

NOISE IMPACT ASSESSMENT OF PROPOSED NEW WASH PLANT

**A1 SERVICES (MANCHESTER) LTD, OVERMAN WAY,
MANCHESTER**

REPORT REFERENCE NO. J004857-7932-RDC-02

9th September 2024

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Document Control Sheet

Details of Assessment	
Client	A1 Services (Manchester) Ltd
Document Title	Noise Impact Assessment – Proposed new wash plant, A1 Services (Manchester) Ltd, Overman Way, Manchester.
Report Reference	J004857-7932-RDC-02

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Issue	Date	Author	Remark	Status
01	06/07/2024	Richard Cookson	Initial Issue	
02	09/09/2024	Richard Cookson	Added mitigation advice	

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This report has been prepared based upon a scope of works and associated resources agreed between the client and Philip Dunbavin Acoustics Ltd (PDA). This report has been prepared with all reasonable skill, care and diligence and has been based upon the interpretation of data collected. This has been accepted in good faith as being accurate and valid at the time of the collection. This report has been based solely on the specific design assumptions and criteria stated herein.



CONTENTS

1.0	SUMMARY.....	4
2.0	INTRODUCTION	5
3.0	NOISE ASSESSMENT CRITERIA.....	5
3.1	Guidance - Noise and Vibration Management: Environmental Permits	5
3.2	BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.....	6
3.3	WHO Guidelines for Community Noise	7
4.0	SURVEY AND EXISTING OPERATION NOISE	8
4.1	Survey.....	8
4.2	Existing Operations on Site	8
5.0	PROPOSED NEW WASH PLANT AND INCREASE IN THROUGHPUT.....	10
5.1	Preliminary Impact.....	10
5.1.1	Proposed Wash Plant.....	10
5.1.2	Increased Throughput	11
6.0	CONTEXT	13
7.0	UNCERTAINTY	13
7.1	Uncertainty in Measurements	13
7.2	Uncertainty in Sound Power Levels	13
7.3	Uncertainty in Calculation Method	14
8.0	MITIGATION.....	14
9.0	CONCLUSION	15

APPENDIX A – DEFINITION OF ACOUSTIC TERMS



1.0 SUMMARY

At the request of A1 Services (Manchester) Ltd, a noise impact assessment has been undertaken relating to the replacement of the existing temporary wash plant with a relocated permanent wash plant, and increase in throughput of recycled aggregate processing at Overman Way, Manchester, M27 8BQ.

An assessment of the site and the previous aggregate wash plant was reported within PDA report J004857-7860-RDC-01 dated 5th June 2024.

This report details the impact of the proposed new wash plant and increase in throughput of the site.

The results of the preliminary calculation of impact in accordance with BS 4142:2014+A1:2019 have indicated that the Rating Levels following the replacement of the wash plant and increase in throughput are +4dB above the background level at houses off Duchy Road and Pevensey Road, and +2dB above the background at houses on Langley Road. These indicate an impact below the onset of 'adverse impact' and therefore a 'low' impact, depending on context.

When context is taken into account, the impact of the propose new Aggregate Wash Plant and increase in throughput remains low, being below the predicted onset of 'adverse impact' at the nearest noise sensitive properties.

2.0 INTRODUCTION

The A1 Services site at Overman Way, Manchester takes up a part of the industrial estate on the site of the former Agecroft Colliery. The existing site operations involve the storage and supply of aggregates, receipt of waste aggregates, crushing and processing of waste aggregates and the production of concrete blocks to make modular pre-formed concrete barriers.

The location of the site and surrounding local area including the closest residential receivers are shown in Figure 1 below.



Figure 1. Site Location

3.0 NOISE ASSESSMENT CRITERIA

3.1 Guidance - Noise and Vibration Management: Environmental Permits

The above on-line guidance details the procedure for performing a risk assessment for noise and vibration emissions with regard to Environmental Permits. The full guidance is available at :

<https://www.gov.uk/government/publications/noise-and-vibration-management-environmental-permits/noise-and-vibration-management-environmental-permits>

The guidance states that the assessment should be carried out by a competent person who should be for example a holder of either:

- Institute of Acoustics Diploma in Acoustics and Noise Control
- Institute of Acoustics Certificate of Competence in Environmental Noise Measurement, with relevant experience

The guidance goes on to describe how the assessment should be carried out in terms of initial desktop risk assessment, off-site monitoring survey, source assessment and Best Available Technology (BAT) or appropriate measures justification for any required mitigation.

Broadly, the above assessment is to be carried out in accordance with the methodology of BS4142 'Methods for rating and assessing industrial and commercial sound', with any noise propagation modelling carried out in accordance with ISO 9613 'Acoustics – attenuation of sound during propagation outdoors'.

3.2 BS4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound

The effect of plant noise emissions on the nearest noise sensitive residences can be assessed in accordance with BS4142:2014+A1:2019 – '*Methods for rating and assessing industrial and commercial sound*'.

The standard describes a method of determining the level of a noise of commercial or industrial nature, together with procedures for assessing the impact of such a noise outside nearby noise sensitive areas.

The standard provides a procedure for comparing the noise from commercial sources with background noise levels in the absence of the commercial noise and determining the likely impact of the noise on noise sensitive areas.

In accordance with BS 4142 the background noise level is the typical A-weighted sound pressure level at the assessment position that is exceeded for 90% of a given time interval (L_{A90}). The specific noise level is the equivalent continuous (L_{Aeq}) sound pressure level at the assessment position produced by the noise source over a given time interval.

Certain acoustic features can increase the impact over that expected from a simple comparison between the specific noise level and the background level. Where such features are present, these are taken into account by adding corrections to the specific noise level.

The corrections are applied based on whether the following features occur, or are expected to be present. The correction values can either be determined subjectively, or by various objective measurement procedures.

- The noise contains a distinguishable, discrete, continuous tone (whine, hiss, screech, hum, etc.). 0 – 6 dB penalty
- The noise contains distinct impulses (bangs, clicks, clatters, or thumps). 0 – 9 dB penalty.
- The noise is irregular enough to attract attention. 0 – 3 dB penalty.
- Other features. 0 – 3 dB penalty.

From the addition of the above penalties where appropriate the rating level is established, this being the value that is compared with the background noise.

According to BS 4142 an initial estimate of the impact is given for a rating level of:

- 10 dB(A) or more above the background is an indication of significant adverse impact, depending on the context.
- 5 dB(A) above the background is an indication of an adverse impact, depending on the context.



- where the rating level does not exceed the background level, this is an indication of the specific sound source having a low impact, depending on the context.

The above initial assessment may then be modified depending on the context to take into account;

- The absolute level of the sound.
- The character and level of the residual sound compared to the character and level of the specific sound.
- 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:
 1. Façade insulation treatment
 2. Ventilation and / or cooling that will reduce the need to have windows open so as to provide rapid or purge ventilation; and
 3. Acoustic screening

3.3 WHO Guidelines for Community Noise

In 1999, the WHO (World Health Organisation) published Guidelines for Community Noise, stating the following internal noise levels are applicable to dwellings.

Table 1 - WHO Guidelines for Community Noise criteria

Specific Environment	Critical Health Effect(s)	L_{Aeq} dB	Time Base (hours)¹
Outdoor living area	Serious annoyance, daytime and evening	55	16
	Moderate annoyance, daytime and evening	50	16
Outside Bedrooms	Sleep disturbance, window open (outdoor values) night time	45	8

¹ Typically taken to be daytime/evening - 07:00 – 23:00 hours, and night time 23:00 – 07:00 hours.

WHO guidelines state, ‘To protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady, continuous noise should not exceed 55 dB L_{Aeq} on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50 dB L_{Aeq} .’



4.0 SURVEY AND EXISTING OPERATION NOISE

4.1 Survey

Ambient sound measurements were undertaken at two locations close to the nearest noise sensitive houses to the site in March / April 2024. Full details of the survey are reported in PDA report J004857-7860-RDC-01 dated 5th June 2024.

A summary of the derived Background and Residual Sound Levels at the nearest noise sensitive properties is summarised below:

Table 2 - Representative Background and Residual Levels

	(dB[A])	
	Pos 1	Pos 2
Representative Background Sound Level L_{A90}	48	53
Representative Residual Sound Level L_{Aeq}	57	71*

Notes

* Noise levels at position 2 were very high due to heavy traffic on Langley Road including a high percentage of HGVs.

4.2 Existing Operations on Site

Measurements were made of the items of plant operating on site and a sound propagation model was produced. Full details of the measurement and model are included in PDA report J004857-7860-RDC-01 dated 5th June 2024. The results of the model for existing operations on-site (including aggregate washing) are reproduced below:

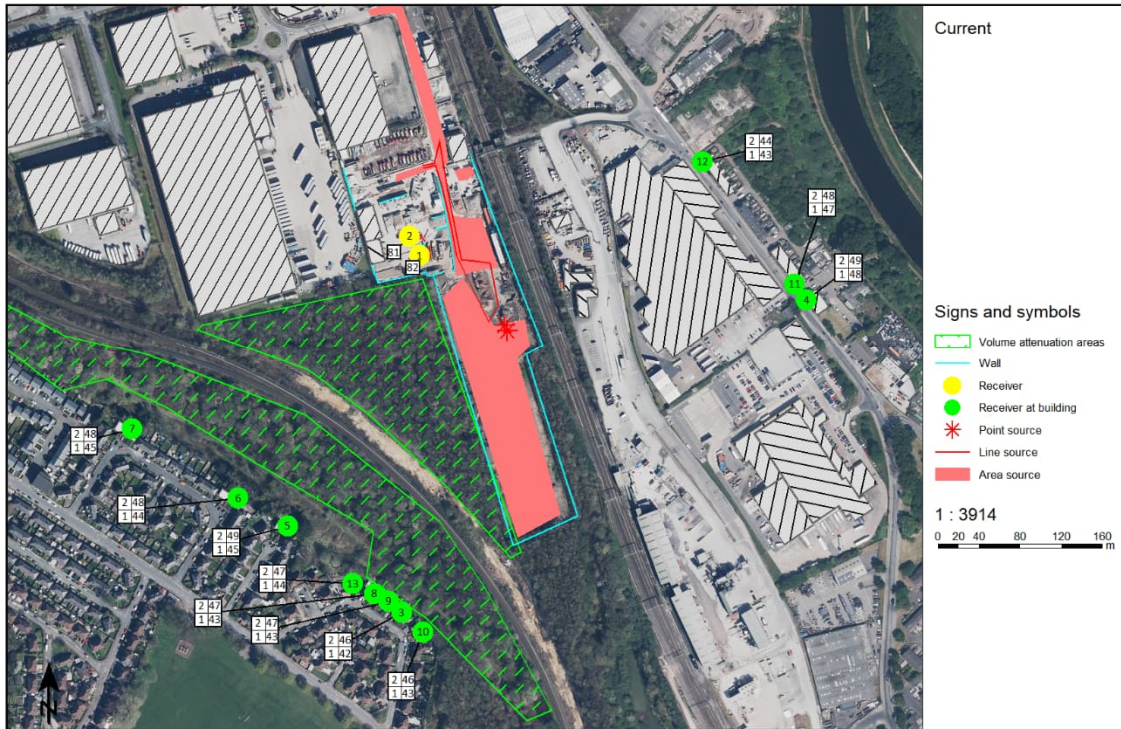


Figure 2 - SoundPlan model - sound propagation to nearest noise sensitive properties – Tables give sound pressure level for the indicated floor heights

Table 3 - Comparison of current operations with underlying background sound levels

Location	Predicted Specific Sound Level $L_{Aeq,T}$ (dB)	Feature Correction	Rating Level L_{Ar} (dB)	Representative Background $L_{A90(15-min)}$ (dB)	Difference between Rating Level and Background (dB)
Houses on Duch Road and Pevensey Road (worst case)	49	+3	52	48	+4
Houses on Langley Road (worst case)	49	+0 *	49	53	-4

* At receivers on Langley Road the site is unlikely to be audible and hence no feature correction is appropriate.

5.0 PROPOSED NEW WASH PLANT AND INCREASE IN THROUGHPUT

It is proposed to install a new permanent wash plant at the site, whilst retaining the existing crusher and dry screen which will allow the throughput of aggregate recycling at the site to be increased to 750,000 tonnes per year.

5.1 Preliminary Impact

5.1.1 Proposed Wash Plant

The sound propagation model has been modified to include the proposed new wash plant to the southern portion of the site, with the existing crusher and screen relocated to the centre of the site.

Sound levels for the proposed new wash plant have been taken from the CDE Global report of Typical Noise Emissions for the M2500 – AGGMAX wash plant. The plant has been modelled as a line source at 3m high. The Soundplan model has been calibrated to the measured far-field sound pressure of the wash plant at 100m. As the CDE Global report does not include a frequency spectrum for the wash plant sound levels, the measured spectrum of the existing temporary wash plant have been used and normalised to calibrate the model at 100m from the source.

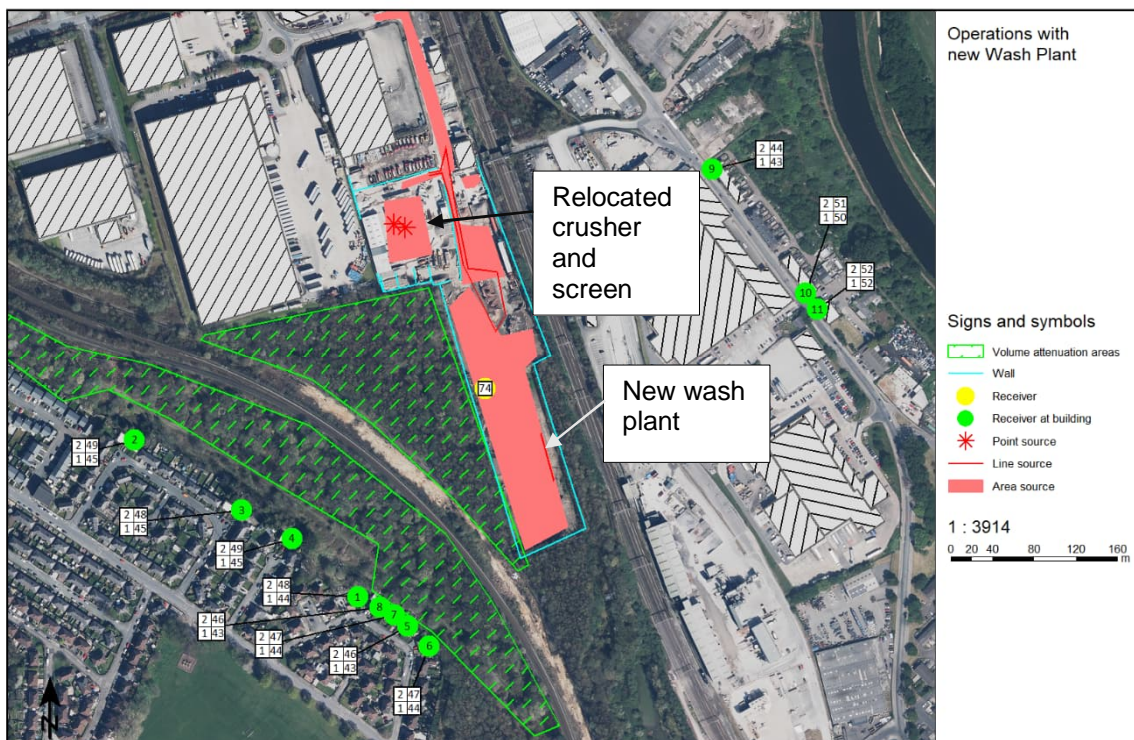


Figure 3 - Currently permitted operations plus proposed permanent wash plant

Table 4 – Current operations and capacity with new wash plant – worst case hour

Location	Predicted Specific Sound Level $L_{Aeq,T}$ (dB)	Feature Correction	Rating Level L_{Ar} (dB)	Representative Background $L_{A90(15-min)}$ (dB)	Difference between Rating Level and Background (dB)
Houses on Duch Road and Pevensey Road (worst case)	49	+3	52	48	+4
Houses on Langley Road (worst case)	52	+3	55	53	+2

The initial estimate of impact remains the same as previously, with all of the worst affected nearby noise sensitive properties below the +5dB onset of adverse impact level, which indicates a low impact, depending on context.

5.1.2 Increased Throughput

The above initial assessments of impact relate to the installation of the new permanent Wash Plant, and the relocation of the crusher and screen. The above model represents a worst case hour of operation at the current capacity, as it is assumed that the wash plant and screed are operating continuously with deliveries at the current level of approximately 40 lorries per day.

It is also proposed to increase the throughput of the site. We have been informed that the current operations of approximately 40 lorries per day will be increased to a throughput of 750,000 tonnes, which we understand is equivalent to 11 lorries per hour throughout the operating hours of the site (07:00 – 18:00 weekdays and 07:30 – 14:00 Saturdays). This is equivalent to an increase from approximately 4 lorries per hour to approximately 11 lorries per hour which is equivalent to a 4.4 dB uplift in the sound power due to lorry movements on-site. The model of the existing site operation also allowed for two 360° Excavators operating for 100% of the time. We have also increased the sound power of the excavators by 4.4 dB to represent an estimated five 360° Excavators running full time, and a sixth running approximately 50% of the time when the site operates at the proposed new capacity. Updating the above propagation model to include the uplift in lorry movements and excavator operation results in the following:

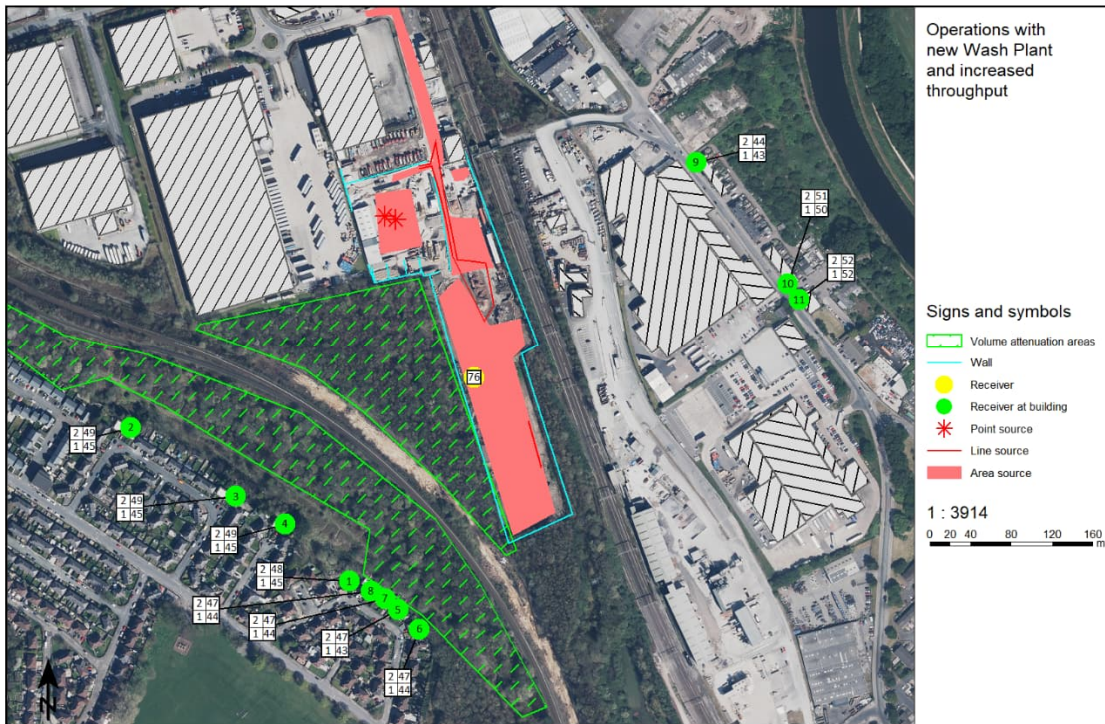


Figure 4 – Operations including new wash plant and uplift in material processing

Table 5 – Proposed increased throughput with new wash plant

Location	Predicted Specific Sound Level $L_{Aeq,T}$ (dB)	Feature Correction	Rating Level L_{Ar} (dB)	Representative Background $L_{A90(15-min)}$ (dB)	Difference between Rating Level and Background (dB)
Houses on Duch Road and Pevensey Road (worst case)	49	+3	52	48	+4
Houses on Langley Road (worst case)	52	+3	55	53	+2

Comparing Table 4 and Table 5 above it is apparent that there is no significant additional increase in the noise level at the nearest noise sensitive properties due to the proposed increase in throughput.

6.0 CONTEXT

The BS4142 preliminary estimate of impact for the site operations needs to be modified for context. With reference to context BS4142 indicates that the significance of sound of an industrial and/or commercial nature affecting residential uses depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. BS4142 indicates that pertinent factors that could modify context would include: the absolute level of sound; the character and level of the residual sound compared to the character and level of the specific sound; the sensitivity of the receptor and whether dwellings or other premises used for residential purpose already incorporate design measurements that secure good internal and/or outdoor acoustic conditions.

The Specific Sound Level is below the WHO Guidelines for Community Noise 50 dB criterion for nearby noise sensitive properties off Duchy Road, but marginally above the criterion for houses on Langley Road. However, we would note that in this case there are also significant levels of environmental noise due to other sources and in this case the ambient sound levels in the absence of the specific source are still greater than both the Specific Sound and the Rating Level due to the A1 Services site, both at the current operating throughput of the site, and with the proposed maximum increased throughput.

We would further note that the assessment has been carried out conservatively by including for all of the operations at the A1 Aggregates site, whereas, in strict accordance with BS 4142:2014+A1:2019, only the specific noise due to the source considered (the Aggregate Wash Plant) ought to be assessed in which context the existing sources of noise at the site are already permitted and pre-existing.

The character of the sound from the A1 Aggregates site is not out of character with other environmental sounds in the vicinity of the site, being in the vicinity of a number of other large scale industrial processes and also close to major and continuous road traffic sources which include a reasonably high proportion of HGV traffic.

Taking into account the above contextual features, and the minimal increase in sound level due to the increase in throughput of the plant, after context has been taken into account, the impact of the site would remain the low. Hence although an increase in the specific sound and rating level at houses off Langley Road is predicted due to the operation of the new permanent wash plant, the rating level remains below the onset level of an adverse impact.

7.0 UNCERTAINTY

BS4142 indicates that an assessment of noise impact should consider uncertainty within the assessment. This uncertainty can arise from: uncertainty in measurements; uncertainty in sound emission and sound power level; and uncertainty in calculation method.

7.1 Uncertainty in Measurements

It is noted that the instrumentation used for the assessment conform to Class 1 accuracy in accordance with IEC 61672. In addition, the instrumentation has been calibrated to national standards and were field calibrated at the time of the measurements. The measurements of background were undertaken on the boundary of the nearest residential receivers.

We would therefore consider that the effect of uncertainty on the measurement of background sound would be minimal.

7.2 Uncertainty in Sound Power Levels

The noise emission from the Aggregate Wash Plant has been measured in-situ in normal operation using instrumentation conforming to Class 1 accuracy in accordance with IEC 61672. The propagation model was calibrated to ensure that the measured values were predicted at the measurement locations.



Measurements have been carried out in a conservative manner and we would therefore consider that the uncertainty of the determination of the source sound powers would be minimal, and generally be conservative (more likely to overpredict rather than underpredict the sound power of the considered Aggregate Wash Plant source).

7.3 Uncertainty in Calculation Method

It is noted that the calculations have been undertaken utilising a known prediction method and have utilised the standard ISO 9613. In addition calculations have been undertaken utilising commercial prediction software. We note that the ISO 9613 method assumes meteorological conditions favourable to noise propagation (in all directions), and for much of the time during operation of the plant we would expect noise propagation to be less favourable (i.e. lower noise) than those predicted herein.

Taking into account of the above, we would consider uncertainty in the results of the assessment due to the calculation method to be low, with the calculations being conservative.

8.0 MITIGATION

As indicated above, the predicted impact of the proposed new wash plant operation is below the onset of adverse impact at the nearest noise sensitive properties. As such, no specific mitigation is required to reduce the noise emissions from the site.

Although there are no specific requirements to reduce noise emissions, as a general duty of care noise emissions should be minimised by adoption of suitable operating procedures to minimise noise egress. These operational mitigation measures are detailed in the accompanying Noise Management Plan ref: J004857-7881-RDC-3.



9.0 CONCLUSION

At the request of A1 Services (Manchester) Ltd, a noise impact assessment has been undertaken relating to the replacement of the existing temporary wash plant with a relocated permanent wash plant, and increase in throughput of recycled aggregate processing at Overman Way, Manchester, M27 8BQ.

An assessment of the site and the previous aggregate wash plant was reported within PDA report J004857-7860-RDC-01 dated 5th June 2024.

This report details the impact of the proposed new wash plant and increase in throughput of the site.

The results of the preliminary calculation of impact in accordance with BS 4142:2014+A1:2019 have indicated that the Rating Levels following the replacement of the wash plant and increase in throughput are +4dB above the background level at houses off Duchy Road and Pevensey Road, and +2dB above the background at houses on Langley Road. These indicate an impact below the onset of 'adverse impact' and therefore a 'low' impact, depending on context.

When context is taken into account, the impact of the propose new Aggregate Wash Plant and increase in throughput remains low, being below the predicted onset of 'adverse impact' at the nearest noise sensitive properties.

APPENDIX A – DEFINITION OF ACOUSTIC TERMS

The decibel

This is the basic unit of noise, denoted dB.

A Weighting

This is a weighting process which simulates the human ear's different sensitivity at different frequencies. A weighting can be shown two typical ways, 50 dB(A) L_{eq} or 50 dB L_{Aeq} . Both mean the same thing. (See below for a definition of L_{eq}). The dB(A) level can be regarded as the overall level perceived by human beings.

L_{eq} and $L_{eq(s)}$

This is the equivalent continuous noise level which contains the same acoustic energy as the actual time-varying sound. In other words it is a kind of average noise level. It is denoted dB L_{eq} or, for A-weighted figures dB(A) L_{eq} or dB L_{Aeq} . It can also be expressed in terms of frequency analysis (see later). $L_{eq(s)}$ is the sample L_{eq} level.

L_n

This is the level exceeded for n% of the time. It is denoted dB L_n or, for A-weighted figures dB(A) L_n or dB L_{An} . It can be expressed in terms of frequency analysis (see later). L_{90} is the level exceeded for 90% of the time and is a measure of the lowest level typically reached. L_{10} is the level exceeded for 10% of the time and is the highest level typically reached. L_{50} is the level exceeded for 50% of the time and, mathematically, it is the median.

L_{max}

This is the maximum level reached during a measurement period. The "time constant", or the ability of the equipment to respond to impulses is usually expressed along with it, e.g. "Fast", "Slow", etc. It is denoted dB L_{max} or, for A-weighted figures dB(A) L_{max} , dB L_{Amax} , etc. It can also be expressed in terms of frequency analysis.

Frequency Analysis

Whereas dB(A) gives a very useful overall figure, it has its limitations in that it cannot be used to model or predict the effect of noise control and mitigation as this nearly always has radically different performance at different frequencies.

Frequency analysis expresses an overall noise level at each frequency or band of frequencies in the audible range. Octave band analysis divides the audible range into 10 bands from 31.5 Hz to 16 kHz and the noise level in each band can be expressed in any form e.g. L_{eq} , L_{90} , L_{max} etc. One third octave band analysis uses 30 bands.

Narrow band analysis takes the process to resolutions of less than 1 Hz. This is useful for identifying the existence of tones (whines, hums, etc.) and in pin-pointing the sources.