Edition 12 dated February 2024 sets out the land use planning policies of the Welsh Government. Section 1 states:

1.1 Planning Policy Wales (PPW) sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes (TANs), Welsh Government Circulars, and policy clarification letters, which together with PPW provide the national planning policy framework for Wales. PPW, the TANs1, MTANs2 and policy clarification letters comprise national planning policy.

The most relevant statements for noise affecting a residential use are provided in Section 6.7 and summarised below:

"6.7.1 Clean air and an appropriate soundscape, contribute to a positive experience of place as well as being necessary for public health, amenity and well-being. They are indicators of local environmental quality and integral qualities of place which should be protected through preventative or proactive action through the planning system. Conversely, air, noise and light pollution can have negative effects on people, biodiversity and the resilience of ecosystems and should be reduced as far as possible."

6.7.4 The planning system should maximise its contribution to achieving the well-being goals, and in particular a healthier Wales, by aiming to reduce average population exposure to air and noise pollution alongside action to tackle high pollution hotspots. In doing so, it should consider the long-term effects of current and predicted levels of air and noise pollution on individuals, society and the environment and identify and pursue any opportunities to reduce, or at least, minimise population exposure to air and noise pollution, and improve soundscapes, where it is practical and feasible to do so.

6.7.5 In taking forward these broad objectives the key planning policy principle is to consider the effects which proposed developments may have on air or soundscape quality and the effects which existing air or soundscape quality may have on proposed developments. Air Quality and soundscape influence choice of location and distribution of development and it will be important to consider the relationship of proposed development to existing development and its surrounding area and its potential to exacerbate or create poor air quality or inappropriate soundscapes. The agent of change principle says that a business or person responsible for introducing a change is responsible for managing that change. In practice, for example, this means a developer would have to ensure that solutions to address air quality or noise from nearby pre-existing infrastructure, businesses or venues can be found and implemented as part of ensuring development is acceptable.

6.7.6 In proposing new development, planning authorities and developers must, therefore:
*•	address any implication arising as a result of its association with, or location within, air quality management areas, noise action planning priority areas or areas where there are sensitive receptors;*
*•	not create areas of poor air quality or inappropriate soundscape; and*
*•	seek to incorporate measures which reduce overall exposure to air and noise pollution and create appropriate soundscapes.*

6.7.7 To assist decision making it will be important that the most appropriate level of information is provided and it may be necessary for a technical air quality and noise assessment to be undertaken by a suitably qualified and competent person on behalf of the developer."

6.7.8 Good design, for example setting back buildings from roads to avoid canyon effects and using best practice in terms of acoustic design to ensure the appropriate and intended acoustic environment of completed developments should be incorporated at an early consideration in the design and planning process. Other mitigation measures must be capable of being effectively implemented for their intended purpose, and could include those related to:

- *traffic management and road safety;*
- *ensuring progress towards a shift to low or zero emissions means of road transport, such as electrical charging points;*
- *supporting low or zero emissions public transport;*
- *providing active travel infrastructure; and*
- *incorporating green infrastructure, where it can improve air quality by removing air pollution and aiding its dispersal, reduce real or perceived noise levels by absorbing and scattering noise and introducing natural sounds to soften man-made noise, provide areas of relative tranquillity, and reduce exposure by putting a buffer between sources of pollution and receptors.*

6.7.14 Proposed development should be designed wherever possible to prevent adverse effects to amenity, health and the environment but as a minimum to limit or constrain any effects that do occur. In circumstances where impacts are unacceptable, for example where adequate mitigation is unlikely to be sufficient to safeguard local amenity in terms of air quality and the acoustic environment it will be appropriate to refuse permission.

6.7.19 The health imperative of good air quality and appropriate soundscapes in contributing to the overall character and quality of places and the health and well-being of people and wildlife should be fully recognised. It will not be appropriate to locate sensitive uses, such as hospitals, schools, care homes and housing adjacent to busy roads or other transport routes, where there are no connectivity benefits to be gained and where health and amenity impacts associated with increased exposure of people to pollution will be unacceptable. Whilst some uses may be appropriate with *the aid of good design air quality and soundscape considerations can be overriding factors, especially for sensitive uses, if they cannot be adequately mitigated and impacts minimised.*

6.7.20 Where sensitive developments need to be located close to existing transportation infrastructure for sustainable movement and access they should be designed, as far as practicable, to limit harmful substances and noise levels within and around those developments both now and in the future. This may include employing the principles of good acoustic design and the inclusion of active travel or travel management measures as part of development proposals. Such development, however, should preferably be located away from existing sources of significant noise, which may include aircraft noise or roads, particularly new roads or those with programmed route improvements.

6.7.21 Regard should be paid to current air quality and noise levels and the quality of the existing soundscape and account taken of any relevant local air quality action plan, noise action plan and/ or local or regional air quality strategy as part of development strategies and proposals in development plans and before determining planning applications.

6.7.24 The potential impacts of noise pollution arising from existing development, be this commercial, industrial, transport related or cultural venues (such as music venues, theatres or arts centres), must be fully considered to ensure the effects on new development can be adequately controlled to safeguard amenity and any necessary measures and controls should be incorporated as part of the proposed new development. This will help to prevent the risk of restrictions or possible closure of existing premises or adverse impacts on transport infrastructure due to noise and other complaints from occupiers of new developments. It will be important that the most appropriate level of information is provided and assessment undertaken.

PPW does not provide any quantifiable criteria and directs you to the Technical Advice Notes (TAN 11).

3.2. **Technical Advice Note (Wales) - Noise**

Planning Policy Wales (PPW) Edition 11 dated February 2021 sets out the land use planning policies of the Welsh Government. It is supplemented by a series of Technical Advice Notes. The relevant planning criteria for proposed residential development is in Technical Advice Note (Wales) 11 entitled "Noise" which was published in October 1997. The introduction states:

"This note provides advice on how the planning system can be used to minimise the adverse impact of noise without placing unreasonable restrictions on development or adding unduly to the costs and administrative burdens of business.

It outlines some of the main considerations which local planning authorities should take into account in drawing-up development plan policies and when determining *planning applications for development which will either generate noise or be exposed to existing noise sources".*

For noise from industrial and commercial developments, such as plant noise, TAN 11 states:

"B17. The likelihood of complaints about noise from industrial development can be assessed, where the Standard is appropriate, using guidance in BS 4142: 1990. Tonal or impulsive characteristics of the noise are likely to increase the scope for complaints and this is taken into account by the "rating level" defined in BS 4142. This "rating level" should be used when stipulating the level of noise that can be permitted. The likelihood of complaints is indicated by the difference between the noise from the new development (expressed in terms of the rating level) and the existing background noise. The Standard states that, 'A difference of around 10 dB or higher indicates that complaints are likely. A difference of around 5 dB is of marginal significance'. Since background noise levels vary throughout a 24-hour period it will usually be necessary to assess the acceptability of noise levels for separate periods (e.g. day and night) chosen to suit the hours of operation of the proposed development. Similar considerations apply to developments that will emit significant noise at the weekend as well as during the week. In addition, general guidance on acceptable noise levels within buildings can be found in BS 8233: 1987."

The TAN document directs readers to British Standard 4142.

4. Assessment Criteria

British Standard 4142:2014 entitled 'Method for rating and assessing industrial and commercial sound' use outdoor sound levels to assess the likely effects of sound upon people who might be inside or outside a dwelling or other premises used for residential purposes. The principle is that of establishing the 'difference' between the 'rating level' and the 'background sound level'.

The 'rating level' is the 'specific sound level' of the source over a period of one hour during the day (07:00 to 23:00 hours) and over a period of 15 minutes during the night (23:00 to 07:00 hours).

Section 9 entitled 'Rating Level' states: *"Certain acoustic features can increase the significance of impact over that expected from a basic comparison between the specific sound level and the background sound level. Where such features are present at the assessment location, add a character correction to the specific sound level to obtain the rating level."*

An acoustic character correction should be added to the 'specific sound level' if it exhibits any tonality, impulsivity, other specific characteristics and/or intermittency at the assessment location. The value of the character correction varies, dependent on the prominence of the character of the sound source at the assessment location.

In Section 11 of the Standard, entitled 'Assessment of the Impacts', it states: *"Obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level (see Clause 8) from the rating level (see Clause 9) and consider the following.*

- *Typically, the greater this difference, the greater the magnitude of the impact.*
- *A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.*
- *A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.*
- *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."*

In all instances the context needs to be considered when determining the overall impact. In terms of context BS 4142:2014 states: *"Where the initial estimate of the impact needs to be modified due to the context, take all pertinent factors into consideration, including the following.*

1) *Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night. Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.*

2) *The character and level of the residual sound compared to the character and level of the specific sound. Consider whether it would be beneficial to compare the frequency spectrum and temporal variation of the specific sound with that of the ambient or residual sound, to assess the degree to which the specific sound source is likely to be distinguishable and will represent an incongruous sound by comparison to the acoustic environment that would occur in the absence of the specific sound. Any sound parameters, sampling periods and averaging time periods used to undertake character comparisons should reflect the way in which sound of an industrial and/or commercial nature is likely to be perceived and how people react to it.*

   NOTE 3 Consideration ought to be given to evidence on human response to sound and, in particular, industrial and/or commercial sound where it is available. A number of studies are listed in the "Effects on humans of industrial and commercial sound" portion of the "Further reading" list in the Bibliography.

3) *The sensitivity of the receptor and whether dwellings or other premises used for residential purposes will already incorporate design measures that secure good internal and/or outdoor acoustic conditions, such as:*
   - *i) façade insulation treatment;*
   - *ii) ventilation and/or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and*
   - *iii) acoustic screening."*

In terms of good internal acoustic conditions, the most relevant criteria and methodology is provided in BS8233:2014. This is in accordance with a March 2020 Technical published by the ANC Working Group, which provided comments and guidance to clear any ambiguity in BS414:2014+A1:2019.

The March 2020 Technical Note later states:

"Whilst BS 4142 can be used to assist in the determination of the likelihood of an adverse or significant adverse impact, <u>guidance on internal design criteria and mitigation is provided elsewhere. BS 8233:2014, for example, provides guidance on indoor ambient noise levels</u>."

We are not aware of any local authority requirement to achieve a more onerous criterion than that provided in BS4142.

5. Baseline Noise Survey

A baseline noise survey was undertaken at the site between the 12th and 16th of July 2024.

5.1. Monitoring Equipment

Sound Pressure Levels were measured using a Class 1 sound level meter with a half-inch condenser microphone, using the 'fast' setting. The equipment is checked regularly using a Quality System meeting the requirements of British Standard EN ISO/IEC 17025:2017 "General requirements for the competence of testing and calibration laboratories"; in accordance with British Standard EN 10012:2003 "Measurement management systems. Requirements for measurement processes and measuring equipment"; and traceable to the National Standards.

This equipment was checked and calibrated as noted below and the certificates are available for inspection.

Table 3: Monitoring equipment

Equipment Description	Serial Number	Date of Calibration	Calibration Certification Number
SLM, Svantek, 977A	69510	15/03/2024	1508101-1
Pre-Amplifier, Svantek, SV12L	73650	15/03/2024	1508101-1
Microphone, ACO Pacific, 7052E	90933	15/03/2024	1508101-1
Calibrator, Larson Davis, CAL200	17892	15/03/2024	1508101-1

The measuring systems were checked for calibration before and after the tests and no significant drift was detected.

5.2. Weather Conditions

Below were the weather conditions over the duration of the survey at the monitoring location.

Table 4: Weather conditions during the survey period

Date	Wind Speed Range (m/s)	Wind Direction	Temperature (°C)	Precipitation Time (hrs)	Cloud cover (%)
12th July 2024	≤4	W	12 - 17	0	50
13th July 2024	3 - 4	N	10 – 19	0	--
14th July 2024	2 – 4	E	7 – 17	0	--
15th July 2024	≤3	E	10 – 17	0	--
16th July 2024*	7 – 8*	NW	14 - 21	0	40

*High winds during this period – data obtained omitted from the assessment dataset

5.3. Monitoring Procedure

The microphone was situated in a free field position, mounted on a tripod, at an approximate height of 1.5 metres. Traffic on the surrounding road network formed the baseline noise climate. The location is representative of the NSRs.

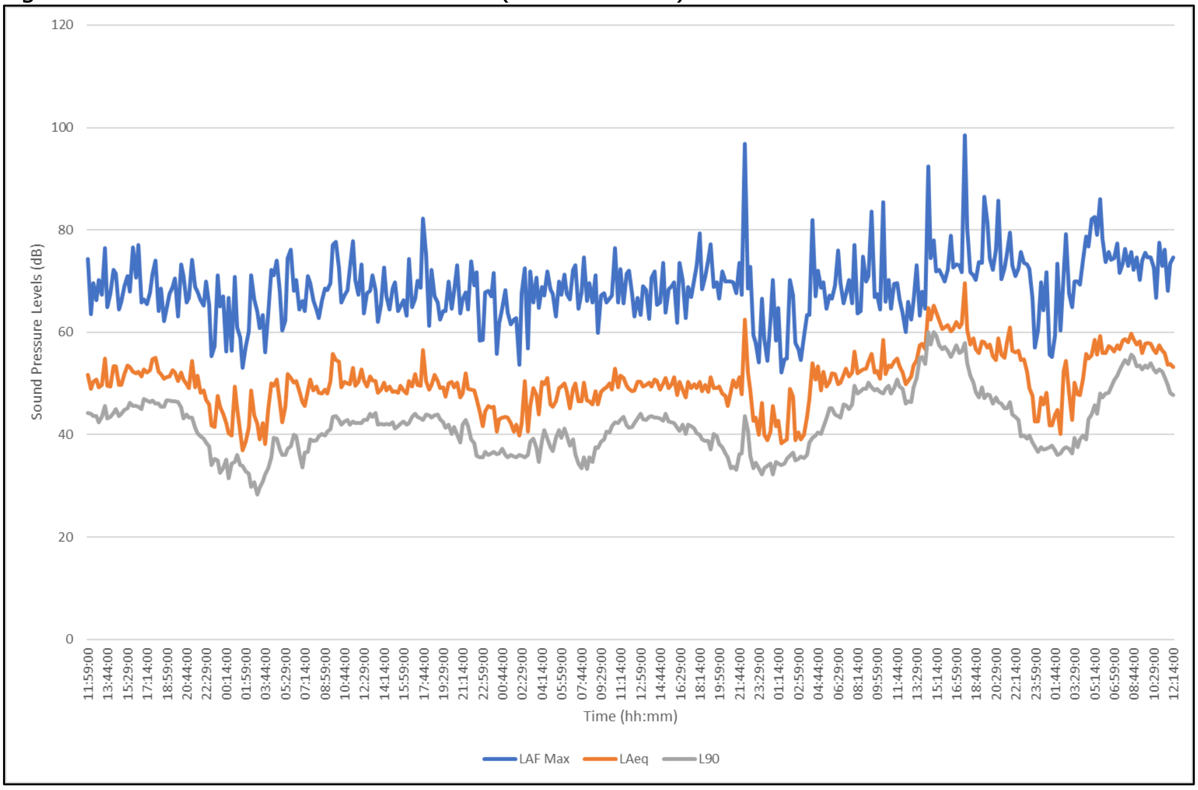
The monitoring location is provided in the figure below.

Figure 3: Monitoring location

5.4. Measured Noise Levels

The chart below details the measured maximum (L_{AFmax}), equivalent (L_{Aeq}) and background (L_{A90}) noise levels measured over the survey period. Measurements below are detailed in 15-minute intervals.

Figure 4: Measured noise levels over time (free field level)



The table below details the measured 15-minute daytime and night time background and residual noise levels, representative of existing residential receivers.

Table 5: Measured representative residual and background noise levels (free field)

Period	Background, dB $L_{A90,15minutes}$		Equivalent, dB $L_{Aeq,15minutes}$	
	Range	Mode	Range	Mode
Daytime, 0700 – 2300hrs	32 - 60	42	40 - 70	49
Weekday Operating Period 0630 – 2030hrs	34 – 60	42	46 – 70	50
Saturday Operating Period 0630 – 2030hrs	34 – 44	42	46 – 57	49
Design Target, Worst-Case Period 0630 – 0730hrs	34 – 40	37	46 – 51	46

6. Plant Assessment

We base the following assessment on the plant details noted above. If the plant specification is amended through the design stages, the plant noise impact will require reassessment.

6.1. Noise Modelling

6.1.1. Noise Modelling Parameters

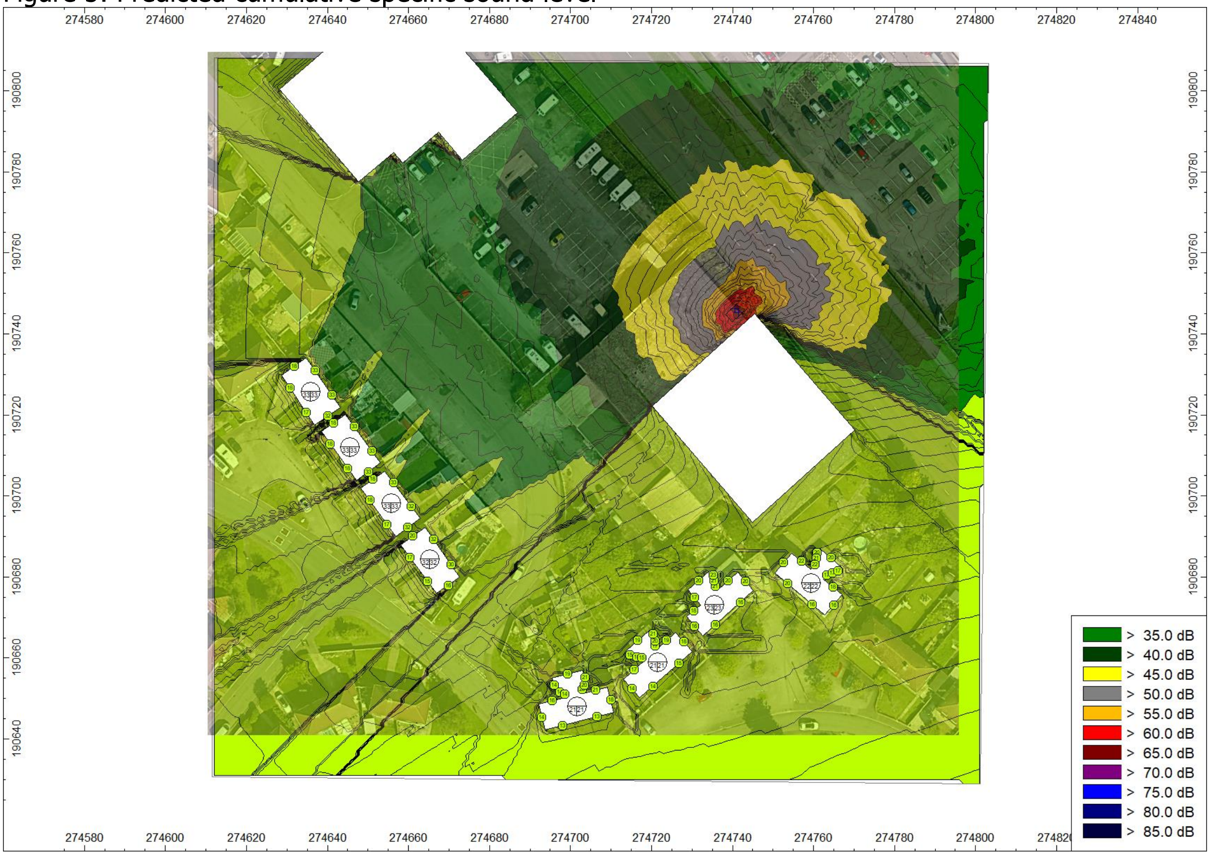
A noise modelling exercise has been undertaken, based on the supplied information, to address the impact of plant noise as it affects the NSRs. Noise level predictions have been carried out using the noise modelling software CadnaA by DataKustik. The software calculates its predictions on the International Standard ISO 9613-2 entitled 'Acoustics – Attenuation of sound during propagation outdoors', published in 2024. The following parameters have been assumed in the noise model:

- The building heights are based on Google satellite imagery and on-site observations.
- The 'max. Order of Reflection' is considered to be 3.
- The ground across the site and surrounding area is considered hard and reflective (G=0).
- Buildings are considered to be reflective.
- The plant noise levels are as detailed in Section 2.2
- All plant is operating continuously and simultaneously at 90% capacity.
- The topography of the site is presumed to be flat.
- The predicted noise grid is at a height of 4.5 metres.
- The predicted building evaluation receivers are given at the worst case per façade, across all floors.
- The external plant units are proposed to be within a plant area that the client advises will be constructed with solid, closed boarded fencing.
    - We advise the fence is constructed to a height of 2.5m with materials comprising a minimum surface mass of $10kg/m^2$.
    - There must be no gaps in the construction.
    - The access doors to the plant area must be as noted in the site descriptions above

6.1.2. Noise Modelling Results

The below figure shows the predicted cumulative specific sound level of the plant operating simultaneously at 90% capacity:

Figure 5: Predicted cumulative specific sound level



As can be seen from the above model, the highest cumulative noise level due to the proposed plant is 33 dB $L_{Aeq,\ T}$.

6.2. Initial Estimate of Impact

A British Standard 4142:2014 assessment of the impact of plant noise has been undertaken at a location representative of the NSRs.

6.2.1. Specific Sound Level

Based on the above modelling results the specific sound level at the worst-case NSR is 33 dB $L_{Aeq,\ T}$. This is the level at the NSR without any character correction.

6.2.2. Background Sound Level

From the measured data we have determined a typical background sound level of 37 dB $L_{A90,1hour}$, and 37 dB $L_{A90,15mins}$ to account for the short period of night-time hours as classed in BS4142.

6.2.3. Character Corrections

BS4142:2014 states that character corrections should be added to the 'specific sound level' if it exhibits any *tonality, impulsivity, other specific characteristics and/or intermittency* at the assessment location.
Based on our site visit and knowledge of such plant units, corrections to be applied are as follows:

- ***Tonality*** – As we do not have third-octave band noise data for the plant, the tonality of the plant cannot be accurately predicted. It is the supplier's/installer's responsibility to ensure that no tonality is present at the NSR.
- ***Impulsivity*** – Plant such as this is not normally impulsive. No correction applied.
- ***Intermittency*** – The plant has the potential to be intermittent. A +3dB correction is applied.
- ***Other Sound Characteristics*** – Fixed plant noise is present at the site due to other industrial and commercial premises, as such no character correction for other sound characteristics should be applied.

6.2.4. Initial Estimate of Impact

The following table shows the comparison of the rating sound level (including character corrections) against the plant noise limits.

Table 6: British Standard 4142:2014 initial estimate.

Parameter	Period	
	Weekday Operating Period (06.30 to 20.30 hours)	**Saturday Operating Period (06.30 to 20.30 hours)**
Background Sound Level	37 dB	37 dB
Specific Sound Level	33 dB $L_{Aeq,\,T}$	33 dB $L_{Aeq,\,T}$
Character Correction	+3 dB	+3 dB
Rating Level	36 dB $L_{Aeq,\,T}$	36 dB $L_{Aeq,\,T}$
Assessment Difference	-1 dBA	-1 dBA

As can be seen above, the cumulative level of plant noise at NSR is below background for the day and night periods. As such, the external plant associated with the development is considered acceptable.

Context of absolute noise levels is also considered below.

6.3. Context

6.3.1. Absolute Levels

"1) The absolute level of sound. For a given difference between the rating level and the background sound level, the magnitude of the overall impact might be greater for an acoustic environment where the residual sound level is high than for an acoustic environment where the residual sound level is low. Where background sound levels and rating levels are low, absolute levels might be as, or more, relevant than the margin by which the rating level exceeds the background. This is especially true at night. Where residual sound levels are very high, the residual sound might itself result in adverse impacts or significant adverse impacts, and the margin by which the rating level exceeds the background might simply be an indication of the extent to which the specific sound source is likely to make those impacts worse.

With regard to 'absolute levels', the most relevant guidance is British Standard 8233:2014 and WHO 1999. Internally to a dwelling during the day should not exceed 35 dB $L_{Aeq,16hour}$ and 30 dB $L_{Aeq,8hour}$ during the night.

The internal level is approximately 15 dB(A) quieter than the external free-field level (as stated by the WHO) allowing for the attenuation of a partially open window. Therefore, based on the above, the worst-case absolute level assessment is follows.

Table 7: Absolute level assessment

Time Period	Predicted External Level	Open Window Correction dB(A)	Predicted Internal Level $L_{Ar,T}$ dB	Within Criteria
Day	36 $L_{Ar,60minute}$ dB	-15	21	YES
Night	36 $L_{Ar,15minute}$ dB	-15	21	YES

As can be seen from the table above, the rating sound level of the installed units operating simultaneously is within the BS8233:2014 criteria for acceptable levels during the day and night.

The assessment is undertaken with the two units operating at their highest expected capacity simultaneously. This is worst-case, and in most cases, the level at the dwellings could be lower than that predicted.

7. Plant Noise Limits

If the final selection of plant units varies from the noted specification above, then the below plant limits will need to be met.

Based on the above criteria and the assessment time periods stated, the maximum rating noise limits of noise from new plant associated with the development are as follows.

These limits should be determined at the façade of the nearest existing sensitive receivers and should include all character corrections for tonality, intermittency, impulsivity and any other applicable noise character.

Table 8: Recommended Plant Noise Rating Level Limits at existing receivers

Time Period	Limits at Existing NSRs
Weekday Operating Period 0630 – 2030hrs	37 dB $L_{Ar(1\ hour)}$
Saturday Operating Period 0630 – 2030hrs	37 dB $L_{Ar(15\ minutes)}$

With plant meeting the above limits, the impact will be low in terms of BS4142, and will achieve the requirements of the PPW, at the sensitive receivers around the site.

8. Summary & Conclusions

Sandycroft Projects Limited appointed Acoustic Consultants Limited to undertake a noise impact assessment for proposed new plant associated with the redevelopment of Stationery House, Acacia Avenue, Port Talbot.

This report provides a noise impact assessment of the anticipated operational noise at the nearest residential noise sensitive receivers (NSRs). The noise impact assessment is based on the results of a background noise level survey and noise level predictions using manufacturer's noise data from a similar site.

We provide advice on the timber fencing proposed to the plant area in the report. The fencing must be 2.5m high, comprising material with a minimum surface mass of $10kg/m^2$. The access doors to the plant units are shielded from direct line of sight to the NSRs.

The proposed plant noise is expected to be below and equal to the background noise level during both the day and night periods. If the plant schedule listed in this report does not reflect the finalised plant specification, then plant limits have been provided that will need to be met.

With the proposed plant noise limits met, plant noise associated with the proposals will be of low impact in terms of BS4142 and plant noise from the proposals would not cause a change in behaviour or attitude and will achieve the aims of the PPW.

9. Appendix 1 – Glossary of Acoustic Terminology

A-weighted sound pressure pA – value of overall sound pressure, measured in pascals (Pa), after the electrical signal derived from a microphone has been passed through an A-weighting network.

A-weighted sound pressure level, L_{pA} - quantity of A-weighted sound pressure given by the following formula in decibels (dBA)

$L_{pA} = 10 \log_{10} (p_A/p_0)^2$

where:

p_A is the A-weighted sound pressure in pascals (Pa);
p_0 is the reference sound pressure (20 μPa)

Background sound level, $L_{A90,T}$ – A-weighted sound pressure level that is exceeded by the residual sound assessment location for 90% of a given time interval, T, measured using weighting F and quoted to the nearest whole number of decibels

Break-in - noise transmission into a structure from outside.

Decibel (dB) – The decibel is the unit used to quantify sound pressure levels. The human ear has an approximately logarithmic response to acoustic pressure over a very large dynamic range (typically 20 micro-Pascals to 100 Pascals). Therefore, a logarithmic scale is used to describe sound pressure levels and also sound intensity and power levels. The logarithms are taken to base 10. Hence an increase of 10 dB in sound pressure level is equivalent to an increase by a factor of 10 in the sound pressure level (measured in Pascals). Subjectively, this increase would correspond to a doubling of the perceived loudness of sound.

Equivalent continuous A-weighted sound pressure level, $L_{Aeq,T}$ – value of the A-weighted sound pressure level in decibels of continuous steady sound that, within a specified time interval, T = t2 – t1, has the same mean-squared sound pressure as a sound that varies with time, and is given by the following equation:

$$L_{\mathrm{Aeq},T} = 10\lg_{10}\left\{(1/T)\int_{t_1}^{t_2}[p_{\mathrm{A}}(t)^2/p_0^2]\mathrm{d}t\right\} \qquad (1)$$

where:

p_0 is the reference sound pressure (20 μPa); and

$p_{\mathrm{A}}(t)$ is the instantaneous A-weighted sound pressure (Pa) at time t

NOTE The equivalent continuous A-weighted sound pressure level is quoted to the nearest whole number of decibels.

Facade level – sound pressure level 1 m in front of the façade. Facade level measurements of L_{pA} are typically 1 dB to 3 dB higher than corresponding free-field measurements because of the reflection from the facade.

Free-field level – sound pressure level away from reflecting surfaces. Measurements made 1.2 m to 1.5 m above the ground and at least 3.5 m away from other reflecting surfaces are usually regarded as free-field. To minimize the effect of reflections the measuring position has to be at least 3.5 m to the side of the reflecting surface (i.e. not 3.5 m from the reflecting surface in the direction of the source).

Octave and Third Octave Bands – The human ear is sensitive to sound over a range of frequencies between approximately 20 Hz to 20 kHz and is generally more sensitive to medium and high frequencies than to low frequencies within the range. There are many methods of describing the frequency content of a noise. The most common methods split the frequency range into defined bands, in which the mid-frequency is used as the band descriptor and in the case of octave bands is double that of the band lower. For example, two adjacent octave bands are 250 Hz and 500 Hz. Third octave bands provide a fine resolution by dividing each octave band into three bands. For example, third octave bands would be 160 Hz, 250 Hz, 315 Hz for the same 250 Hz octave band.

Sound pressure level – Sound pressure level is stated on many of the charts. It is the amplitude of the acoustic pressure fluctuations in a sound wave, fundamentally measured in Pascals (Pa), typically from 20 micro-Pascals to 100 Pascals, but commonly simplified onto the decibel scale.

Sound reduction index, R – laboratory measure of the sound insulating properties of a material or building element in a stated frequency band.

Specific sound level, $L_s = L_{Aeq,Tr}$ – equivalent continuous A-weighted sound pressure level produced by the specific sound source at the assessment location over a given reference time interval, T_r.

Structure-borne noise – audible noise caused by the vibration of elements of a structure, the source of which is within a building or structure with common elements.

Rating level, $L_{Ar,Tr}$ – Specific sound level plus any adjustment for the characteristic features of the sound.

Reverberation Time, T – The reverberation time is defined as the time taken for a noise level in an enclosed space to decay by 60 dB from a steady level once the noise source has stopped. It is measured in seconds. Often a 60 dB decay cannot be measured so the reverberation time is measured over a lesser range and corrected back to the time for a 60 dB drop assuming a constant decay rate. Common parameters are T20 (time taken for a 20 dB decay multiplied by three) and T30 (time taken for a 30 dB decay multiplied by two).

Vibration Dose Value, VDV – measure of the total vibration experienced over a specified period of time.

Estimated Vibration Dose Value, eVDV – estimation of the total vibration experienced over a specified period of time. This is usually based on the number of events and shortened measurement data.

Weighted sound reduction index, R_w – Single-number quantity which characterizes the airborne sound insulating properties of a material or building element over a range of frequencies. The weighted sound reduction index is used to characterize the insulation of a material or product that has been measured in a laboratory (see BS EN ISO 717-1).

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