

784-B048969



Noise Technical Note

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1.1 INTRODUCTION

This technical note has been prepared in response to comments raised during a virtual meeting between Tetra Tech, Knowsley Council and Quod Ltd. regarding predicted impacts due to noise associated with the above scheme. The commentary raised within the meeting identified that the extant use of the site allows for unrestricted HGV access, parking and unloading at Unit A1, and therefore the impact of the scheme should be assessed in the absence of this unit.

Based upon this commentary, a revised assessment of the scheme has been undertaken with Unit A1 omitted, and the recommendations & conclusions revised based upon this assessment. The revised assessment also includes provision for a revised parking layout, whereby parking spaces to the north of the site between Unit A2 and Unit B have been reduced to increase landscaping buffer between the car park and residential properties, and a 2.0m Acoustic Barrier has been implemented along the northern car park boundary in this location.

It was also requested by Knowsley Council that explanation was provided for a change in modelled noise levels at receptor locations notionally unaffected by a previous variation to the site layout. This change was driven by refinement of the HGV movement assumptions to each unit, whereby the HGV movements serving each unit were adjusted based upon the number of bays available (further information within Section 1.3), rather than extrapolated flows for the site as a whole (which would not have been feasible given the capacity of each unit).

1.2 ASSESSMENT CRITERIA

In order to enable the assessment of the proposed development in terms of LOAEL and SOAEL, Table 1 presents equivalent noise levels and associated actions with the target noise level criteria identified. The noise level criteria detailed below have been derived from standards and design guidance:

- BS 8233:2014 '*Guidance on Sound Insulation and Noise Reduction for Buildings – Code of Practice*'
- World Health Organization (1999) '*Guidelines for Community Noise*'
- IEMA '*Guidelines for Environmental Noise Impact Assessment*'

Table 1 Noise Level Criteria and Actions

Noise Sources	Noise Level Criteria	Justification for Effect Level- Action Required
No Observed Adverse Effect Level (NOAEL)		
Absolute internal noise criteria for the following noise sources with windows closed: - Goods vehicle deliveries including arrival and departure of vehicles and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Noise levels are below: <i>Living Rooms:</i> 35 dBL_{Aeq,16hours} <i>Kitchens, Dining Rooms, and Studies:</i> 40 dBL_{Aeq,16hours} <i>Bedrooms:</i> 35 dBL_{Aeq,16hours} 30dB L_{Aeq,8hr} L_{AFmax,2min} noise levels do not exceed: 45dB L_{AFmax} based on 10th highest L_{AFmax,2min} sample)	Justification for Effect Level: Less than threshold values in Table 4 in BS8233:2014 and Table 1 in World Health Organisation (1999) Guidelines on Community Noise Action Required: None
Change in noise levels for the following noise sources: - Goods vehicle deliveries including arrival and departure of vehicles and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Increase in ambient L_{Aeq,T} due to contribution from proposed development of ≤1dB.	Justification for Effect Level: Within negligible short-term impact classification range in Table 7.14 in IEMA 2014 guidance Guidelines for Environmental Noise Impact Assessment Action Required: None
Lowest Observed Adverse Effect Level (LOAEL)		
Absolute internal noise criteria for the following noise sources with windows closed: - Goods vehicle deliveries including arrival and departure of vehicles and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Noise levels are between: <i>Living Rooms:</i> 35-40 dBL_{Aeq,16hours} <i>Kitchens, Dining Rooms, and Studies:</i> 40-45 dBL_{Aeq,16hours} <i>Bedrooms:</i> 35-40 dBL_{Aeq,16hours} 30-35dB L_{Aeq,8hr} - L_{AFmax,2min} noise levels do not exceed 45dB L_{AFmax} based on 10th highest L_{AFmax,2min} sample)	Justification for Effect Level: Exceed threshold guidelines in Table 4 of BS8233:2014 and World Health Organisation (1999) Guidelines on Community Noise by no greater than 5dB to achieve <u>reasonable internal conditions</u> as defined by Note 7 to Table 1 in BS8233:2014 Action Required: Mitigate and reduce to a minimum the exceedance over the threshold
Change in noise levels for the following noise sources: - Goods vehicle deliveries including arrival and departure of vehicles and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Increase in ambient L_{Aeq,T} due to contribution from proposed development of 1.0-2.9dB.	Justification for Effect Level: Within minor short-term impact classification range in Table 7.14 in IEMA 2014 guidance Guidelines for Environmental Noise Impact Assessment Action Required: Additional mitigation required to achieve effect of LOAEL or less.
Significant Observed Adverse Effect Level (SOAEL)		
Absolute internal noise criteria for the following noise sources with windows closed: - Goods vehicle deliveries including arrival and departure of vehicles and unloading of vehicles. - Service yard noise including forklift truck movements. - Car Parks	Noise levels are between: <i>Living Rooms:</i> 40-45 dBL_{Aeq,16hours} <i>Kitchens, Dining Rooms, and Studies:</i> 45-50 dBL_{Aeq,16hours} <i>Bedrooms:</i> 40-45 dBL_{Aeq,16hours} 35-40dB L_{Aeq,8hr} 45-55dB L_{AFmax,2min} based on 10th highest L_{AFmax,2min} sample)	Justification for Effect Level: Exceeds BS8233:2014 L_{Aeq,T} reasonable criteria by 5dB or exceeds L_{AFmax,2min} (10th highest sample) Action Required: Additional mitigation required to achieve effect of LOAEL or less.

Noise Sources	Noise Level Criteria	Justification for Effect Level- Action Required
Change in noise levels for the following noise sources: • Goods vehicle deliveries including arrival and departure of vehicles and unloading of vehicles. • Service yard noise including forklift truck movements. • Car Parks	Increase in ambient $L_{Aeq,T}$ due to contribution from proposed development of 3.0-4.9dB.	Justification for Effect Level: Within moderate short-term impact classification range in Table 7.14 in IEMA 2014 guidance Guidelines for Environmental Noise Impact Assessment Action Required: Additional mitigation required to achieve effect of LOAEL or less.

1.3 MODEL INPUT DATA

The model inputs representing operational noise are presented within Table 2 for L_{Aeq} and L_{AFMax} . Previous Tetra Tech measurements of a similar, representative nature have been used throughout which has informed the assessments found in Section 1.4.

Table 2 Operational Noise Sources

Description	Type of Source	Source	Sound Pressure Level (dB)		
			Daytime $L_{Aeq,1Hour}$	Night-Time $L_{Aeq,15mins}$	Night-Time L_{AMax}
HGV Unloading	Point Source	Previous Tetra Tech Measurements	73.8 @ 3m	76.3 @ 3m	89.4 @ 3m
HGV Parking		Previous Tetra Tech Measurements	52.7 @ 3m	57.7 @ 3m	89.4 @ 3m
Electric Forklift		Previous Tetra Tech Measurements	73.4 @ 3m	73.4 @ 3m	89.4 @ 3m
HGV Movement	Line Source (Moving Point)	Previous Tetra Tech Measurements	-	-	73.0 @ 3m*
Car Park	Area Source	Previous Tetra Tech Measurements	54.0 @ 1m	54.0 @ 1m	73.0 @ 3m

*Maximum noise level applied to moving point source for both daytime and night-time assessments

Assessments have been undertaken utilizing an assumption of 100% and 50% of HGV loading bays being in use at any one time during the daytime and night-time respectively. HGV movement assumptions to each unit are 2 movements per loading bay (1 arrival and 1 departure per bay) during the daytime assessment period, and 1 movement per loading bay (1 arrival and 1 departure at 50% of bays) during the night-time assessment period.

Table 3 summarises receptor locations that have been selected to represent worst-case sensitive receptors with respect to direct noise from the site. Façades of the nearest noise sensitive properties to the development site have been represented. The locations of the receptors are presented within Figure 1.

Table 3 Sensitive Receptor Locations

Ref.	Description	Type of Use	Height (m) Daytime / Night-time
R01	98 Logwood Road	Residential	1.5/4.0
R02	9 Holland Grove	Residential	1.5/4.0
R03	20 Rudgate Road	Residential	1.5/4.0
R04	Newsham Road	Residential	1.5/4.0
R05	24 Newsham Road	Residential	1.5/4.0
R06	10 Newsham Road	Residential	1.5/4.0
R07	59 Bridgewater Way	Residential	1.5/4.0
R08	66 Bridgewater Way	Residential	1.5/4.0
R09	62 Bridgewater Way	Residential	1.5/4.0
R10	46 Bridgewater Way	Residential	1.5/4.0
R11	34 Bridgewater Way	Residential	1.5/4.0
R12	White House – 91-92 Cronton Road	Residential	1.5/4.0
R13	3 Whitefield Lane	Residential	1.5/4.0
R14	Cronton Road	Residential	1.5/4.0
R15	2 Cronton Road	Residential	1.5/4.0
R16	1 Sevenoak Grove	Residential	1.5/4.0

Figure 1 Sensitive Receptor Locations



1.4 ASSESSMENT OF EFFECTS (UNIT A2 & B & RETAIL ONLY)

1.4.1 Noise Intrusion Assessment

Internal noise levels at sensitive receptor locations from all noise sources identified within Table 2 have been assessed both with windows open, where a reduction from a partially open window of 15 dB has been used, and with windows closed where an assumption of glazing with a sound reduction of 30 dB has been used.

Table 4: Daytime Noise Intrusion Levels $L_{Aeq,1hour}$ (UNIT A2 & B & RETAIL ONLY)

Location	External L_{Aeq}	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria L_{Aeq}
R01	26.2	11.2	0.0	35
R02	26.8	11.8	0.0	35
R03	27.7	12.7	0.0	35
R04	24.6	9.6	0.0	35
R05	26.3	11.3	0.0	35
R06	28.7	13.7	0.0	35
R07	33.1	18.1	3.1	35
R08	33.3	18.3	3.3	35
R09	43.2	28.2	13.2	35
R10	36.8	21.8	6.8	35
R11	33.8	18.8	3.8	35
R12	48.7	33.7	18.7	35
R13	47.6	32.6	17.6	35
R14	47.2	32.2	17.2	35
R15	46.8	31.8	16.8	35
R16	46.0	31.0	16.0	35

Predicted daytime noise levels are below the BS8233/WHO daytime $L_{Aeq,1hour}$ internal criterion of 35 dB(A) at all existing sensitive receptor locations assuming a windows open scenario.

Therefore, daytime noise levels at receptors are predicted to result in a No Observed Adverse Effect (NOAEL).

Table 5: Night-time Noise Intrusion Levels $L_{Aeq,15min}$ (UNIT A2 & B & RETAIL ONLY)

Location	External L_{Aeq}	Internal L_{Aeq} with windows open	Internal L_{Aeq} with windows closed	Criteria L_{Aeq}
R01	24.0	9.0	0.0	30
R02	25.0	10.0	0.0	30
R03	26.3	11.3	0.0	30
R04	23.4	8.4	0.0	30
R05	24.8	9.8	0.0	30
R06	27.1	12.1	0.0	30
R07	32.4	17.4	2.4	30
R08	32.4	17.4	2.4	30
R09	42.9	27.9	12.9	30
R10	36.5	21.5	6.5	30
R11	33.5	18.5	3.5	30
R12	45.8	30.8	15.8	30
R13	44.6	29.6	14.6	30
R14	44.3	29.3	14.3	30
R15	43.9	28.9	13.9	30
R16	43.1	28.1	13.1	30

Predicted night-time noise levels are below the BS8233/WHO night-time $L_{Aeq,15min}$ internal criterion of 30 dB(A) at all identified closest existing sensitive receptor locations with the exception of R12. As the internal noise level at this receptor falls within the 30-35dB range representing 'reasonable internal conditions' (and therefore within the LOAEL), a change in noise assessment for the site (inclusive of Unit A1) has been undertaken within Section 1.4.2 to contextualize the results of the assessment.

Table 6 presents the noise intrusion assessment for night-time L_{Amax} levels at all receptor locations.

Table 6: Night-time Noise Intrusion Levels L_{Amax} (UNIT A2 & B & RETAIL ONLY)

Location	External L_{Amax}	Internal L_{Amax} with windows open	Internal L_{Amax} with windows closed	Criteria L_{Amax}
R01	46.0	31.0	16.0	45
R02	45.5	30.5	15.5	45
R03	41.8	26.8	11.8	45
R04	34.8	19.8	4.8	45
R05	41.9	26.9	11.9	45
R06	41.2	26.2	11.2	45
R07	42.7	27.7	12.7	45
R08	44.4	29.4	14.4	45
R09	50.5	35.5	20.5	45
R10	42.8	27.8	12.8	45
R11	41.0	26.0	11.0	45
R12	55.4	40.4	25.4	45
R13	56.3	41.3	26.3	45
R14	53.6	38.6	23.6	45
R15	52.7	37.7	22.7	45
R16	51.8	36.8	21.8	45

Predicted night-time L_{Amax} noise levels are predicted to be below the BS8233/WHO night-time L_{Amax} criterion of 45 dB(A) at the identified closest existing sensitive receptor locations. Night-time L_{Amax} noise levels at all receptors are predicted to fall within the No Observed Adverse Effect (NOAEL).

1.4.2 Change In Noise Level Assessment (All Units)

To contextualize the significance of night-time noise levels falling within the LOAEL, an assessment of change in noise levels (inclusive of Unit A1) has been undertaken for the night-time. The results of this assessment are presented within Table 7.

Table 7 Change in Noise Level Assessment (Night-Time, All Units)

Receptor I.D.	Predicted External $L_{Aeq,15mins}$ (dB)	Measured Baseline (L_{Aeq} , dB)	Measured Baseline Combined with Predicted External Noise Level (dB)	Effects of Proposed Scenario (dB)
R01	24.9	50.7	50.7	0.0
R02	25.6	51.1	51.1	0.0
R03	28.2	51.6	51.6	0.0
R04	25.3	45.1	45.1	0.0
R05	25.7	45.1	45.1	0.0
R06	28.6	46.5	46.6	0.1
R07	33.4	46.5	46.7	0.2
R08	33.5	46.5	46.7	0.2
R09	43.4	56.3	56.5	0.2
R10	36.6	56.3	56.3	0.0
R11	33.7	56.3	56.3	0.0
R12	46.6	60.3	60.5	0.2
R13	45.2	60.3	60.4	0.1
R14	47.4	60.3	60.5	0.2
R15	50.2	60.3	60.7	0.4
R16	51.5	60.3	60.8	0.5

As demonstrated above, the proposed scheme (inclusive of Unit A1) is predicted to generate an increase of no more than a 0.5dB in baseline noise levels at sensitive receptor locations (considered to be imperceptible) during the night-time, therefore falling within the No Observed Adverse Effect Level (NOAEL).

Based upon the Noise Intrusion Assessment demonstrating a worst-case impact within the LOAEL, and the change in noise level demonstrating an impact within the NOAEL, it is considered that adverse effects associated with noise generated by the scheme are demonstrated to be within relevant criteria presented within best-practice guidance documentation, and generally imperceptible at sensitive receptor locations.

As such, it is considered that suitability of the scheme in accordance with National Planning Policy has been demonstrated, and the scheme should not be refused on the grounds of adverse impacts due to Noise.

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