

## TECHNICAL DESIGN NOTE AC01

TO: Tom Smith, TTRS Developments Limited  
FROM: Graham Hornby (MZA)  
DATE: 18<sup>th</sup> December 2023  
SUBJECT: TDN AC01 – Kitchen Extract Fans

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Tom,

Further to your request, please find attached the assessment of the three proposed kitchen extract fans serving the new Coopers Yard Development in Holmfirth.

### ASSESSMENT CRITERIA

This assessment is based on the requirements of the recently issued Decision Notice from Kirklees Council for the approved development. The application is approved under reference 2023/62/92880/W for the '*Change Of Use And External Alterations To Convert Former Tool Hire Centre/Office/Storage To Mixed Use Food And Drink Venue Linked To O'briens Beer Cafe And Bottle Shop With Construction Of Covered Seating Area (Within A Conservation Area)*'.

In particular, the kitchen extract fans have been considered with respect to Planning Condition #5;

5. The combined noise from any fixed mechanical services and external plant and equipment shall be effectively controlled so that the combined rating level of noise from all such equipment does not exceed the background sound level at any time. 'Rating level' and 'background sound level' are as defined in BS 4142:2014+A1:2019.

**Reason:** To ensure the proposed development does not cause harmful noise pollution within neighbouring noise sensitive locations, in the interest of amenity, to comply with the aims and objectives of Policies LP16(b) and LP52 of the Kirklees Local Plan and Chapters 12 and 15 of the National Planning Policy Framework.

Accordingly, the requirements of British Standard 4142:2014 (+A1:2019) are summarised below;

## British Standard 4142:2014 +A1:2019 Methods for rating and assessing industrial and commercial sound

BS 4142 provides a methodology for rating and assessing sound associated with both industrial and commercial premises. The purpose of the Standard is clearly outlined in the opening section where it states that the method is appropriate for the consideration of:

- Sound from industrial and manufacturing processes;
- Sound from fixed installations which comprise mechanical and electrical plant and equipment;
- Sound from the loading and unloading of goods and materials at industrial and/or commercial premises; and
- Sound from mobile plant and vehicles that is an intrinsic part of the overall sound emanating from premises or processes, such as that from forklift trucks, or that from train movements on or around an industrial and/or commercial site.

The Standard is based around the premise that the significance of the noise impact of an industrial/commercial facility can be derived from the numerical subtraction of the background noise level (not necessarily the lowest background level measured, but the typical background of the receptor) from the measured/calculated rating level of the specific sound under consideration. This comparison will enable the impact of the specific sound to be concluded based upon the premise that typically “the greater this difference, the greater the magnitude of the impact”. This difference is then considered as follows:

- 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."

BS 4142 further states that “where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact” again depending upon the specific context of the site. The Standard further qualifies the assessment protocol by outlining conditions to the comparative assessment and stating that “not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact”, thus implying that all sites should be assessed on their own merits and specifics.

The Standard quantifies the typical reference periods to be used in the assessment of noise, namely:

- Typical Daytime      07:00 – 23:00    1-hr assessment period
- Typical Night-time    23:00 – 07:00    15-min assessment period

The Standard also outlines methods for defining appropriate “character corrections” within the rating levels to account for tonal qualities, impulsive qualities, other sound characteristics and/or intermittency. These are:

- a. the Subjective Method,
- b. the Objective Methods for tonality; and,
- c. the Reference Method.

It is noted by the Standard that where multiple features are present the corrections should be added in a linear fashion to the specific level.

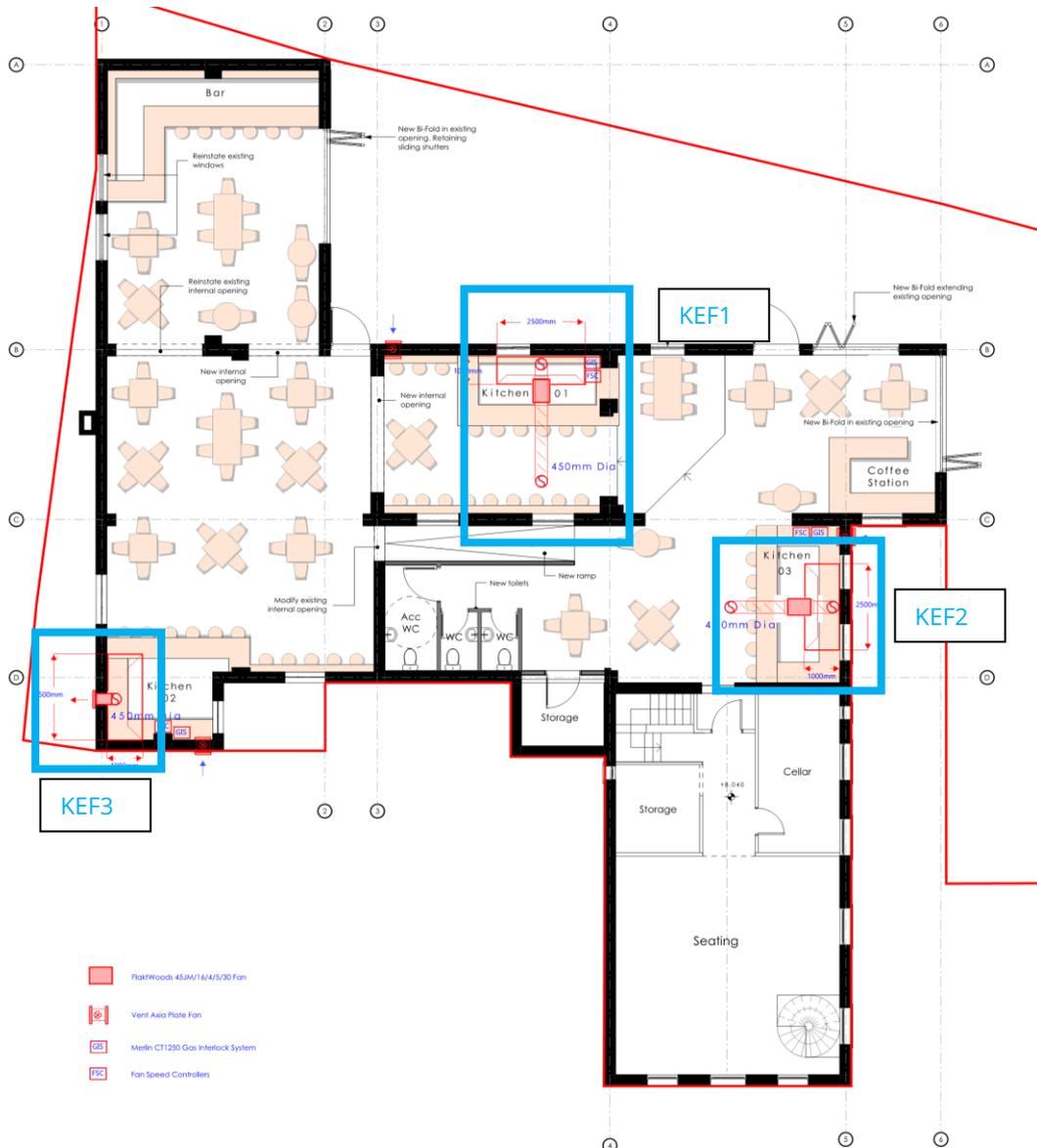
Level of Perceptibility	Tonal Correction dB	Impulsivity Correction dB	Correction for 'other sound characteristics' dB	Intermittency Correction dB
No Perceptibility	+0	+0	Where neither tonal nor impulsive but clearly identifiable +3	If intermittency is readily identifiable +3
Just Perceptible	+2	+3		
Clearly perceptible	+4	+6		
Highly perceptible	+6	+9		

**Table 1 - BS 4142 Subjective Method Rating Correction**

This standard and methodology will only be used to assess the impact of sound from any fixed plant.

## PROPOSED EQUIPMENT

It has been confirmed that the only equipment being installed at the development, that creates a potential noise emission to off-site receptors will be the three new kitchen extract fans. These are to be located as noted below;



**Figure 1** – Location of Proposed Equipment

KEF1 and 2 terminate through the roof whereas KEF3 terminates through the wall.

The fans will be identical Flakt Woods JM Aerofoil 45Jm/16/4/5/30 units providing  $1.27\text{m}^3/\text{s}$  of extract air. The fans will be located internally with only the final discharge air being external. It is understood makeup up air will be through natural building leakage. The noise data for the fans at the operating duty is provided overleaf.

	Sound Spectrum (Hz)								Overall	
	63	125	250	500	1k	2k	4k	8k	Lw*	LpA @ 3 m**
Inlet*	73	75	71	68	66	64	59	54	79	51
Outlet*	74	75	71	68	66	64	60	56	79	51
Breakout*	74	75	71	68	66	64	60	56	79	51

\* Lw dB re 10<sup>-12</sup> W  
 \*\* dBA re 2x10<sup>-5</sup> Pa  
 Sound data at requested duty.

Figure 2 - Noise data for proposed fans (all 3 identical)

### NEAREST NOISE SENSITIVE RECEPTORS

The nearest identified noise sensitive receptors (NSRs) to the site are identified below.



Figure 3 - Nearest Noise Sensitive Receptors to the Site

These are;

- NSR1 & 2 – No. 1 and No. 3 Cooper Lane
- NSR3 - The Terrace, Huddersfield Road

## ASSESSMENT DISTANCES

The BS4142 assessment should be undertaken within the external garden area, but where no external garden space exists (as is the case for The Terrace, at a position representative of the nearest façade).

As such the following distances have been used in this assessment. The blue shading indicates that there is partial screening between the source at receiver (by roof ridges etc) and the orange colour indicates the source is completely obscured at the assessment location.

Assessment Location	Distance between Plant and NSR's		
	KEF1	KEF2	KEF3
NSR1 &2	18m	23m	27m
NSR3	25m	19m	36m

**Table 2 – Assessment Distances and Screening**

For the purposes of this assessment an acoustic loss for partial has been taken to be 5dBA and the loss for full screening is 10dBA.

## PREDICTED NOISE LEVELS

Based on the above the predicted source noise levels at the assessment locations are predicted to be;

Assessment Location	Predicted Noise Levels			
	KEF1	KEF2	KEF3	Total dBA
NSR1 &2	34 - 5 = 29dBA	32 - 10 = 22dBA	32 - 10 = 22dBA	31dBA
NSR3	32 - 10 = 22dBA	34 - 10 = 24dBA	30 - 10 = 20dBA	27dBA

**Table 3 – Assessment Distances and Screening**

It should be noted that this assumes all three fans to be operating simultaneously, which is considered to be very much a worst case assumption.

## TARGET RATING NOISE LEVELS

The target rating noise level criteria applicable to the development have been taken from the Planning Noise Impact Assessment produced by MZA Acoustics Limited (ref 1700964-RP-NIA-0001.1 – Cooper’s Yard Holmfirth – Planning Noise Assessment), based on Kirklees guidance entitled ‘Noise Design Advice’.

**Table 4 – Target Plant noise emission criteria**

Period	Typical Background Sound Level $L_{A90,T}$	Target Rating Level $L_{Ar}$
<b>NSR 1&amp;2</b>		
Daytime (07:00 – 23:00)	47	$\leq 47$
Night-time (23:00 – 07:00)	30	$\leq 30$
<b>NSR 3</b>		
Daytime (07:00 – 23:00)	49	$\leq 49$
Night-time (23:00 – 07:00)	43	$\leq 43$

It has been confirmed that the opening hours for the premises are 11:00 to 22:00hr. On that basis it has been confirmed that the proposed kitchen extract fans will only operate during the defined daytime period in BS4142 (07:00 to 23:00).

Therefore the target rating level at NSR1&2 is  $L_{Ar,Tr}$  47dB and at NSR 3 it will be  $L_{Ar,Tr}$  49dB.

## PREDICTED RATING NOISE LEVELS

The predicted source noise levels at the receptor locations are well below the assessment criteria noted. However, penalties for acoustic features must be applied.

The nature of the fan is such that there is not likely to be any impulsiveness features. Having considered the absolute level of each octave band and the level of each octave band compared to adjacent octave bands, it is also considered that there will be no tonal component. The fans will have the ability to be turned on and off as and when required. As such it is considered that a +3dB penalty for intermittency could be applied.

**Table 5 - Rating Level vs Criterion**

Assessment Location	Predicted Noise Levels dB(A)	Acoustic Feature Penalty	Rating Level	Criterion	Excess over Rating
NSR1 &2	31	+3 (intermittency)	34	47	-13
NSR3	27	+3 (intermittency)	30	49	-19

On the basis of the above it can be seen that the predicted rating level of the operation of the three kitchen extract fans at each assessment location are well below the rating level criterion identified.

As such no mitigation is considered warranted.

Please do not hesitate to contact us with any questions.



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