APPENDIX 11.6
INDUSTRIAL/COMMERCIAL NOISE ASSESSMENT

MODELLED SCENARIOS

Noise levels generated by the operation of the proposed industrial/commercial units will depend upon their future occupants. Different occupants may have different operating hours and working patterns depending upon the nature of their business. For example, the use of HGV trailer chillers would be limited to occupants requiring the storage and distribution of chilled goods. For other 'ambient temperature' operators, HGV trailer chillers would not be required.

At this stage, the future occupants are not known, to model noise emissions from service yard operations, HGV movements and unloading/loading activities have been assumed based on professional experience and accounting for the size of the service yard areas and parking.

Scenario 1 – Ambient Goods Operation

- 25% of all docking bays and parking spaces subject to a 'turnover'; within the 1-hour assessment period;
- All docking bays and parking spaces subject to a 'turnover' would have an associated access road arrival and departure movement within a 1-hour assessment period' and
- No chilled goods operations.

Scenario 2 - Partial Chilled Goods Operation

- As Scenario 1, but where 30% of 'turnovers' have electric powered trailer chillers.

The quantity of HGV docking bays, HGV parking bays and personnel car parking bays have been taken from masterplan reference: 5166-CA-00-00-DR-A-05001 P1. However, it is understood at this stage that the Applicant is using land allocation plan: 5166-CA-00-00-DR-A-00001 P1 for submission. M-EC has verified the location of the proposed submission constraints and parameters plan against the indicative masterplan and the drawings overlay in similar fashion such that the outcome of this assessment would not change. Therefore, it should be noted that the no. of HGV bays could increase from that undertaken in this assessment, however, as presented herein, the outcome of the assessment would be unlikely to change.

The source data used to inform this assessment is presented in **Table 11-6.1** and has been adopted for service yard movements in and around the Proposed Development docking and parking bays.

This data has been adopted from M-EC's library of in-house historic measurement data and manufacturers specifications used in similar facility assessments to that of the Proposed Development.

A 'turnover' (per docking bay/parking space) includes:

- 1 x HGV arrival, and 1x HGV pulling away;
- 1 x HGV manoeuvre;
- 1 x air brakes activated;
- 1 x cab engine idling; and
- 30 minutes of unloading/loading (modelled within docking bays only).

For HGV movements to and from the service yards, source data has been determined based upon the guidance contained in the NAC Guide[1]

Section 2.5 of the NAC Guide details a method for calculating the Leq noise level from the combined effect of a number of events (e.g., HGV pass-bys) with their own single event noise exposure level (L_{AX}, also commonly referenced as SEL). The method is as follows:

- $L_{eq} = L_{AX} + 10\log(N) - 10\log(T)$; whereby:
- L_{Ax} = single event noise exposure level (SEL);
- N = number of events within the time period; and
- T = duration of time period in seconds.

In addition, Figure 4.1.4 from the NAC guide presents a method for determining the L_{AX} at a distance of 10m from the nearest kerbside edge, for heavy and light vehicles travelling at different speeds.

Combining the use of NAC Figure 4.1.4 with the equation adopted from NAC Section 2.5 provides a means of determining the L_{eq} that will arise at 10m as a result of a given number of HGV movements on an access road or defined path. This has been applied assuming an HGV pass-by speed of 20kmh. Within the acoustic model, the sound power levels of the HGV line source(s) have been calibrated such that the calculated levels are modelled.

Table 11-6.1 Service Yard Source Data

Activity	**Sound Pressure Level (dB) in Octave Band Centre Frequency (Hz**								**Time (s)**	**$L_{Aeq, T}$ @ 10m**	**L_{AFmax} @ 10m**
	63	**125**	**250**	**500**	**1k**	**2k**	**4k**	**8k**			
HGV Arriving & Manoeuvring	71	66	65	66	69	65	58	50	109	72	78
HGV Engine Idling	75	58	66	60	62	59	52	42	37	66	-
HGV Pulling Away	71	65	64	65	63	62	56	46	15		-
Electric Powered Chiller	75	71	67	61	58	56	52	45	T	65	-
Air Brakes	-	-	-	-	-	-	-	-	3	80	81
Unloading Activities	-	-	-	-	-	-	-	-	420	60	77

[1] A Guide to Measurement and Prediction of the Equivalent Continuous Sound Level, LEq, Noise Advisory Council, 1978.

In addition to HGV movements and unloading activities around the site, stationary plant will also be required within the Site. At this stage, fixed plant items are unknown, however condenser units are typically required for developments such as the Site.

Typically, a condenser will produce an approximate sound pressure level of 65 dB(A) @ 1m with an upper output of 68 dB(A) @ 1m. Therefore, the 68 dB value has been included to inform a worst-case assessment and condensers have been incorporated into the acoustic model for each unit.

In addition to HGV movements, unloading activities around the Site and stationary plant, an indicative assessment of personnel car-parking noise has been undertaken. As per the above assessment Scenarios, the assessment considers a 25% turnover of all parking bays per assessment period. The source data used is presented in **Table 11-6.2.**

Table 11-6.2 Car Parking Source Data

Activity	Sound Pressure Level (dB) in Octave Band Centre Frequency (Hz) @ 10m								Time (s)	$L_{Aeq, T}$ @ 10m	L_{AFmax} @ 10m
	63	125	250	500	1k	2k	4k	8k			
Car Passby	70	69	65	65	60	59	55	53	30	67	-
Car Ignition	41	36	35	39	36	33	32	28	5	41	-
Door Slam	70	66	59	55	49	44	42	36	1	57	-

The above data has been combined to determine an L_{Aeq} value per vehicle over the assessment period and extrapolated to give a calculated value of the total car parking area but land allocation. Within the acoustic model, the sound power levels of the car parking source(s) have been calibrated such that the calculated levels are modelled.

OPERATIONAL NOISE LEVELS

The noise model has been used to generate operational specific sound levels ($L_{Aeq, T}$) across the study area. The resulting noise contours are presented in **Figure 11.2: Noise Contours – Ambient Goods Operation** and **Figure 11.3: Noise Contours – Electrical Goods Operations**. Noise contours are calculated at 4.0m above local ground height.

Operational noise calculations and assessment have been completed at the closest sensitive receptors:

- Carrdus School (bespoke criteria); and
- Dwellings on Banbury Lane (BS 4142 Assessment).

The significance is determined upon the margin by which the operational noise levels encroach on the existing ambient sound level measured at Carrdus School or by which the operational noise level exceeds the background sound level at Dwellings on Banbury Lane and the context in which the sound occurs.

Acoustic character corrections have been applied based on nature of the operations associated with each assessment scenario. Representative background sound levels are taken from the noise survey results. The assessment without mitigation is presented in Table 7.6-2 through Table 7.6-4.

Values are presented in dB(A) with daytime taken at a receptor height of 1.5m and night-time at a receptor height of 4m above local ground level.

The bespoke assessment, without mitigation, for Carrdus School, is presented in **Table 11-6.3.** Note, only a daytime assessment is presented due to the school being unoccupied during the night-time.

Table 11-6.3: Carrdus School Assessment

Assessment Step	Ambient Goods	Electric Goods
Period	Daytime	Daytime
Modelled Sound Level [A]	29	39
Existing Ambient Sound Level [B]	66	66
Modelled Level vs Existing Level [A-B]	-37	-27
Magnitude of Impact	No Change	No Change
NPSE Classification	NOEL	NOEL

For both operating scenarios the modelled sound level is significantly below the existing ambient sound level. Therefore, the magnitude can be considered as **no change** and would be direct, permanent and local. This effect is **not significant**.

The BS 4142 assessment, without mitigation, for Dwellings on Banbury Lane, is presented in **Table 11-6.4**.

Table 11-6.4: BS 4142 Assessment, Dwellings on Banbury Lane

Assessment Step	Ambient Goods		Electric Goods	
Period	Daytime	Night-time	Daytime	Night-time
Modelled Specific Sound Level (dB) [A]	35	35	43	43
Tonality (dB) [B]	-	-	+2	+2
Impulsivity (dB) [C]	+3	+3	+3	+3
Intermittency (dB) [D]	-	-	-	-
Rating Level (dB) [E] [A+B+C+D]	38	38	48	48
Background Sound Level (dB) [F]	63	55	63	55
Rating Level vs Background Sound Level (dB) [E-F]	-25	-17	-15	-7
Magnitude of Impact	No Change	No Change	No Change	No Change
NPSE Classification	NOEL	NOEL	NOEL	NOEL

BS 4142 states that the modelled sound levels should have character corrections for varying factors depending on the acoustic characteristics.

A +2 dB correction has been applied for electric operations for tonality due to the electric chiller traillers and a +3 dB correction has been applied for all scenarios for impulsivity to account for impulses in air brakes and reversing.

However, it should be ntoed that BS 4142 states that corrections should be added if they are perceptible or clearly perceptible.

As the outcome of the assessment indicates that the smallest margin of compliance is – 12 dB (without the inclusion of acoustic character corrections) it is unlikely that sound levels from the proposed development will be audible at the receptors and thus the corrections are considered robust and worst-case.

For both operating scenarios, the rating level is below the background sound level for both daytime and night-time assessment periods. Therefore, the magnitude can be considered as **no change** and would be direct, permanent and local. This effect is **not significant**.

The results of the assessment indicate no significant effects and thus mitigation measures are not required at this stage.