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NOISE IMPACT ASSESSMENT OF PROPOSED AGGREGATE RECYCLING PLANT

OLYMPIC WAY, BLACKPOOL.

REPORT REFERENCE NO. J004664-7570-RC-02

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Document Control Sheet

Details of Assessment	
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Issue	Date	Author	Remark	Status
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	Name	Position
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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

At the request of JN Civils Ltd, a noise impact assessment has been undertaken of the proposed aggregate recycling facility at Olympic Way, Blackpool.

A noise survey has been conducted at locations representative of the nearest noise sensitive properties to the proposed plant. The results of the survey have been used to assess the background sound at the nearest noise sensitive receptors and to determine the likely impact of the proposed use in terms of noise.

The Assessment has been undertaken following the guidance contained within BS4142:2014+A1:2019 –*'Methods for rating and assessing industrial and commercial sound'*.

We have estimated the likely noise levels generated by the operation of the proposed recycling plant, and using this data we have calculated the expected noise level at the nearest noise sensitive receivers.

The results of the preliminary calculation of impact in accordance with BS 4142:2014+A1:2019 has indicated that the impact of the proposed development will be 'low' depending on context.

For all of the nearest noise sensitive properties the Rating Level is below the Background Level.

When context is taken into account, the impact of the proposed development remains 'low'.

The impact of the proposed development on the office use of the Blackpool Police Headquarters, and on the recreational use of the Mereside Park are also predicted to be low, and the development is unlikely to be significantly audible.

As such, there is no reason on account of noise that the development may not be permitted.

2.0 INTRODUCTION

The proposed site at Olympic Way, Blackpool was formerly the site of two gas holders until these were demolished in 2015. The site is currently vacant. The concrete base pads for the gas holders remain with the remainder of the site surfaced with hard-core.

At the western edge of the site is a wash plant which is used to wash and grade mixed sand and aggregate. The plant has been in operation for a number of years, however a new permit for the wash plant is required, and in addition it is proposed to increase the throughput of the wash plant.

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

Figure 1. Site Location and nearest Noise Sensitive Receivers (NSRs)

3.0 NOISE ASSESSMENT CRITERIA

3.1 National Planning Policy Framework

National Planning Policy is guided by the National Planning Policy Framework (NPPF) updated in September 2023. With regard to Noise the Framework states the following;

> *Planning policies and decisions should contribute to and enhance the natural and local environment by:*
>
> - *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.*
>
> *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:*
>
> - *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 life;*
> - *identify and protect tranquil areas which have remained relatively undisturbed by noise and are prized for their recreational and amenity value for this reason.*

The terms '*significant adverse impact*' and '*adverse impact*' are defined in the explanatory notes of the 'Noise Policy Statement for England (NPSE) which states;

> *There are two established concepts from toxicology that are currently being applied to noise impacts, for example, by the World Health Organisation. They are:*
>
> *<u>NOEL – No Observed Effect Level</u>*
>
> *This is the level below which no effect can be detected. In simple terms, below this level, there is no detectable effect on health and quality of life due to the noise.*
>
> *<u>LOAEL – Lowest Observed Adverse Effect Level</u>*
>
> *This is the level above which adverse effects on health and quality of life can be detected.*
>
> *Extending these concepts for the purpose of this NPSE leads to the concept of a significant observed adverse effect level.*
>
> *<u>SOAEL – Significant Observed Adverse Effect Level</u>*
>
> *This is the level above which significant adverse effects on health and quality of life occur.*
>
> The notes also offer an explanation of the term 'adverse impacts' as follows;
>
> *… refers to the situation where the impact lies somewhere between LOAEL and SOAEL. It requires that all reasonable steps should be taken to mitigate and minimise adverse effects on health and quality of life while also taking into account the guiding principles of sustainable development (paragraph 1.8). This does not mean that such adverse effects cannot occur.*

Although no specific noise limits for LOAEL and SOAEL have been defined, in 2014 the UK Government published a planning practice guidance document for noise which indicates where these limits fall with relation to the perception of noise. A summary is reproduced in Section 4.2 below, and the full document is published at https://www.gov.uk/guidance/noise--2. It is considered that guidance from other acoustic standards may be employed to determine suitable levels within the overall principal of the National Planning Policy Framework.

The National Planning Policy Framework also states:

> *Planning policies and decisions should ensure that new development can be integrated effectively with existing businesses and community facilities (such as places of worship, pubs, music venues and sports clubs). Existing businesses and facilities should not have unreasonable restrictions placed on them as a result of development permitted after they were established. Where the operation of an existing business or community facility could have a significant adverse effect on new development (including changes of use) in its vicinity, the applicant (or 'agent of change') should be required to provide suitable mitigation before the development has been completed.*
>
> *The focus of planning policies and decisions should be on whether proposed development is an acceptable use of land, rather than the control of processes or emissions (where these are subject to separate pollution control regimes). Planning decisions should assume that these regimes will operate effectively. Equally, where a planning decision has been made on a particular development, the planning issues should not be revisited through the permitting regimes operated by pollution control authorities.*

3.2 Planning Practice Guidance – Noise

In March 2014 (updated July 2019) the UK Government published further guidance on the assessment of noise for planning purposes in the form of the on-line publication, Planning Practice Guidance on noise (http://www.gov.uk/guidance/noise--2). This document offers further guidance on the typical levels which constitute the NOEL, LOAEL and SOAEL. The relevant section is reproduced in the table below;

Table 1. Planning Practice noise level guidance

Perception	Examples of Outcomes	Increasing Effect Level	Action
No Observed Effect Level			
Not present	No Effect	No Observed Effect	No specific measures required
No Observed Adverse Effect Level			
Present and not intrusive	Noise can be heard, but does not cause any change in behaviour, attitude or other physiological response. Can slightly affect the acoustic character of the area but not such that there is a perceived change in the quality of life.	No Observed Adverse Effect	No specific measures required
Lowest Observed Adverse Effect Level			
Present and intrusive	Noise can be heard and causes small changes in behaviour, attitude or other physiological response, e.g. turning up volume of television; speaking more loudly; where there is no alternative ventilation, having to close windows for some of the time because of the noise. Potential for some reported sleep disturbance. Affects the acoustic character of the area such that there is a small actual or perceived change in the quality of life.	Observed Adverse Effect	Mitigate and reduce to a minimum
Significant Observed Adverse Effect Level			
Present and disruptive	The noise causes a material change in behaviour, attitude or other physiological response, e.g. avoiding certain activities during periods of intrusion; where there is no alternative ventilation, having to keep windows closed most of the time because of the noise. Potential for sleep disturbance resulting in difficulty in getting to sleep, premature awakening and difficulty in getting back to sleep. Quality of life diminished due to change in acoustic character of the area.	Significant Observed Adverse Effect	Avoid
Present and very disruptive	Extensive and regular changes in behaviour, attitude or other physiological response and/or an inability to mitigate effect of noise leading to psychological stress, e.g. regular sleep deprivation/awakening; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory	Unacceptable Adverse Effect	Prevent

It is notable from the above planning guidance that development should not normally be permitted above Significant Observed Adverse Effect Levels, and should aim to minimise Other Adverse Effect Levels

(below SOAEL but above LOAEL). However, it is clear that noise is permitted to approach and/or exceed the Lowest Observed Adverse Effect Level, providing that noise is mitigated and reduced to a minimum.

3.3 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'.

3.4 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

3.5 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 2 - 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 DETAILS

4.1 Ambient Noise Measurement Locations

Ambient noise measurements were undertaken at two positions in the vicinity of the nearest noise sensitive residences. The measurement locations were selected to be representative of the worst case noise sensitive receivers in the vicinity of the proposed development. The microphone was mounted 1.5m above ground and at least 3.5m from any reflecting surface expected to influence measured levels. A range of statistical noise indicators was measured, including broadband L_{Aeq} and L_{A90}. Measurements were setup to record parameters over 15 minute intervals in accordance with the requirements for Background Sound measurements in accordance with BS 4142.

The measurement locations are highlighted in Figure 2 below:

Figure 2. Measurement Positions

4.2 Survey Times

The ambient noise measurements were made at the following times. At position 1 measurements were taken between 19:25 on Sunday 12th November and 11:10 Monday 13th November; and between 18:30 on Wednesday 15th November and 15:00 on Thursday 16th November. At measurement position 2 measurements were taken between 19:45 on Sunday 12th November and 11:15 Monday 13th November; and between 18:30 on Wednesday 15th November and 15:15 on Thursday 16th November.

4.3 Measurement Equipment

The survey was conducted using 1 × Rion NL52 and 1 x NTi XL2 sound level meters, for which calibration certificates are held. The sound level meters are Class 1 accuracy in accordance with IEC 61672-1. The meters were set to A-Weighted and fast response. The meters were calibrated

immediately before and after measurements took place and no significant drift was observed. For all measurements the meters were set to log automatically.

4.4 Weather

Weather observations on the site were that windspeed varied between 1 and 5 m/s from the south-south-east on the Sunday night / Monday morning (wind speed exceeded 5m/s after 6am on Monday morning and the period after this time has been excluded from the results) and on the Wednesday / Thursday windspeeds were between 0 and 4.5m/s (4.5m/s at the start of the measurement on Wednesday afternoon, falling to reasonably still conditions by Wednesday night and Thursday morning) initially from a north-north-west direction changing to an easterly direction.

During the course of the survey temperatures varied between 4°C and 10°C.

4.5 Subjective Description of Noise Sources

During the ambient sound survey the dominant noise source at both measurement positions was continuous distant road traffic noise from the M55, A5230, A583 and Clifton Road, as well as occasional local traffic on Deepdale Road and Bowness Avenue.

5.0 MEASURED RESULTS

A summary of the ambient noise level measurements is given below.

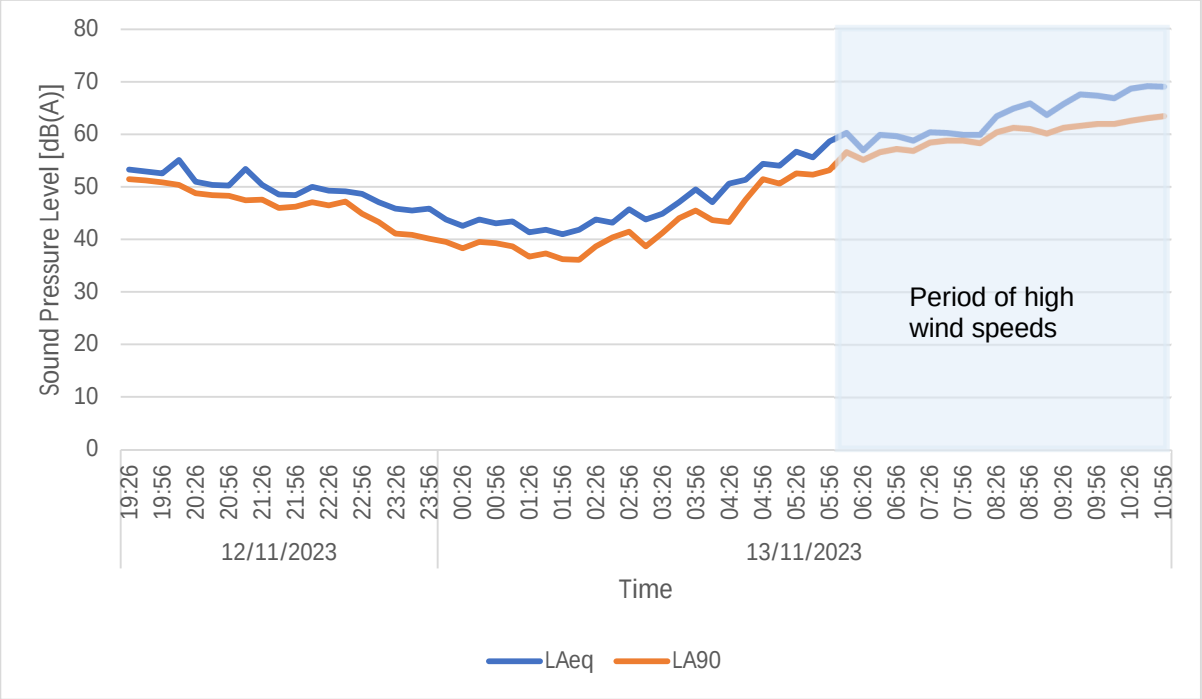

Figure 3 – Ambient sound levels measured at Position 1 during the Weekend (Sunday – Monday)

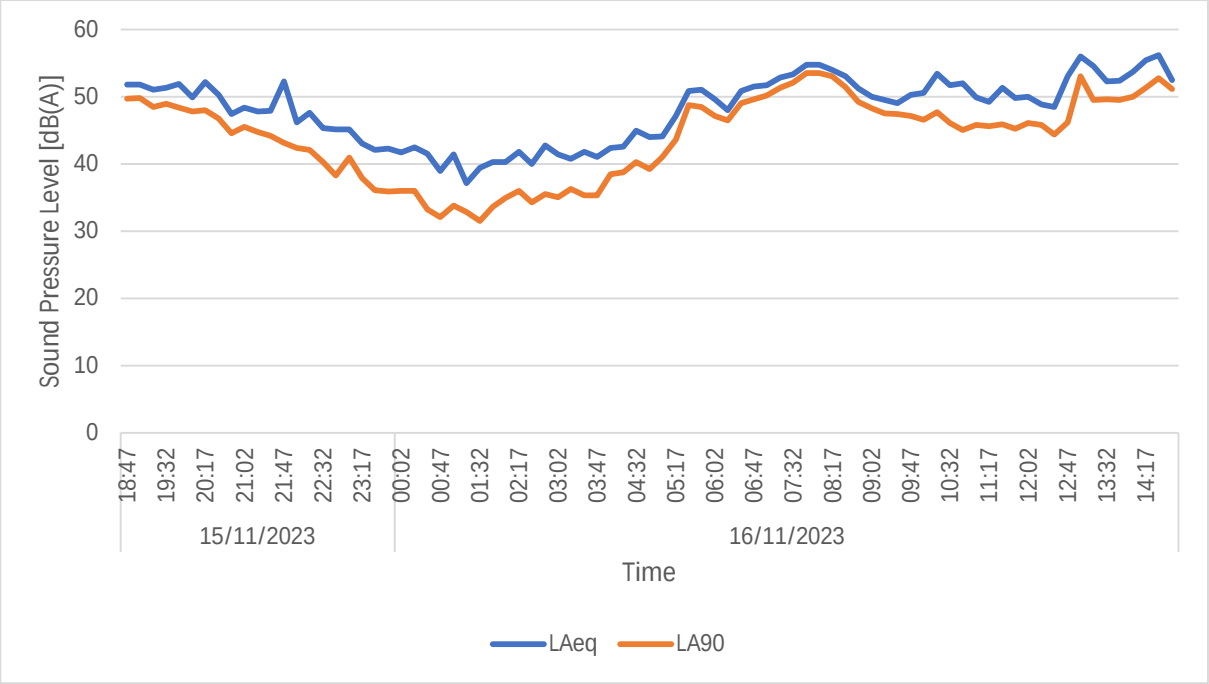

Figure 4 - Ambient sound levels measured at Position 1 during the week (Wednesday / Thursday)

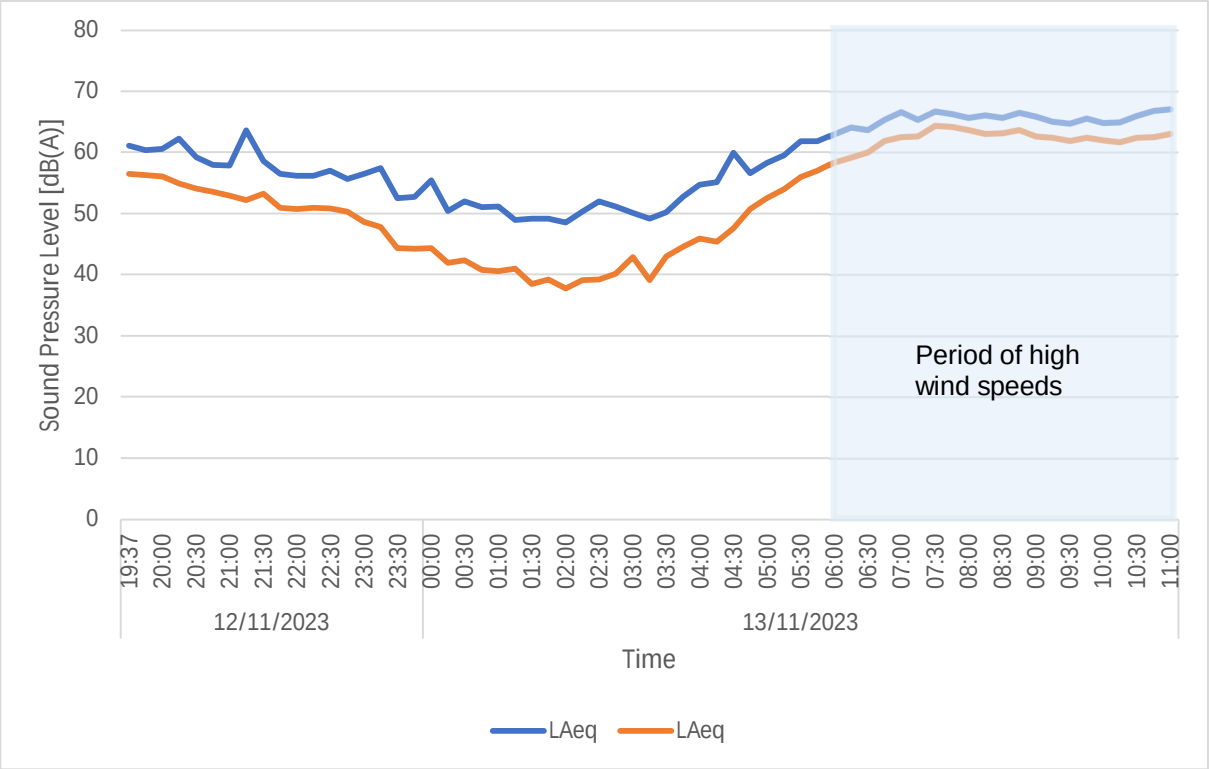

Figure 5 - Ambient sound levels measured at Position 2 during the Weekend (Sunday – Monday)

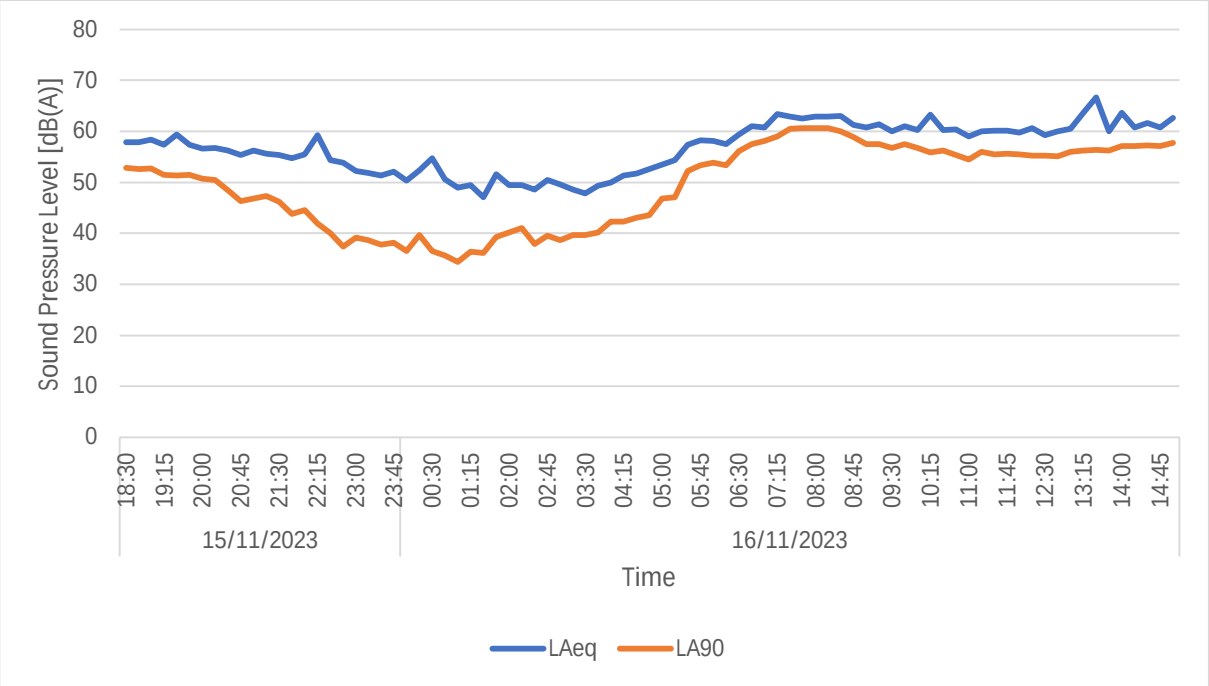

Figure 6 - Ambient sound levels measured at Position 2 during the week (Wednesday / Thursday)

We note that the operator wishes to apply for permission to operate the development over the following hours:

3.4 Hours of Operation

3.4.1 The proposed operating hours are:

- 07:00 to 18:00 on Monday to Friday
- 07:00 to 12:00 on Saturdays
- No working on Sundays or Public Holidays

3.4.2 Emergency access may be required outside of these hours for emergency overnight works. The emergency access would be infrequent and considered to be an abnormal occurrence. If out of hours access is required, the wagons will be parked up only, no machinery will be operated.

For the avoidance of doubt, we have determined the typical background sound levels over the whole of the measured daytime and night-time periods.

The overall sound levels at Position 1 and Position 2 are given in Table 3 below.

Table 3 - Measured Results

Time Period		$L_{Aeq,T}$ (dB)		Range of $L_{A90,15mins}$	
		Pos 1	Pos 2	Pos 1	Pos 2
Weekday	Daytime	53	61	38-54	37-61
	Night-time	45	54	32-50	34-58
Weekend	Daytime	52	59	46-51	50-57
	Night-time	49	56	36-53	38-57

We would note that overall, sound levels appear to be similar at the weekend as during the week, without any significantly lower sound levels at weekend either during the day or the night.

5.1 Derivation of Background Noise

In accordance with the requirements of BS4142 the determination of background is not simply to ascertain a lowest measured background sound level, but rather to quantify what is typical during relevant time periods. Within BS4142 is states the following:

"8.1.4 The monitoring duration should reflect the range of background sound levels for the period being assessed. In practice, there is no "single" background sound level as this is a fluctuating parameter. However, the background sound level used for the assessment should be representative of the period being assessed.

NOTE 1 To obtain a representative background sound level a series of either sequential or disaggregated measurements ought to be carried out for the period(s) of interest, possibly on more than one occasion. A representative level ought to account for the range of background sound levels and ought not automatically to be assumed to be either the minimum or modal value."

Figure 7 to Figure 14 below show the statistical analyses of the Background Sound Level results at measurement position 1 and 2 (with the exclusion of the time period on Monday morning when the wind exceeded 5m/s).

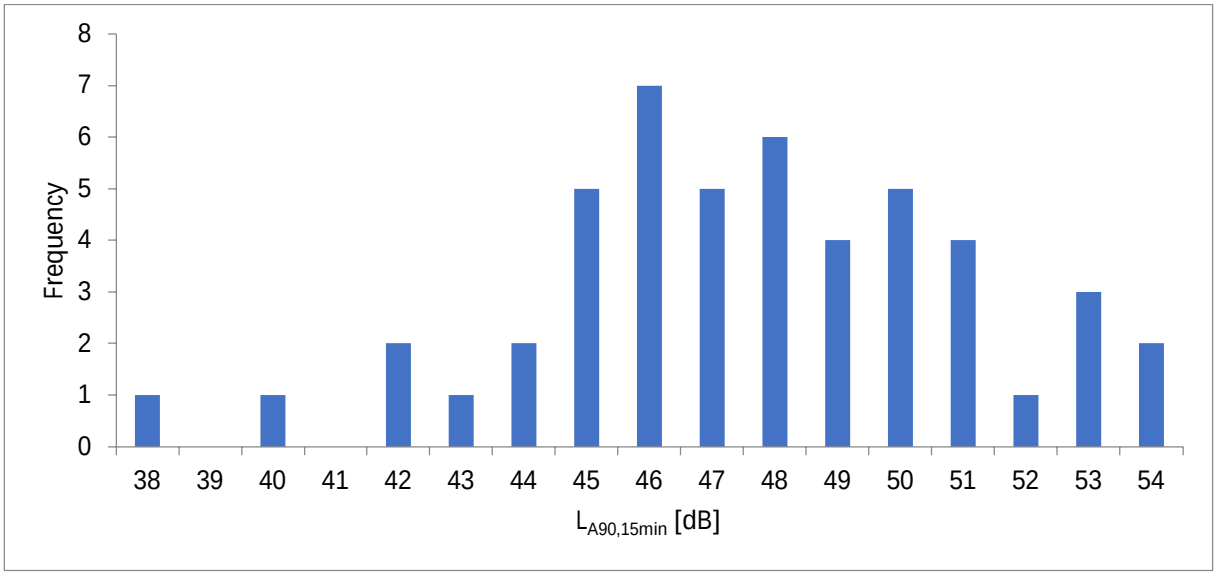

Figure 7 - Statistical Analysis of Background Sound Levels at Measurement Position 1 (Weekday) – Median value 48dB

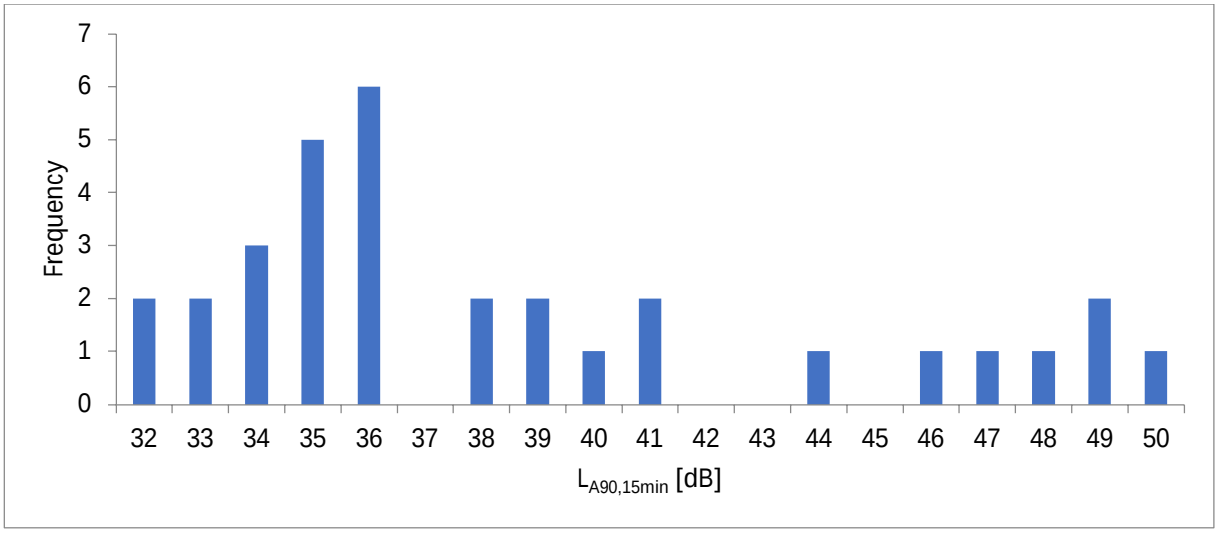

Figure 8 - Statistical Analysis of Background Sound Levels at Measurement Position 1 (weekday night) – Median value 36 dB

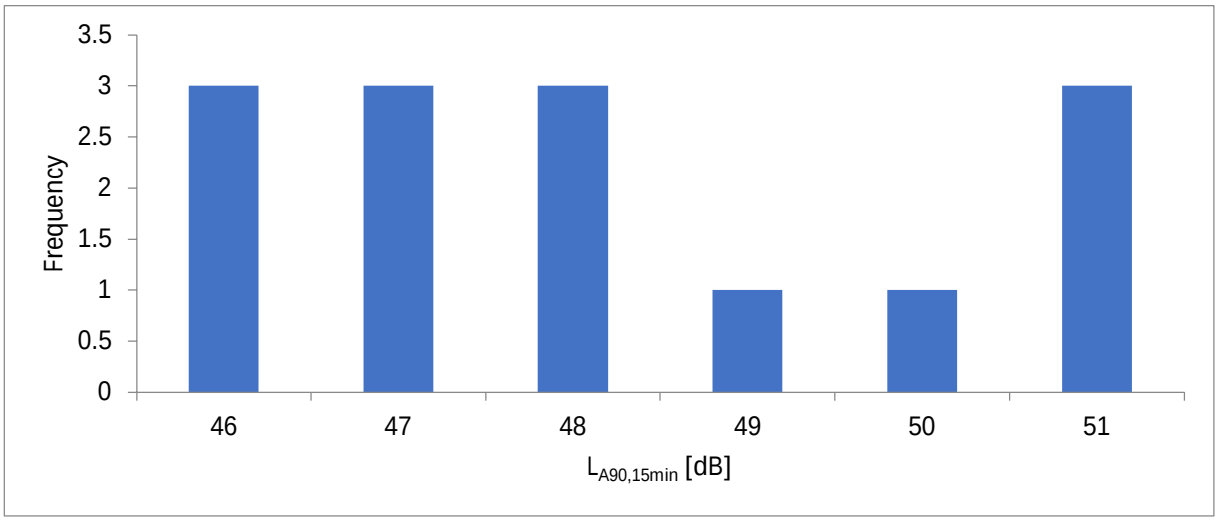

Figure 9 - Statistical Analysis of Background Sound Levels at Measurement Position 1 (weekend day) – Median value 48 dB

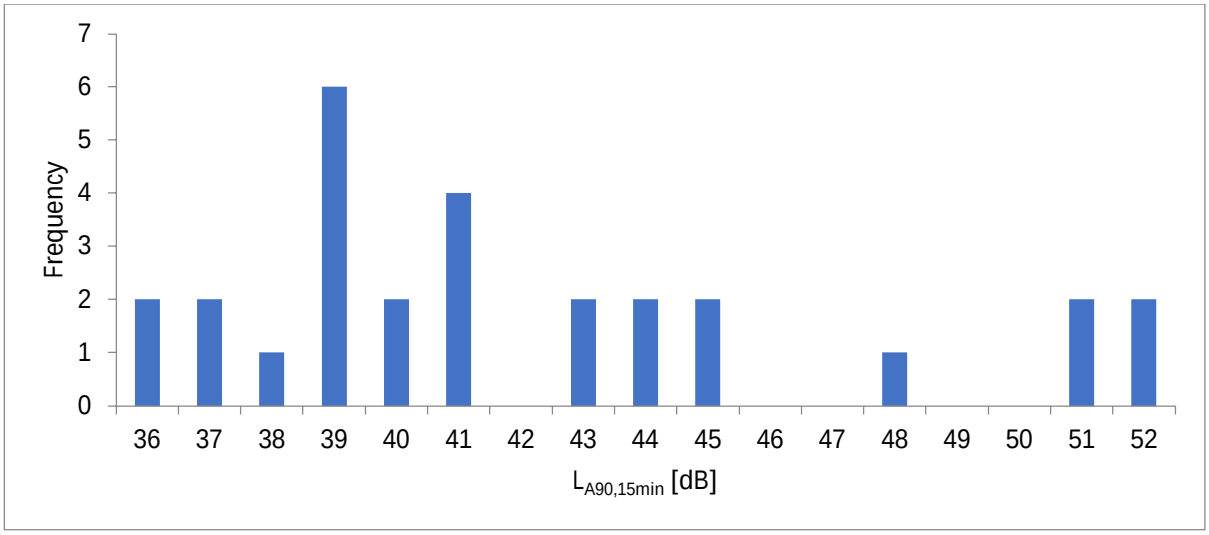

Figure 10 - Statistical Analysis of Background Sound Levels at Measurement Position 1 (weekend night) – Median value 41 dB

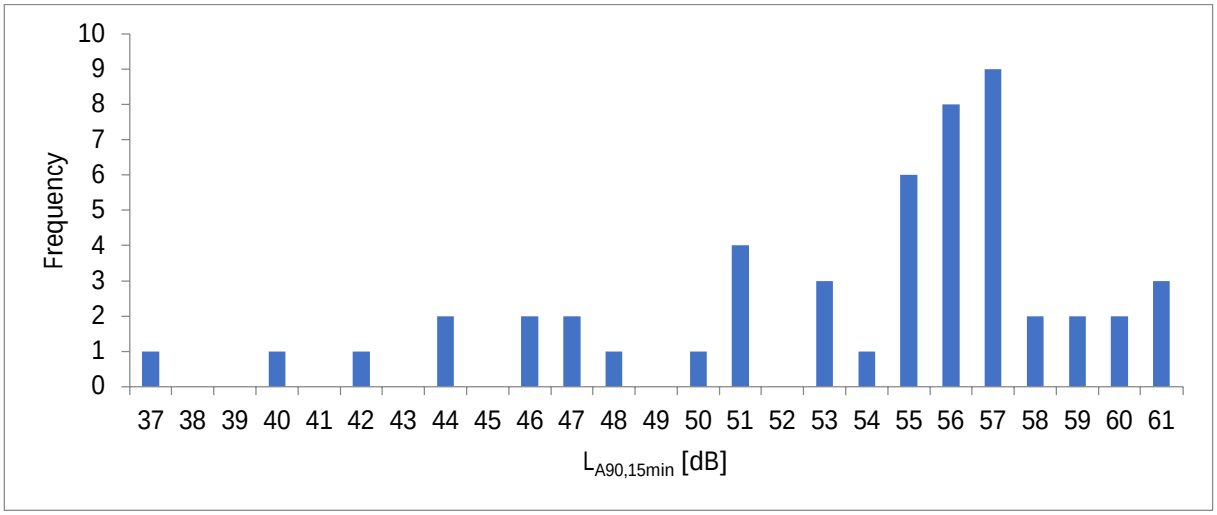

Figure 11 - Statistical Analysis of Background Sound Levels at Measurement Position 2 (weekday day) – Median value 56 dB

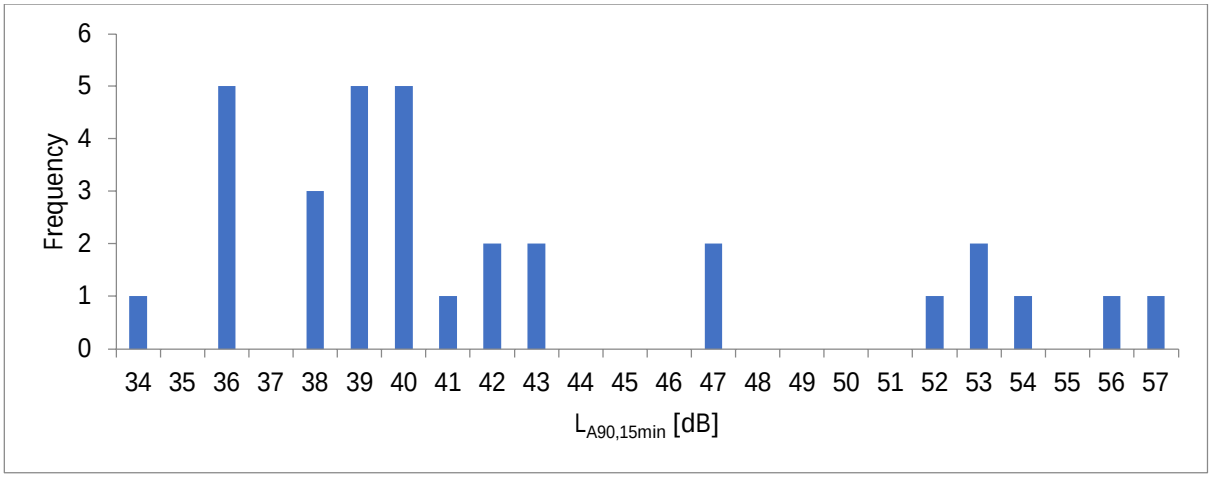

Figure 12 - Statistical Analysis of Background Sound Levels at Measurement Position 2 (weekday night) – Median value 40 dB

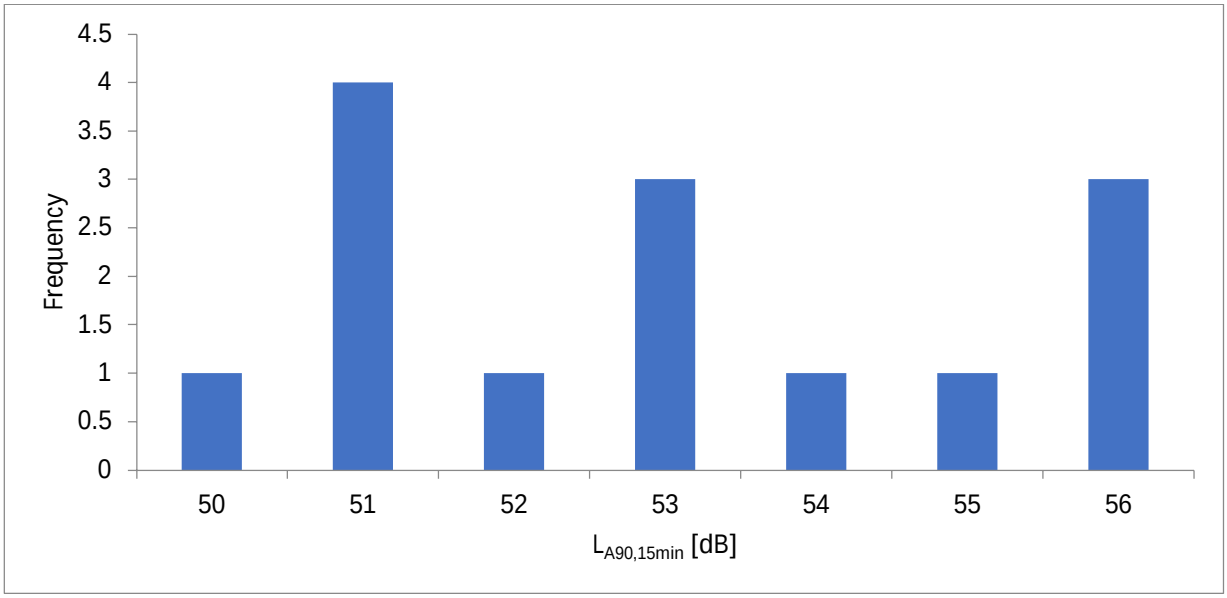

Figure 13 - Statistical Analysis of Background Sound Levels at Measurement Position 2 (weekend day) – Median value 53 dB

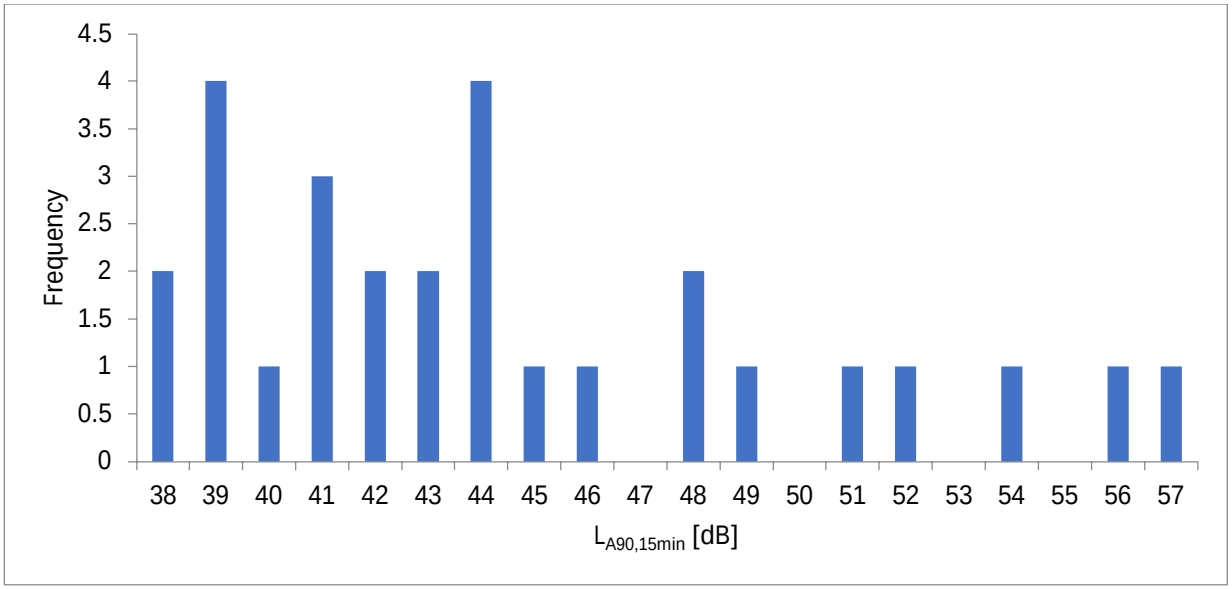

Figure 14 - Statistical Analysis of Background Sound Levels at Measurement Position 2 (weekend night) – Median value 44 dB

In order to determine the typical background sound level for the purposes of the BS 4142:2014+A1:2019 assessment, taking into account that some of the periods have bi-modal or flat frequency histograms, we have taken the median value of the $L_{A90,15min}$ measurements taken over the period considered. For the Residual Sound we have taken the overall L_{Aeq} sound pressure level at each location for the same period.

Table 4 - Representative Background and Residual Levels

	Background Sound Level L_{A90}	Residual Sound Level L_{Aeq}
Pos 1 weekday day	48	53
Pos 1 weekend day	48	52
Pos 1 weekday night	36	45
Pos 1 weekend night	41	49
Pos 2 weekday day	56	61
Pos 2 weekend day	53	59
Pos 2 weekday night	40	54
Pos 2 weekend night	44	56

Typical L_{A90} values have been taken as the median value of the L_{A90} 15 minute measurements taken over the relevant periods at each location.

5.2 Specific Noise Levels

Sound power levels due to the wash plant have been determined from measurements taken by PDA Ltd of similar plant operating at other aggregate processing sites. The measured sound pressure levels are indicated in Table 5 below. These have been used in a Soundplan propagation model to determine the sound power of the wash plant, treated as two line sources, for the main wash plant (feed end) and aggregate screen (output end).

Table 5 – Measurement of existing wash plant

Measurement	Distance (m)	dB(A)	dB(Z)							
			63	125	250	500	1000	2000	4000	8000
Main plant (feed end)	20	77	80	77	74	69	71	72	68	63
Aggregate screen (output end)		74	78	74	71	69	69	68	65	61

We have also determined the sound power of: a typical crusher (crushing recycling / demolition waste); a loading shovel operating; and of an aggregate lorry travelling around a site, by measurement at another aggregate site. These sound power levels are indicated in Table 6 below:

Table 6 – Sound power levels determined from existing plant

Measurement	dB(A)								
	L_{WA}	63	125	250	500	1000	2000	4000	8000
Crusher	110	83	95	97	103	105	104	100	93
Loading Shovel	93	76	78	87	86	86	86	80	71
Aggregate Lorry	97	68	74	82	90	93	92	84	71

6.0 NOISE IMPACT ASSESSMENT

6.1 Specific sound propagation

The specific sound measurements shown in Table 5 have been used to develop a SoundPlan computer model which predicts the noise propagation to the nearest noise sensitive receivers. The sources for the wash plant were modelled as line sources centred 3m above ground level at the proposed location of the wash plant.

For the processing building we have calculated the reverberant sound pressure level within the building accounting for the sound power of the crusher and loading shovel within the building and assuming a typical reverberation time of 1.5 seconds across all frequency bands. Using typical sound insulation values for a single skin steel clad portal frame building and for a typical roller shutter door we have calculated the sound intensity just outside the walls, roof and roller shutter door of the building. The building has been included in the sound plan model with an area source for each wall and the roof of the building to model the sound propagation of the building. The sound insulation values used for the walls, roof and door of the building are indicated in Table 7 below:

Table 7 – Sound reduction of proposed building cladding

Measurement	Sound Reduction Index [dB]							
	63	125	250	500	1000	2000	4000	8000
Single skin cladding (walls and roof)	10	12	13	14	18	22	25	25
Roller shutter door	18	17	19	19	16	20	27	28

In addition to the wash plant and processing building we have also allowed for the aggregate lorries delivering and / or removing aggregate from the site. Using measurements of a lorry travelling around a similar aggregate site we have modelled a line source 0.5m above ground level around the proposed perimeter service road. Using the sound-power measured of an aggregate lorry driving by we have made the conservative assumption that three lorries are operating simultaneously and continuously along the site access road during operation of the site.

Ground was modelled as hard for roads and areas of hard standing and otherwise as soft (absorbent) ground for areas of gravel and grass. Please note that the calculations follow the methodology detailed within ISO 9613-2 Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation. The method takes into account geometric spreading, shielding, reflections, ground absorption and air attenuation. The results of the Soundplan propagation model are shown in Figure 15 below.

Figure 15 – SoundPlan model - sound propagation to noise sensitive properties – Tables give sound pressure level for the indicated floor heights

Therefore based upon the above calculation the worst case specific sound level at the nearest residential receivers on Astling Green (to the north-east of the site) will be 45 dB. The worst case specific sound level at the nearest residential receivers on Deepdale Road (to the north west of the site) will be 42 dB. It is also noted that worst case sound levels in the closest areas of Mereside Park due to the site will be 49dB(A), and outside the Blackpool Police Headquarters building to the east of the site will be 51 dB(A).

6.2 Feature Correction

The sound due to the measured wash plant operation was a mixture of sound from various motors, pumps, conveyor / elevators and vibrating screens. Overall the sound was broadband and continuous in nature not containing any significantly tonal or impulsive sounds. It was also noted that the plant operated continuously once turned on and was not intermittent. As such, the feature corrections for tonality, impulsivity and intermittency were not applicable to the source. The sound from the crusher operation is at a lower level than the wash plant, being attenuated by the enclosing building and is unlikely to include features which would require a penalty after attenuation by the building envelope. It is noted that the specific sound level is well below the pre-existing background sound level at all noise sensitive residences and as such there is not likely to be any strongly perceptible features at the noise sensitive residences. As such, considering the relatively high level of masking provided by existing road traffic noise we do not consider any feature corrections to be appropriate in this case.

6.3 Preliminary Impact Assessment

Please refer to the table below which details the results of the modelling calculation described above and compared these Rating Levels with the Background Sound Levels derived within Section 5.1.

Table 8 - Comparison of Proposed Operations with background sound levels during the day

Noise Sensitive Receiver	Predicted Specific Sound Level $L_{Aeq,T}$ (dB)	Feature Correction	Rating Level L_{Ar} (dB)[1]	Representative Background during operating hours (daytime) $L_{A90(15\text{-}min)}$ (dB)	Difference between Rating Level and Background (dB)
Pos 1 – Astling Green	45	+0	45	48	-3
Pos 2 – Deepdale Road	42	+0	42	53	-9

It is noted that BS4142 indicates the following:

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 initial estimate of impact indicates that the nearest noise sensitive residences are below the level of 'low impact' and well below the level where the onset of 'adverse impact' is indicated.

In accordance with BS4142:2014+A1:2019 the above preliminary estimate needs to be adjusted if required after consideration of context which is discussed further in the section below.

7.0 MITIGATION

Initial mitigation has already been undertaken at the design stage in the form of enclosure of the crusher in a building at the site. Considering the results of the preliminary noise impact assessment above, no further mitigation is required other than the general operational requirements which are set out in the Noise Management Plan for the site.

8.0 CONTEXT

The BS4142 initial estimate 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 Rating Level of 45 dB is well below the WHO Guidelines for Community Noise 50 dB criterion for moderate annoyance in outdoor living spaces, such that during the quieter periods when the plant might be audible, the levels will remain below the 50dB moderate annoyance criterion.

The Rating Level of all of the receivers is below the Background Level and in accordance with BS 4142:2014+A1:2019 this represents a 'low' impact.

When we consider the residual sound level, it is noted that the residual sound level is well above 50dB at the nearest residential locations during the proposed operating hours of the plant, with the residual sound dominated by road traffic noise from both busy local roads and the nearby end of the M55 motorway.

Taking into account all of the above contextual features, we are of the opinion that the preliminary impact of the proposed development at all nearby noise sensitive receivers, after context has been taken into account, remains very low.

9.0 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.

9.1 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 close to the nearest residential receivers.

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

9.2 Uncertainty in Sound Power Levels

The noise emissions from the proposed plant has been measured in-situ in normal operation at a similar aggregate recycling facility, 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.

We would therefore consider that the uncertainty of the determination of the source sound powers would be minimal.

9.3 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.

10.0 NON RESIDENTIAL RECEIVERS

The above assessment has shown that the commercial / industrial sound from the proposed development has a predicted ‘low’ impact at the nearest residential receivers. It is noted however, that BS 4142:2014 is specifically for the assessment of the impact of commercial and industrial noise on residences, where people live and are expected to require periods of quiet rest (during the day) and sleep at night. For non residential uses, other less stringent criteria are appropriate to determine the assessment of impact.

10.1 Blackpool Police Headquarters

The nearby Blackpool Police Headquarters building is essentially an employment building in office use. Suitable acoustic criteria for various building uses are given in BS 8233:2014 “Guidance on Sound Insulation and Noise Reduction for Buildings”. For office uses the standard gives suitable criteria for unoccupied sound levels in open plan offices of 45 – 50 dB(A), and for executive offices of 35 – 40 dB(A). We note that the façade of the building is sealed indicating that the spaces are mechanically ventilated (see Figure 16). As such we would expect at greater than 20dB reduction from sound levels outside to inside, which would therefore result in noise levels due to the proposed use of less than 30dB(A) internally, which is well below the recommended sound level criteria for office spaces.

We also note that the residual sound levels close to the roads (e.g. at Position 2) are around 60dB(A), as such the sound from the proposed development is approximately 10dB or more below the residual level and hence is unlikely to be audible at this receiver due to the masking residual noise from road traffic.

Figure 16 – Blackpool Police Headquarters building

10.2 Mereside Park

Worst case sound levels due to the proposed development at the closest area of Mereside Park are predicted to be around 49dB. We note that this is below the 50dB(A) criterion of the World Health Organisation Guidelines for Community Noise for outdoor living spaces. Also it is well below the residual ~60 dB(A) measured close to the roads (at Position 2) and hence the sound from the proposed development is unlikely to be significantly audible at Mereside Park, in addition to meeting the criterion for outdoor living spaces at times where it may be audible.

11.0 EMERGENCY ACCESS

We note that it is proposed that outside normal operating hours emergency access may be required for lorries from time to time, but this would not involve operation of the processing plant. In order to assess this occasional use, we have re-run the Soundplan sound propagation model with only the lorries operating.

Figure 17 – Sound levels due to emergency access of lorries only to the site

We note that in this case, the rating levels outside the nearest noise sensitive residences remain below the background sound levels at the relevant residences during the night-times and as such the impact for emergency vehicle access remains low. We would also note that allowing for a typical 10dB reduction from outside to inside sound levels through a partially open window would result in internal sound levels of no more than 25 dB(A). As well as being below the pre-existing background sound level, and well below the Residual Sound Level, this level is below the 30 dB night-time criterion of BS 8233 for bedrooms to prevent sleep disturbance. As such the night time emergency use of the site is unlikely to be audible at the nearest noise sensitive residences due to the masking of the existing road traffic noise, and also is below the level which would cause sleep disturbance.

12.0 MITIGATION

Initial mitigation has already been undertaken at the design stage in the form of enclosure of the crusher in a building at the site. Considering the results of the noise impact assessment above, no further mitigation is required other than the general operational requirements which are set out in the Noise Management Plan for the site.

13.0 CONCLUSION

At the request of JN Civils Ltd, a noise impact assessment has been undertaken of the proposed aggregate recycling facility at Olympic Way, Blackpool.

A noise survey has been conducted at locations representative of the nearest noise sensitive properties to the proposed plant. The results of the survey have been used to assess the background sound at the nearest noise sensitive receptors and to determine the likely impact of the proposed use in terms of noise.

The Assessment has been undertaken following the guidance contained within BS4142:2014+A1:2019 –*'Methods for rating and assessing industrial and commercial sound'*.

We have estimated the likely noise levels generated by the operation of the proposed recycling plant, and using this data we have calculated the expected noise level at the nearest noise sensitive receivers.

The results of the preliminary calculation of impact in accordance with BS 4142:2014+A1:2019 has indicated that the impact of the proposed development will be 'low' depending on context.

For all of the nearest noise sensitive properties the Rating Level is below the Background Level.

When context is taken into account, the impact of the proposed development remains 'low'.

The impact of the proposed development on the office use of the Blackpool Police Headquarters, and on the recreational use of the Mereside Park are also predicted to be low, and the development is unlikely to be significantly audible.

As such, there is no reason on account of noise that the development may not be permitted.

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.