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Arnold Clark, Knowsley Lane
Liverpool

Noise Impact Assessment

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EXECUTIVE SUMMARY

BWB Consulting has been instructed by Arnold Clark Automobiles Limited to undertake a noise impact assessment in support of a planning application for a proposed car showroom development off Knowsley Lane, Knowsley.

Planning consent was granted for the wider site in 2020 (20/00376/OUT). This was subject to a number of noise related planning conditions.

A baseline noise survey was undertaken in June 2025 to determine the existing noise levels at nearby noise sensitive receptors (NSRs). The survey and subsequent assessment work has been undertaken in accordance with current standards and guidance following consultation with Knowsley Metropolitan Borough Council (KMBC).

A detailed noise assessment has been undertaken to determine the likely impact of the proposed development on the nearest NSRs. The noise assessment indicates that the proposed development is unlikely to give rise to an adverse noise impact at the nearest noise sensitive receptors.

Furthermore, the results of the assessment indicate that the requirements of the noise related planning conditions will be achieved.

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1. INTRODUCTION

Appointment and Background

1.1 BWB Consulting (BWB) was instructed by Arnold Clark Automobiles Limited ("the Client") to undertake a noise impact assessment in support of a planning application for the development of a car showroom at Knowsley Lane, Knowsley.

1.2 Planning consent was granted for the wider site in 2020 (20/00376/OUT). This was subject to a number of planning conditions, including conditions 17, 18 and 19, which relate to noise.

1.3 Condition 17 states the following;

'Fixed plant and machinery associated with the development shall be designed to a level that is at least 5dB(A) below the existing LA90 background noise level as measured during the relevant time period.

Any tonal, impulsive and/or irregular noise would be addressed by imposing a penalty as per the methodology set out in BS 4142:2014+A1:2019. Methods for rating and assessing industrial and commercial sound.

Noise limits for fixed plant are to apply at a position 1 metre from the closest affected window of the nearest noise sensitive property.

Reason: To safeguard local residents from noise and disturbance, and to comply with Policy ENV2 of the Knowsley Replacement Unitary Development Plan adopted June 2006'.

1.4 Condition 18 states the following;

'The level of noise emitted from activities associated with the site shall not exceed the existing LA90 background noise level as set out within the Noise Impact Assessment submitted with the application (AC103830-1R13) and as measured at the following times:

- LAeq (1 hour) between 0700-2300

- LAeq (15 mins) between 2300-0700

Noise limits are to apply at a position 1 metre from the closest affected window of the nearest noise sensitive property.

Reason: To safeguard local residents from noise and disturbance, and to comply with Policy ENV2 of the Knowsley Replacement Unitary Development Plan adopted June 2006'.

1.5 Condition 19 states the following;

Reserved matters applications shall include a Framework Operational Management Plan and Noise Mitigation Plan for the plot(s) to which they relate which have been informed by an approved noise survey. For the avoidance of doubt, the operational management plan and noise mitigation plans shall seek to ensure that the noise levels within the living rooms, bedrooms and gardens of the adjacent new residential area and the directly facing properties on the southern side of Knowsley Lane do not exceed the relevant standards, including taking account of the impact of HGV's using the junction at the entrance to the site during the evening and night time periods. Plans may include the provision of physical measures such as acoustic barriers etc and/or restrictions for certain types of operation such as HGV servicing or other outdoor activities that cannot be mitigated by physical measures.

Prior to the first occupation of each unit, a detailed operational management and noise mitigation plan based upon the framework operational management and noise mitigation plan shall be submitted to and agreed in writing with the local planning authority. The unit shall then be operated in accordance with the agreed detailed operational management and noise mitigation plan and any physical works required shall be implemented before the first use of the unit they relate to, shall be retained as such thereafter and maintained in accordance with the manufacturers specification

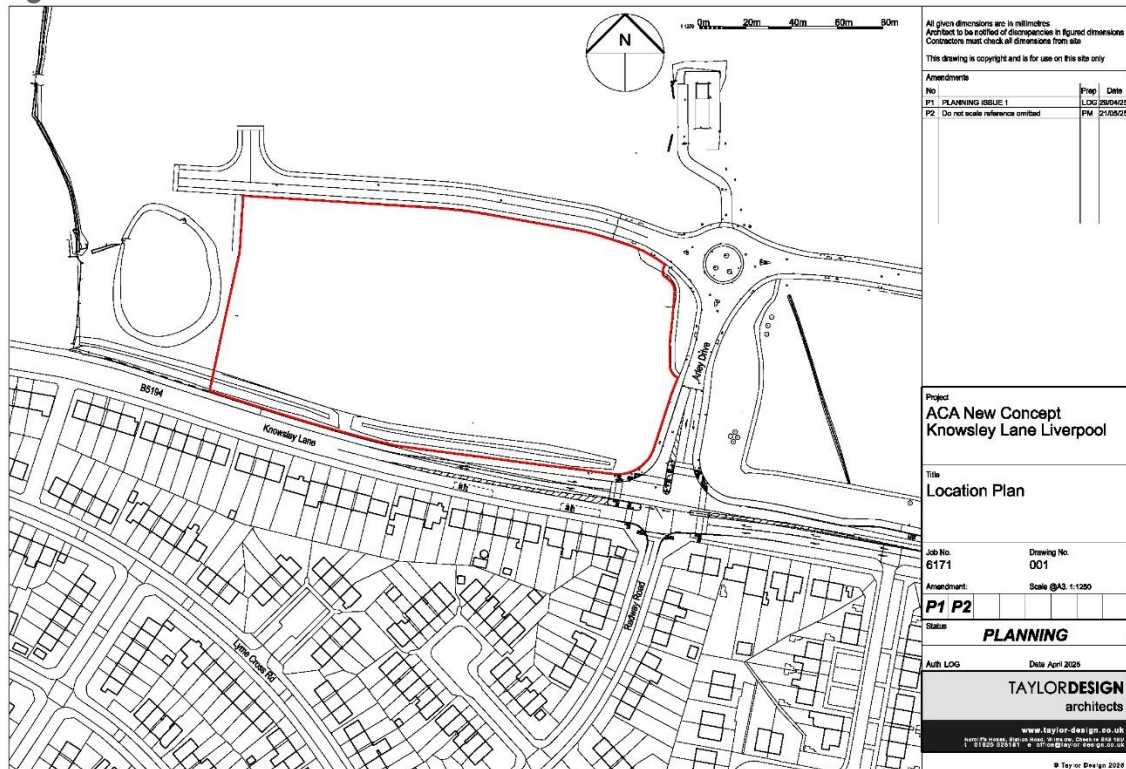
Reason: To ensure that the proposed development does not have a significant adverse effect on the amenity of neighbouring residents through causing unacceptable noise and disturbance - in particular through HGVs servicing the properties causing excessive noise at the access junction into the site during the evening and night time period and to comply with Saved Policy ENV2 of the Knowsley Replacement Unitary Development Plan adopted June 2006.

- 1.6 This assessment has been undertaken based on the results of a baseline noise survey on the Site. The results of the survey have been assessed in accordance with current standards and guidance, following consultation with Knowsley Metropolitan Borough Council (KMBC) and reference to conditions 17, 18 and 19.
- 1.7 This report is necessarily technical in nature, so to assist the reader, a glossary of acoustic terminology can be found in **Appendix A**.

Site Setting

- 1.8 The Site is located to the north of Knowsley Lane, Knowsley, and is within the administrative area of Knowsley Metropolitan Borough Council (KMBC). The Site currently comprises rough grassland. The Site is bound by Knowsley Lane to the south with residential development beyond, Arley Drive to the East, and grassland to the north and west. The M57 is located approximately 150 m to the north. The Site location is shown in **Figure 1.1**.

Figure 1.1: Site Location



Drawing by Taylor Design Architects. Drawing No. 001 Amendment: P2

Proposed Development

- 1.9 The Proposed Development comprises a car showroom, and the Proposed Site Plan is shown in **Figure 1.2**.

Figure 1.2: Proposed Site Plan



Drawing by Taylor Design Architects. Drawing No. 101 Amendment: P3

Existing Noise Sensitive Receptors

- 1.10 Noise from the proposed car showroom has been assessed at nearby existing Noise Sensitive Receptors (NSRs). The nearest NSRs are dwellings to the south on Knowsley Lane and to the west off Higherfield Crescent, and these are detailed in **Table 1.1** below and shown in **Figure 1.3**. Noise may be perceptible at other NSRs, however likely lesser than the NSRs described below.

Table 1.1: Noise Sensitive Receptors

NSR	Grid Reference		Bearing from Site	Distance from Site Boundary
	Easting	Northing		
1 - Residential Housing	344786	392641	South	22 metres
2 - Residential Housing	344612	392739	West	125 metres

Figure 1.3: Noise Sensitive Receptors



2. STANDARDS AND GUIDANCE

National Planning policy Framework (NPPF)

- 2.1 Published in December 2024, this document sets out the Government's planning policies for England. It makes the following reference to noise in the section entitled Conserving and enhancing the natural environment:

"187. Planning policies and decisions should contribute to and enhance the natural and local environment by:

[...]

e) preventing new and existing development from contributing to, being put at unacceptable risk from, or being adversely affected by, unacceptable levels of soil, air, water or noise pollution or land instability. Development should, wherever possible, help to improve local environmental conditions such as air and water quality, taking into account relevant information such as river basin management plans."

- 2.2 It also makes the following references to noise in the Section entitled Ground conditions and pollution:

"198. Planning policies and decisions should also ensure that new development is appropriate for its location taking into account the likely effects (including cumulative effects) of pollution on health, living conditions and the natural environment, as well as the potential sensitivity of the Site or the wider area to impacts that could arise from the development. In doing so they should:

a) mitigate and reduce to a minimum potential adverse impacts resulting from noise from new development – and avoid noise giving rise to significant adverse impacts on health and the quality of life⁷²;

b) identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.

⁷² See Explanatory Note to the Noise Policy Statement for England (Department for Environment, Food & Rural Affairs, 2010)."

BS 8233:2014: Guidance on Sound Insulation and Noise Reduction for Buildings

- 2.3 This standard provides guidance for the control of noise in and around buildings. The guidance provided within the document is applicable to the design of new buildings, or refurbished buildings undergoing a change of use, but does not provide guidance on assessing the effects of changes in the external noise levels to occupants of an existing building.

- 2.4 The guidance provided includes appropriate internal and external noise level criteria which are applicable to dwellings and office for steady external noise sources. It is stated that it is desirable that the internal ambient noise level does not exceed the following criteria set out in **Table 2.1** below:

Table 2.1: Summary of Internal Ambient Noise Levels to be Achieved in Habitable Rooms

Activity	Location	Internal noise level criteria ($L_{Aeq,T}$, dB)	
		Daytime (07:00 – 23:00hrs)	Night-time (23:00 – 07:00hrs)
Resting	Living room	35	-
Dining	Dining room/area	40	-
Sleeping (daytime resting)	Bedroom	35	30

- 2.5 Whilst BS 8233:2014 recognises that a guideline value may be set in terms of sound exposure level (SEL) or L_{AFmax} for the assessment of regular individual noise events that can cause sleep disturbance during the night-time, a specific criterion is not stipulated. Accordingly, reference has been made in this assessment to the World Health Organisation (WHO) 1999: Guidelines for Community Noise.
- 2.6 With respect to external amenity space such as gardens and patios it is stated that it is desirable that the noise level does not exceed 50 dB $L_{Aeq,T}$, with an upper guideline value of 55 dB $L_{Aeq,T}$ which would be acceptable in noisier environments. It is then confirmed that higher external noise criteria may be appropriate under certain circumstances such as within city centres urban areas, and locations adjoining the strategic transportation network, where it may be necessary to compromise between elevated noise levels and other factors such as convenience of living, and efficient use of land resource.

World Health Organisation (WHO) 1999: Guidelines for Community Noise

- 2.7 The World Health Organisation (WHO) guidance: 1999: Guidelines for Community Noise includes guidance for individual maximum noise events during the night-time. This document draws upon guidance from Vallet and Vernay, which states:

“For good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10-15 times per night.”

BS 4142:2014+A1:2019 – ‘Methods for Rating and Assessing Industrial and Commercial Sound’

- 2.8 The BS 4142 Standard describes methods for rating and assessing the following:
- 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.
- 2.9 The methods use outdoor sound levels to assess the likely effects of sound on people who might be inside or outside a dwelling or premises used for residential purposes upon which sound is incident. The Standard advises the purpose of the methodology includes the assessment of sound from any plant and activities associated with existing industrial and/or commercial uses at proposed residential dwellings.
- 2.10 If appropriate, the specific sound level of the source ($L_{Aeq,T}$) is corrected, by the application of one or more corrections for acoustic features such as tonal qualities and/or distinct impulses, to give a 'rating' level ($L_{A,r,Tr}$). The Standard effectively compares and rates the difference between the rating level of the specific sound and the typical background sound level ($L_{A90,T}$) in the absence of the specific sound.
- 2.11 The Standard advises that the time interval ('T') of the background sound measurement should be sufficient to obtain a representative or typical value of the background sound level at the time(s) the source in question operates or is proposed to operate in the future.
- 2.12 Comparing the rating level with the background sound level, BS 4142 states:

"Typically, the greater this difference, the greater the magnitude of 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."

Knowsley Metropolitan Borough Council Local Policy

- 2.13 The local plan for Knowsley Metropolitan Borough Council (KMBC) contains the following regarding noise:

"Policy CS2

"New development in Knowsley and the preparation of subsequent stages of the local plan will be expected to support the following development principles:

...

Principle 4: *Recognise environmental limits, protect and enhance environmental assets, enhance local character and promote quality of place by:*

...

(j) Minimising negative impact upon flood risk, air quality, water quality, land quality, soil quality, and noise or vibration levels and ensuring any negative impacts are appropriately mitigated."

And

"The design of new development should avoid unacceptable impacts which affect the amenity and living conditions of occupiers of buildings. Such effects can include generation of noise, light and air pollution and harmful overbearing and loss of privacy through overlooking."

Consultation with Knowsley Metropolitan Borough Council

2.14 Consultation was undertaken with KMBC on the 2nd June 2025 via email detailing the methodology of the noise impact assessment in order to agree the assessment approach.

2.15 The following methodology was proposed:

- Undertake a baseline noise survey over a weekday and weekend period to determine the existing background noise levels at the existing noise sensitive receptors (NSRs);
- Assess noise associated with the proposed car dealership including HGV movements, unloading/loading activities, car parking, and fixed plant items in accordance with BS4142:2014+A1:2019 and BS8233:2014 at existing NSRs. Where required, a context assessment in accordance with BS4142:2014+A1:2019 and BS8233:2014 will be undertaken to determine the final impact; and
- Where appropriate, noise mitigation measures will be considered to reduce noise to within acceptable levels at existing NSRs.

2.16 At the time of this report, no formal response has been received.

3. BASELINE NOISE MONITORING

- 3.1 A baseline noise survey was undertaken in June 2025 to determine the prevailing noise climate at locations representative on nearby NSRs to the proposed development. Baseline noise measurements were undertaken at the measurement location (ML1) identified in **Figure 3.1**.

Figure 3.1: Measurement Location



Survey Methodology

- 3.2 Noise measurements were undertaken at ML1 between 14:45 hours on Friday 6th June until 09:30 hours on Wednesday 11th June 2025. Measurement equipment was established in free-field conditions at a height of circa 1.5 m above local ground level, and 12 m from the nearest kerb of Knowsley Lane.

Measurement Equipment

- 3.3 The baseline noise measurements were undertaken using the Class 1 specification noise measurement equipment detailed in **Table 3.1**. The equipment's sensitivity was checked using a portable calibrator immediately before and after the measurements with no significant drift observed. The sound level meter, pre-amplifier and microphone was calibrated to traceable standards at an accredited laboratory within the 24 months prior to the measurements. The portable calibrator was calibrated within the 12 months preceding the date of the survey.

Figure 3.2: Noise Measurement Equipment

Equipment	Make and Model	Serial Number
Sound Level Meter	01dB FUSION + DMK	14156
Microphone	GRAS 40CD	466797
Calibrator	CIRRUS CR:515	103135

Meteorological Conditions

- 3.4 Precipitation occurred during the measurement period, therefore any periods of precipitation have been removed from the measurement results.
- 3.5 Precipitation occurred during the commissioning of the equipment on Friday 6th June until midday of Saturday 7th of June, therefore these times have been removed from the measurement results. Although the precipitation ceased at midday on Saturday 7th of June, measured data has been removed up to 18:00 hours.
- 3.6 Excluding the periods of precipitation described above, the weather during the survey periods remained conducive to environmental noise measurement, it being dry with winds <5m/s.

Observations

- 3.7 At ML1, the prevailing noise climate was dominated by road traffic noise on Knowsley Lane with constant noise from the M57 motorway to the north.

Measurement Results

- 3.8 A summary of the measured levels to be used within the assessment are provided below. **Table 3.2** and **Table 3.3** detail measured sound levels at ML1. Full measurement results are presented in **Appendix B**.

Figure 3.3: Summary of Measured Sound Levels at ML1

Period ¹	Duration	dB LAeq,T ²	dB LA90,T	dB LAfmax ⁴
Weekday Daytime	16-hours	62	54 ³	-
Weekday Night-time	8-hours	57	45	72

Period ¹	Duration	dB L _{Aeq,T} ²	dB L _{A90,T}	dB L _{AFmax} ⁴
Weekend Daytime	16-hours	60	55 ³	-
Weekend Night-time	8-hours	54	47	70

¹ Periods between 14:45 hours on Friday 6th June until 18:00 hours on Saturday 7th June have been removed from the survey results due to precipitation.

² Logarithmic average sound pressure levels during measurement period

³ Typical backgrounds based on the analysis of the mean, mode and median L_{A90,1h} values during the operational periods on a weekday.

⁴ The 10th highest L_{AF,max} level based on a sample period of 2 minutes in accordance with ANC ADO Noise Guidance

Figure 3.4: Summary of Average (logarithmic) Octave Band Sound Pressure Levels at ML1

Period ¹	Octave Band Sound Pressure Levels (L _{eq} dB)								dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1kHz	2kHz	4kHz	8kHz	
Daytime	65	60	58	55	59	54	46	42	62
Night-time	59	53	50	48	54	49	46	41	57

¹ Periods between 14:45 hours on Friday 6th June until 18:00 hours on Saturday 7th June have been removed from the survey results due to precipitation.

4. ASSESSMENT

- 4.1 The results of the baseline noise survey have been used as a basis for the noise assessment. This assessment considers noise from operations during proposed operational hours.
- 4.2 The proposed opening times have been advised by the Client to be 08:00-20:00 hours Monday to Friday, 08:00-18:00 hours on Saturdays, and 11:00-17:00 hours on Sundays.
- 4.3 As gardens are located on the screened side of the dwellings at NSR1, the assessment has been undertaken based on the free-field levels at the worst-affected façade. For NSR2, the noise levels have been predicted in the garden area.

Noise Model

- 4.4 In order to predict the noise levels from the proposed development Site as existing NSRs, a detailed acoustic model of the Site has been generated applying the following prediction methodology:
- The model was generated using the PC based CadnaA® noise modelling software.
 - For industrial/commercial noise sources, the noise model was set to apply the noise prediction methodology set out in ISO 9613-2:2024 Acoustics – Attenuation of sound during propagation outdoors – Part 2: Engineering method for the prediction of sound pressure levels outdoors.
 - Mapping of the Site and the surrounding area was calibrated into the noise model based on known Ordinance Survey grid reference points.
 - Indicative ground topography was approximated using the LIDAR Composite 2 m DTM information freely available from the data.gov website.
 - To reflect the local ground cover, ground absorption was set to $G = 0.5$ (50% acoustically absorptive).
 - The model was set to include second order reflected noise from solid structures.
 - The site layout as shown in **Figure 1.2** has been incorporated into the noise model in order to account for screening that is provided by the development itself.
 - Off-site buildings which would provide screening to the Site have been incorporated as reflective façades.

Noise from HGV Loading/Unloading

- 4.5 It is assumed that 2 no. HGV arrivals could take place during any 1-hour daytime period. In the absence of specific noise data, noise data has been sourced from surveys undertaken at similar developments.

- 4.6 Given that the wider site access road around the site already exists, and the loading/unloading area is located just off this road, HGV movements within the site have not been included within the following assessment.
- 4.7 Historic source data has been used for the loading/unloading of a transporter, measured on a similar site. During the survey period, two multi-vehicle transporter units were loaded and unloaded concurrently. Two other transporter units departed the site during the survey period. The dominant source of noise from the loading / unloading operation is impact noise (metal on metal) as vehicles are driven on/off the transporters, and noise from hydraulic lifting systems, including a dead-lock crank system associated with the transporter ramp system. Engine noise from cars being loaded on to transporters, and from transporters arriving and leaving the delivery area was also clearly audible. This data is shown in **Table 4.1**.

Table 4.1: Calculated sound pressure level at 10m – Transporter unloading

Event	Sound pressure level, $L_{Aeq,T}$ (dB)	Measurement distance (m)	Assumed, on-time per period (s)	Time corrected, sound pressure level @10m, $L_{Aeq,T}$ (dB)
Daytime 1-hour				
2 no. multi-vehicle transporter units were loaded and unloaded concurrently. 2 no. transporter units departing	68	15	1800 ¹	69
Night-time 15-minutes				
1 no. multi-vehicle transporter units were loaded and unloaded concurrently. 1 no. transporter units departing	65	15	900 ²	69
¹ On-time during 3600s daytime period				
² On-time during 900s night-time period				

- 4.8 Noise from deliveries has been included within the noise model as a point source with a height of 4 m.
- 4.9 In calculating the level of noise produced by the transporters, **Table 4.1** considers vehicles manoeuvring during arrival, departure, and during loading/unloading operations.
- 4.10 Based on the above information, the predicted daytime noise levels have been predicted at NSRs without any mitigation in place.
- 4.11 In accordance with BS4142: 2014+A1:2019, penalties are applied to the specific sound level in order to provide the rating level. These penalties relate to the acoustic features of the sound source. Noise from loading / unloading of the transporter is impulsive

however given the low predicted sound levels compared to background sound levels this is unlikely to be a prominent feature at receptors. Accordingly, a 3 dB penalty has been applied to account for impulsivity that is likely to be just perceptible at the receptors.

- 4.12 The predicted noise levels at the NSR have been assessed in accordance with BS4142 considering a +3 dB penalty at NSRs. The assessment is shown in **Table 4.2**.

Table 4.2: BS4142 Delivery noise assessment daytime

Description	Daytime (0700 – 2300) dB				Relevant BS 4142 clause
	Weekday		Weekend		
	NSR1	NSR2	NSR1	NSR2	
Specific sound level ($L_{Aeq,T}$)	51	41	51	41	7.3.5
Acoustic feature correction	+3				9.2
Rating level ($L_{Ar,T}$)	54	44	54	44	9.2
Background sound level ($L_{A90,T}$)	54 ¹		55 ²		8
Excess over background	0	-10	-1	-11	-
BS 4142 impact	Low Impact				-
Meets the requirements of Planning Condition 18	Yes				-

¹ Typical backgrounds based on the analysis of the mean, mode and median $L_{A90,1h}$ values during the operational periods on a weekday.

² Typical backgrounds based on the analysis of the mean, mode and median $L_{A90,1h}$ values during the operational periods on a weekend.

- 4.13 The rating level is below the existing background level during the operational daytime periods on a weekday and weekend. Therefore, this demonstrates a 'low impact' in accordance with BS 4142:2014+A1:2019, dependent on context.

Noise from the Car Wash

- 4.14 It is noted that as part of the development there will be an onsite car wash including the use of jet washers. Therefore, it is considered appropriate to determine the impact on nearby noise sensitive receptors from noise associated with the car wash. This has been assessed in accordance with BS4142 for the daytime period only.
- 4.15 As the proposed development is not currently operational, the assessment has been based on noise data from historical measurements, which has been collected during

surveys undertaken at similar developments, including intermittent noise from jet washers, engine noise and raised voices from the car wash staff.

- 4.16 It is considered that during busy periods, both car wash bays could be occupied at the same time, and could operate continuously, therefore an on-time correction has not been applied. However, in accordance with BS4142, a correction of 6dB has been added to the specific noise level for impulsivity which is likely to be clearly perceptible at the NSRs.
- 4.17 For the purpose of this assessment, a noise level of 62dB L_{Aeq} at 1m has been used as the noise level from the carwash. This has been included within the noise model as a point source at 1m in height. In the absence of octave band noise data, the sources have been modelled at 500Hz, in accordance with ISO 9613.
- 4.18 The predicted noise levels at the NSRs have been assessed in accordance with BS4142. A +6dB penalty has been applied at NSR1 to account for impulsivity which is likely to be clearly perceptible at NSR1. Given the low level predicted at NSR2, it is considered that a penalty is not warranted. The assessment is shown in **Table 4.3**.

Table 4.3: BS 4142 Assessment of car wash operations

Description	Daytime (0700 – 2300) dB				Relevant BS 4142 clause
	Weekday		Weekend		
	NSR1	NSR2	NSR1	NSR2	
Specific Sound Level	30	14	30	14	7.3.5
Acoustic feature correction	+6	-	+6	-	9.2
Rating Level	36	14	36	14	9.2
Background Sound Level	54 ¹		55 ²		8
Excess of rating over background level	-18	-40	-19	- 41	11
BS 4142 impact	Low Impact				
Meets the requirements of Planning Condition 18	Yes				-

¹ Typical backgrounds based on the analysis of the mean, mode and median LA90,1h values during the operational periods on a weekday.

² Typical backgrounds based on the analysis of the mean, mode and median LA90,1h values during the operational periods on a weekend.

- 4.19 The BS4142 assessment indicates that noise from the carwash would result in a 'low impact' during the daytime period in accordance with BS4142.

- 4.20 When noise from the car wash and loading/unloading activities are considered cumulatively, the results of the assessment do not change, with a low impact predicted at NSRs 1 and 2, in accordance with BS4142.

Fixed Plant

- 4.21 Although the mechanical design is not fixed, the project M&E engineers have provided details of a number of fixed plant items relating to air handling proposed within the development. An assessment has been completed of the fixed plant items. These items have been listed in **Table 4.4**.

Table 4.4: Summary of Fixed Plant items

Type	Make and Model	Sound Power Level dB L _{WA}	Details
Condensing Unit 1 VRF	Mitsubishi PURY-P500YNW-A2	80	100% Capacity heating/cooling
Condensing Unit 2 VRF	Mitsubishi PURY-P550YNW-A2	89	100% Capacity heating/cooling
Condensing Unit 3 AC	Mitsubishi MUZ-AP71VK2	65	Heating/cooling mode

- 4.22 Following information from the Client, it is understood that the air handling plant will be located on the north-western wall of the workshop. Given the distance to the receptors, and the low noise levels produced by the units, no acoustic penalties have been applied.
- 4.23 The sound power levels for the fixed plant items have been included within the model as point sources with a height of 1 m. In the absence of octave band noise data, the sources have been modelled at 500Hz, in accordance with ISO 9613.
- 4.24 Based on the above information, the predicted daytime noise levels have been predicted at NSRs without any mitigation in place. The predicted noise levels at the NSRs have been assessed in accordance with BS4142 and the assessment is shown in **Table 4.5**.

Table 4.5: BS4142 Plant noise assessment daytime

Description	Daytime (0700 – 2300) dB				Relevant BS 4142 clause
	Weekday		Weekend		
	NSR1	NSR2	NSR1	NSR2	
Specific sound level (L _{Aeq,T})	45	29	45	29	7.3.5
Acoustic feature correction	-				9.2
Rating level (L _{A,r,T})	45	29	45	29	9.2

Description	Daytime (0700 – 2300) dB				Relevant BS 4142 clause
	Weekday		Weekend		
	NSR1	NSR2	NSR1	NSR2	
Background sound level (L _{A90,T})	54 ¹		55 ²		8
Excess over background	-9	-25	-10	-26	-
BS 4142 impact	Low Impact				-
Meets the requirements of Planning Condition 17	Yes				-
¹ Typical backgrounds based on the analysis of the mean, mode and median L _{A90,1h} values during the operational periods on a weekday. ² Typical backgrounds based on the analysis of the mean, mode and median L _{A90,1h} values during the operational periods on a weekend.					

Noise from Other Fixed Plant Items

- 4.25 It is anticipated that there may be other fixed plant and equipment associated with the Proposed Development that may have the potential to generate noise. However, at this stage details of the proposed type, number, and precise location of any such plant or the nature of its operation are not available. In the absence of detailed information, it is appropriate to specify suitable noise control limits to which any plant and equipment should conform. These limits should include any appropriate corrections for acoustic characteristics, in accordance with BS 4142.
- 4.26 In accordance with Condition 17, the rating level of fixed plant noise sources should not exceed 5dB below the existing background sound level when measured at the nearest receptors. The cumulative effect of all external plant should be specified so that the rating level is less than or equal to the prevailing background noise level.
- 4.27 Noise from external plant on the Site should achieve 47dB L_{Af,Tr} for daytime periods, which takes into account the noise from the air conditioning units. This rating level limit will apply at least 3.5 metres from the façade of NSRs (i.e., in free-field conditions).
- 4.28 In accordance with BS 4142, the assessment of plant noise emissions should include appropriate rating corrections for tonal, irregular, or intermittent plant where applicable, before comparison with the above limits.
- 4.29 Once the detailed nature of such future uses is confirmed, noise from any fixed plant can be considered to ensure that the limits can be met.
- 4.30 It should be noted that the derived rating level limits would be applicable to the total noise from the simultaneous operation of all external plant serving the Proposed Development. As such, noise emissions from individual items of plant will need to be

lower than the given limit, although the exact limit for each individual item of plant will be dependent upon its type, noise characteristics, location etc.

Condition 19

- 4.31 In accordance with Planning Condition 19, reserved matters applications shall include a Framework Operational Management Plan and Noise Mitigation Plan for the plot(s) to which they relate. This is provided in Appendix C. In addition, noise levels within the living rooms, bedrooms and gardens of NSRs 1 and 2 should not exceed the relevant standards.
- 4.32 This assessment has been undertaken in accordance with BS4142:2014A1:2019, which is the standard for assessing industrial and commercial sound. The results of the assessment demonstrate that operational noise associated with the proposed operations should not give rise to adverse effects within noise sensitive areas of the new residential area and the directly facing properties on the southern side of Knowsley Lane.
- 4.33 The rating level of noise from all operations is predicted to be 55dB $L_{A,r,Tr}$ at NSR1. As garden areas are located on the screened side of dwellings, there have not been considered further. Assuming 15dB through a partially opened window, would result in internal noise levels of 40dB $L_{A,r,Tr}$, which exceeds the internal criteria recommended in BS8233:2014.
- 4.34 This exceedance is only likely to occur when loading/unloading activities are being undertaken and for the majority of the time, the noise level at NSR1 is predicted to be 49dB $L_{A,r,Tr}$. Given a low impact is predicted in accordance with BS4142, the requirements of conditions 17 and 18 are achieved and the predicted noise levels are significantly below the existing ambient noise levels in the area, it is considered that noise from proposed operations should be acceptable and the requirements of condition 19 are achieved.
- 4.35 The rating level of noise from all operations is predicted to be 50dB $L_{A,r,Tr}$ in garden areas, which is the lower guideline value detailed in BS8233:2014. Assuming 15dB through a partially opened window, would result in internal noise levels of 35dB $L_{A,r,Tr}$, which meets the internal criteria as recommended in BS8233:2014.

Uncertainty

- 4.36 There are several potential sources of uncertainty in the result obtained. These are listed in **Table 4.6**, along with the measures taken to mitigate them.

Table 4.6: Sources of uncertainty

Source	Mitigation
Effects of wind on background sound levels due to wind generated noise	The noise survey was undertaken in calm, dry weather conditions.
Uncertainties in assessment procedure	Minimised by following standard procedure (BS 4142).
Uncertainties in calculations	The resultant levels have been derived using acoustic modelling software, which uses industry

Source	Mitigation
	recognised standard IOS 9613-2 calculation method.
Instrumentation	Verification calibrations of noise meters are undertaken at the beginning and end of measurement period.
Background Sound Levels	Background sound levels have been measured over a period of several days

- 4.37 Reasonably practicable steps have been taken to reduce the level of uncertainty in the assessment.

5. CONCLUSION

- 5.1 BWB Consulting has been instructed by Arnold Clark Automobiles Limited to undertake a Noise Impact Assessment (NIA) in support of a planning application for a proposed car showroom development off Knowsley Lane, Knowsley.
- 5.2 Planning consent was granted for the wider site in 2020 (20/00376/OUT). This was subject to a number of noise related planning conditions.
- 5.3 A baseline noise survey was undertaken in June 2025 to determine the existing noise levels at nearby noise sensitive receptors (NSRs). The survey and subsequent assessment work has been undertaken in accordance with current standards and guidance following consultation with Knowsley Metropolitan Borough Council (KMBC).
- 5.4 A detailed noise assessment has been undertaken to determine the likely impact of the proposed development on the nearest NSRs. The noise assessment indicates that the proposed development is unlikely to give rise to an adverse noise impact at the nearest noise sensitive receptors.
- 5.5 Known items of fixed plant have been assessed and noise limits have been set based on the results of the assessment to ensure that the requirements of planning condition 17 is achieved.
- 5.6 The assessment indicates that noise associated with operational noise will not exceed the existing background noise level, without mitigation in place.
- 5.7 In accordance with condition 19, a framework operational management plan is included within Appendix C.

APPENDICES

APPENDIX A: Glossary of Terms

Noise

Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.

Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.

The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or L_{Aeq} , L_{A90} etc., according to the parameter being measured.

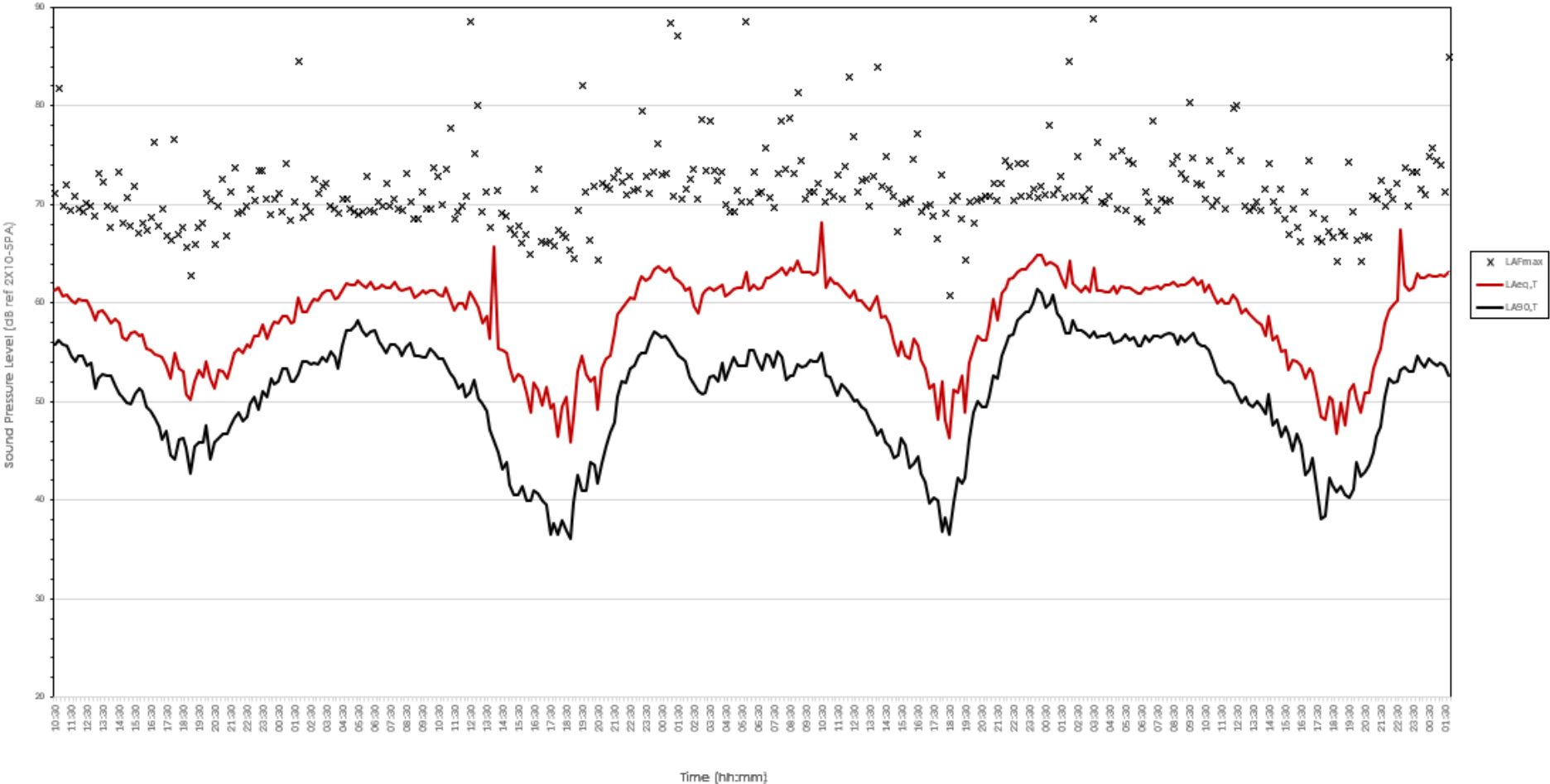
The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

Acoustic Terminology

Term	Description
dB (decibel)	The scale on which sound pressure level is expressed. Sound pressure level is defined as 20 times the logarithm of the ratio between the root-mean-square pressure of the sound field and a reference pressure (2×10^{-5} Pa).
dB(A)	A-weighted decibel. This is a measure of the overall level of sound across the audible spectrum with a frequency weighting (i.e., 'A' - weighting) to compensate for the varying sensitivity of the human ear to sound at different frequencies.
$L_{Aeq, T}$	L_{Aeq} is defined as the notional steady sound level which, over a stated period of time (T), would contain the same amount of acoustical energy as the A - weighted fluctuating sound measured over that period.
L_{Amax}	L_{Amax} is the maximum A - weighted sound pressure level recorded over the period stated. L_{Amax} is sometimes used in assessing environmental noise where occasional loud noises occur, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
L_{10} and L_{90}	If a non-steady noise is to be described, it is necessary to know both its level and the degree of fluctuation. The L_n indices are used for this purpose, and the term refers to the level exceeded for n% of the time. Hence L_{10} is the level exceeded for 10% of the time, and the L_{90} is the level exceeded for 90% of the time.
Free-field Level	A sound field determined at a point away from reflective surfaces other than the ground with no significant contributions due to sound from other reflective surfaces. Generally, as measured outside and away from buildings.
Façade Level	A sound field determined at a distance of 1 m in front of a large sound reflecting object such as a building façade.

APPENDIX B: Full Survey Results

Arnold Clark, Knowsley
Environmental Noise Survey
Measurement Location 1
7th June - 11th June 2025



APPENDIX C: Framework Operational Management Plan

Project	Arnold Clark, Knowsley Lane, Liverpool		
Document Number	244775/ACOUSTICS/ONMP1	Date	08/07/2025
Author	Lucy Elmer BA (Hons), MSc, MIOA	Status	P01 ISSUE

OPERATIONAL NOISE MANAGEMENT PLAN

This Operational Noise Management Plan will help to ensure that activities at the Site are conducted in a considerate and responsible manner.

The plan covers the following aspects of operations:

- The Site's responsibilities;
- The staff and driver's responsibilities; and
- The review procedure

Site's responsibilities

The site to which this plan relates should not operate outside the opening times of 08:00-20:00 hours Monday to Friday, 08:00-18:00 hours on Saturdays, and 11:00-17:00 hours on Sundays. A noise assessment should be undertaken should the site need to operate outside of these hours.

All items of fixed plant should achieve 47dB $L_{A,Tf}$ for daytime periods. This rating level limit will apply at least 3.5 metres from the façade of NSRs (i.e., in free-field conditions). Should fixed plant items operate during the night-time (2300-0700), then a further noise assessment should be undertaken.

Transporters will be prohibited from waiting in the vicinity of the site with their engines running.

All plant will be sited so that the noise impact at nearby noise-sensitive receptors is minimised.

Review procedure

In the case of any complaints received from local residents or any contraventions of the noise management plan noted, site management will investigate and, where necessary, undertake remedial action immediately. Details of any complaints, including name and address of the complainant, reason for complaint, time of complaint and action taken will be maintained and made available to the local authority upon request.

The site manager will be notified of all complaints received and any contraventions of the Operational Noise Management Plan noted.

The Operational Noise Management Plan will be reviewed on receipt of a complaint, taking into account any issues which have arisen, to ensure that additional measures required are implemented.

Details of complaints received by the council will be recorded and details passed to the site manager for investigation and where necessary, any remedial action will be undertaken.

It is considered that should the above recommendations be implemented, noise from operational noise associated with the site should be kept to a minimum and a low impact should be registered at the nearest sensitive receptors.

END
