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ENVIRONMENT

Biffa Waste Services

Lamby Way, Cardiff

Noise Impact Assessment

BMP2054

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ENVIRONMENT

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Lamby Way, Cardiff

Noise Impact Assessment

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Notice

EXECUTIVE SUMMARY

BWB Consulting Ltd has been appointed by Biffa Waste Services to undertake a noise impact assessment to support an Environmental Permitting application for a Waste Centre at Lamby Way, Cardiff.

The results of a detailed noise modelling exercise undertaken by BWB have been assessed against relevant guidance and the results of a baseline noise survey at the nearest noise sensitive receptors.

The results of the assessment indicate that, based on the current design, appropriate noise levels are likely to be achieved at nearest noise sensitive receptors.

Adopting an active approach to noise management, it is considered that the site is low risk from a noise perspective.

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1. INTRODUCTION

Appointment & Background

1.1 BWB Consulting Ltd has been appointed by Biffa Waste Services to undertake a noise impact assessment to support an Environmental Permitting application for waste transfer services at Lamby Way, Cardiff.

1.2 The results of a detailed noise modelling exercise undertaken by BWB have been assessed against the appropriate British Standard following a series of baseline noise measurements at nearest noise sensitive receptors.

1.3 This report is necessarily technical in nature, so to assist the reader, a glossary of acoustic terminology can be found in **Appendix A**.

The Development

1.4 The Site is located to the north of Lamby Way in Rumney, Cardiff (CF3 2ET). The site is located within the north-eastern extents of Cardiff, approximately 500m south of Rumney. The site lies within a predominantly urban environment with industrial buildings and residential properties dominating the wider surrounds. The site is bordered by other industrial and commercial buildings of the Waterside Business Park, to the south, west and east. To the north a treeline and railway line separate the site from the residential area of Rumney. The site measured approximately 0.9ha.

1.5 The nearest noise sensitive receptors to the site are dwellings located on New Road, as close as 60 metres from the northern site boundary. The site location and nearest noise sensitive receptors are shown below in **Figure 1.1**. The layout is shown below in **Figure 1.2**.

Figure 1.1: Boundary and Existing Noise Sensitive Receptors

Figure 1.2: Site Layout

1.6 Parts of the Severn Estuary are designated a Site of Special Scientific Interest (SSSI) and a Special Protection Area (SPA). It is understood that consideration should be given to the impact from noise on populations of overwintering birds. However, given the existing uses in the area, which is predominantly of a industrial/commercial nature, it is considered that noise from the installation is unlikely to cause a significant impact on these areas. Therefore, these areas have not been considered further within the following assessment.

Previous Noise and Vibration Work

1.7 **Table 1.1** summarises the noise and vibration assessment work that has previously been undertaken to date in support of planning stage works for the development.

Table 1.1: Previous noise and vibration assessments

Planning Reference	Description	Noise and Vibration work
18/01639/MJR	Detailed Planning Application for Original Scheme	Baseline noise monitoring and assessment

1.8 The original noise assessment work has been accepted by Cardiff Council, and the previous application has been approved.

1.9 With respect to elements relevant to the Environmental Permit application, the assessment work considered the baseline noise conditions, noise from equipment associated with the waste transfer centre, including a reciprocal saw, shredder and forklift truck movements, and noise from HGV deliveries to and from the Proposed Development inside the installation boundary.

Planning Obligations

1.10 The current extant planning consent includes a noise related planning condition that is reproduced below:

> "4. Noise emitted from fixed plant and equipment on site shall achieve a rating noise level of background -10dB at the nearest noise sensitive premises when measured and corrected in accordance with BS 4142:2014 (or any British Standard amending or superseding that standard).
>
> Reason: To ensure that the amenities of occupiers of other premises in the vicinity are protected in accordance with Policies KP5 and EN13 or the Cardiff Local Development Plan 2006-2026".

2. STANDARDS AND GUIDANCE

Welsh Government Noise and Soundscape Action Plan 2018 – 2023

2.1 This document sets out a common approach as to how environmental noise is managed in Wales. The section on industrial noise, which has been provided by Natural Resource Wales (NRW), makes reference to Horizontal Guidance Note for Noise and BS4142:2014. These are detailed below.

Horizontal Guidance Note for Noise Part 2 – Noise Assessment and Control (H3 Part 2)

2.2 The document outlines permit conditions and regulation of noise. It also describes the principles of noise measurement and prediction, and the control of noise by design, operational and management techniques and abatement technologies.

2.3 This guidance has been produced by the Environment Agency for England and Wales in collaboration with the Scottish Environment Protection Agency (SEPA) and the Northern Ireland Environment and Heritage Services (EHS). The purpose of the guidance note is to provide supplementary information, relevant to all sectors, to assist applicants in preventing and minimising emissions of noise and vibration as described in the Environmental Permitting Sector Guidance Notes.

2.4 The document identifies that an assessment of noise will be very site-specific and will depend upon many factors but that, generally speaking, more data will be needed to assess an impact than to assess the risk of an impact. The document states that noise sources can be ranked in a number of ways:

- By noise level
- By rating level in accordance with BS 4142:1997 (superseded by the 2014 and 2019 versions)
- by the distance from the sensitive receptors, or proximity to the site boundary — or likelihood that the noise will travel long distances (for example, low–frequency noise) might be used to give an estimation of the impact
- sources that operate at night or at weekends
- the source associated with the worst complaint record
- threat of Regulatory action, or previous Regulatory action where the problem may have relapsed

2.5 To determine whether a more stringent level of control is required, it will be necessary to identify the required end-point or desired noise output from the process at the sensitive receptors. To achieve this, each source may have to be addressed individually.

2.6 The performance required to achieve a reduction in emissions will be determined by Permit conditions, and the need to achieve Best Available Techniques (BAT) for a particular operation. For any remedial option, an assessment of the costs and benefits should be undertaken to inform the final selection. In many cases the decision will be straightforward, but in others it will not be clear-cut. Several factors may have to be balanced. Noise must also be balanced alongside other emissions and environmental

impacts in determining BAT for a particular installation. Conflict between noise and other pollutants is rare however, and it is normally a balance of costs and benefits.

Guidance on noise impact assessment involving calculations or modelling

2.7 This web-based guidance was published on 23 October 2018 and provides direction on the information that must be submitted to the Environment Agency in a noise impact assessment that uses computer modelling or spreadsheet calculations.

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

2.8 H3 Part 2 draws heavily on the BS 4142 Standard, which 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_s) 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 ($L_{Ar,Tr}$).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."

Consultation with Natural Resources Wales

2.13 A notice requiring further information was received from Natural Resources Wales (NRW), on 8th January 2021. The additional requested in relation to noise are detailed below.

- It is not clear how the potential impact of noise pollution on the internationally important populations of overwintering birds which are a designated feature of the Severn Estuary SSSI and SPA, which is situated less than a kilometre from the site at some points have been considered.
- A revised noise impact assessment must be provided that includes all the necessary information to comply with BS4142. In addition, for a site of this complexity simple noise attenuation calculations may not be sufficient and detailed noise modelling should be undertaken. The report refers to the wrong operator, the report refers to Vastint Cardiff BV when the application is from Biffa Waste Services. This also need to be amended.
- Confirm the times in which the site will be operational, paragraph 1.13 of the submitted Noise Impact Assessment report states; "It is understood that operation hours will typically be 07:00 – 16:30 Monday to Friday, however it is assumed that the Site could operate 24 hours a day, 7 days a week." All potential operating hours should be reflected in the assessment. Following recent discussions and in the revised supporting statement it has been established that the operating hours will be limited to daytime. This need to be updated in the Noise Impact Assessment.
- The Noise Impact Assessment report refers to the World Health Organisation (WHO) 1999: Guidelines for Community Noise. These guidelines are not relevant for carrying out industrial noise assessments. The latest Welsh Government Noise Action Plan should be considered. Please amend and update.
- A noise monitoring survey was carried out between the 16th and 17th February 2017 to determine the background sound level. As the survey was carried out over 3 years ago, it may not be representative of the current sound levels in the area. In addition, the survey was undertaken at the Northern boundary of the site. The background sound levels should be measured at an appropriate location(s) at or near to the closest noise sensitive receptor(s) and be representative of when the site will be operational. Also, if operational over weekends as well as weekdays, surveys should be carried out over representative times. Please address and update in revised Noise Impact Assessment.
- Table 3.2 of the Noise Impact Assessment outlines background sound levels, 16-hour and 8-hour average values have been used to assess impact in the submitted report, for this assessment the 1-hour and 15-minute average values should be used for assessing daytime and night-time impacts

respectively, in-line with the requirements of BS4142. Please review and amend in revised Noise Impact Assessment to be submitted.

- No meteorological conditions have been detailed in the Noise Impact Assessment as required by BS4142 (wind speed, wind direction, temperature etc). Please provide additional information/update amended Noise Impact Assessment.
- All sources of potentially noise generating plant/equipment/vehicles have not been identified. The Noise Impact Assessment report only identifies 3 operations; HGV loading/unloading including forklift truck movements, skip delivery/removal and reciprocal saw use. However, paragraph 4.1 states; "It is anticipated that there may be fixed plant and equipment associated with the Proposed Development that have the potential to generate noise. At this stage of the development, 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 should conform. These limits should include any appropriate corrections for acoustic characteristics." This is not an acceptable approach, as all plant/equipment whether inside a building or not should be clearly identified and assessed for impact, this includes all vehicle movements on site, the exact location of the items of plant on site should also be presented in the assessment (including drum crusher and shredder). Also consider reverse alarms on vehicles. Please update and amend Noise Impact Assessment. In the event that future changes to operations require different or additional equipment, a new noise assessment should be submitted in support of any required permit variation.
- The report states that a survey was carried out on the existing site to obtain sound levels of the 3 operations assessed, however, in Table 4.2 of the Noise Impact Assessment only the measurement of the HGV loading/unloading including forklift truck movements have been used, the skip delivery/removal has been taken from library values and the reciprocating saw has been obtained from BS5228:A1:2014. Confirm why these values have been used and not the actual measured values.
- There is a drum crusher in one of the storage bays – this is used for 20 to 30 minutes per week at most. It is not acceptable to rule out the drum crusher as not needed to be considered further, all noise sources should be considered. Please review and update Noise Impact Assessment. In addition, this statement contradicts paragraph 4.2 of the submitted report.
- Paragraph 4.13 of the Noise Impact Assessment states; "From the current site plan, loading bays are shown to the south east of the northern bays, and it is assumed that reciprocal saw use would be limited to areas immediately in front of bays. It is therefore assumed that the bays will be of a suitable acoustic integrity so as to provide effective acoustic screening to the nearest noise sensitive receptors from loading and cutting activities.". No detail has been provided as to the exact location, height, construction materials or acoustic properties of the bays/buildings. A 10dB acoustic correction for the screening of activities in the assessment has been used, more detailed information is required to justify this correction. Please provide details. An assumption that use of the reciprocal saw will be limited to areas potentially screened by the loading bays is insufficient on its own to justify exclusion of this source from scenarios where impacts at receptors are not subject to screening correction. Please review and amend Noise Impact Assessment.
- There is a higher annual throughput at this new proposed site at Lamby Way compared to that at the current site at Currant Embankment. From recent discussions, operations will also be limited to daytime operations. Does this mean longer

duration of activities taking place on site to account for larger throughput? Please provide more details.

- Confirm what is meant by façade level in table 3.2 of the Noise Impact Assessment Report and show on map.
- There are contradicting statements within the Noise Impact Assessment report such as discrepancies between amount of truck deliveries i.e. one or two a week or two an hour? What's been used in noise calculations? Also, inconsistencies between adding penalty for intermittency, the Supporting Statement document says no impulsivity applied which contradicts the NIA/ Noise calculations. Also need explanation for not having intermittency penalty.

2.14 Following receipt of the above, a meeting was attended by NRW to discuss the above. It was agreed that many of the points could be dealt with by providing a detailed noise model and updated noise impact assessment to support the permit application.

2.15 Due to the ongoing situation with COVID-19 affecting baseline noise levels it was agreed that undertaking a noise survey during this time may not be representative and that for the time-being the assessment should utilise the results of the previous monitoring. Should an additional survey be required at a later date, then the assessment would be updated to reflect this.

2.16 Although it is understood that there will be a higher annual throughput associated with the new proposed site at Lamby Way, the following assessment has considered the duration of the noise generating activities/equipment which have been provided by the client.

3. NOISE MODELLING

3.1 In order to predict the noise levels from the proposed development site at nearby noise sensitive receptors, 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 package;
- For industrial/commercial noise sources, the noise model was set to apply the noise prediction methodology set out in ISO 9613-2: Acoustics – *Attenuation of sound during propagation outdoors – Part 2: General method of calculation*;
- 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 Lidar data at 1m;
- Off-site buildings which would provide screening to the Site have been incorporated as reflective façades;
- To reflect the local ground cover, ground absorption was set to G = 0.5 (50% acoustically absorptive ground);
- The model was set to include second order reflected noise from solid structures;
- A 5x5m grid spacing was used at a calculated height of 1.5m above local ground height; and
- The 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.

Source noise data

3.2 From discussions with the Client, it is understood that two forklift trucks, a reciprocal saw, a drum crusher and a shredder will be in use at the Lamby Way site. The following information has been provided:

(i) There will be three skips in the skip yard area, all other areas will be palletised waste.
(ii) The reciprocal saw is mobile and will be used throughout the site, and the drum crusher and shredder will be located in the process bays.
(iii) The drum crusher will be used for two hours a week (20-30 minutes per day).
(iv) The shredder will be used for two hours a week (20-30 minutes per day).
(v) There will be one HGV visiting the site per hour, and one skip vehicle per day.
(vi) Each delivery will take up to one hour, and engines will be switched off during loading/unloading.

3.3 From observations undertake at a similar site, the following has been included within the assessment;

(i) The reciprocal saw is used in the yard to strip parts when necessary – it is used for approximately 30 minutes per week.
(ii) Skip wagons visit the site to load/unload skips – from onsite observations at a similar site, the process takes around 10 minutes.
(iii) During each delivery, forklifts are operating continuously in the area.

3.4 In the absence of specific noise data, noise data has been gathered from other representative sources, including BWB library data and BS5228:2019+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1:Noise.

3.5 A summary of the octave band line source noise data utilised within the operational noise assessment is presented in **Table 3.1** below.

Table 3.1: Octave band data for line sources associated with known operations, at 10m

Source	Octave Band Sound Pressure Levels (L_{Amax} dB)								dB(A)
	63 Hz	125 Hz	250 Hz	500 Hz	1kHz	2kHz	4kHz	8kHz	
HGV Movement (BS5228 Table C6 Row 21 Road Lorry Full)	96	82	74	73	77	72	71	64	80
Forklift truck movement	Based on BWB library data for overall L_{Amax}. As there is no octave band spectral data available for the forklift truck movements, the same spectral shape has been used for this source								82.1

3.6 For HGV and forklift truck movements, the calculations detailed in BS5228:2019+A1:2014, for calculating sound power levels (SWL) from mobile plant and haulage routes have been used, which are reproduced in equations (a) and (b) below.

(a) $SWL = L_{Amax@10m} + 28$

(b) $L_{Aeq} = SWL - 33 + 10\log(Q) - 10\log(V) - 10\log(d)$

Where Q is the flow (number of vehicles per hour), assumed to be 4 HGV movements per hour (associated with the arrival and departure of an HGV and skip vehicle) and 10 forklift truck movements per hour;
V is the average spend of the vehicles in km/h, assumed to be 8km/h; and
D is the distance (m) of the receiver position, assumed to be 10m.

3.7 Octave band levels from **Table 3.1** have been modelled without the installation in place and corrected to provide the equivalent overall $L_{Aeq,T}$ levels at 10m presented in **Table 3.2**.

Table 3.2: Equivalent $L_{Aeq,T}$ noise levels at 10m associated with known line sources, dB(A)

Noise Source	L_{Aeq} @10m (dB)
HGV movement	62
Forklift Truck Movements	68.0

3.8 For the point sources, sound power levels have been calculated using equation (c), which is detailed below.

(c) SWL = $L_{Aeq@10m}$ + 28

Table 3.3: Adopted noise emission data for noise sources associated with known operations, dB(A)

Noise Source	L_{Aeq} @10m (dB)	Sound Power Level, L_W (dB)	Typical Duration	On-time Correction	Source
Loading/ unloading using forklift trucks	62.6	90.6	60 minutes	N/A	BWB Library Data
Roll on/roll off vehicle loading and Unloading	70.1	98.1	10 minutes	-7.8	BWB Library Data
Reciprocal saw use[3]	79.0	107	5 minutes[5]	-10.8	BS5228 Table C4 (Row 72)
Drum Crusher	55.0	83.0	30 minutes	-3	Phoenix Compactors and Balers (https://www.phoenixcompactors.co.uk/products/drum-crusher)
Shredder	-	116	30 minutes	-3.0	Doppstadt 635 Shredder

3.9 Octave band levels for the equipment are shown below in **Table 3.4**. It has not been possible to source octave band data for the drum crusher, therefore an octave band frequency of 1KHz has been used, based on site observations.

Table 3.4: Octave band sound power levels for point sources

Source	Octave Band Sound Power Levels (L_W dB)									dB(A)
	31.5Hz	63 Hz	125 Hz	250 Hz	500 Hz	1kHz	2kHz	4kHz	8kHz	
Loading /unloading using forklift trucks	95	92	91	92	87	86	81	79	71	91
Roll on/Roll off	97	105	98	96	96	93	91	87	78	99
Reciprocal Saw	-	97	103	105	102	99	98	102	97	107
Shredder	108	126	120	114	114	110	106	102	96	116

3.10 The assessment has been based on the following assumptions:

- From the current site plan, loading bays are shown to the south east of the northern bays. It is understood that the reciprocal saw is mobile, however for the purpose of this assessment it is assumed that reciprocal saw use would be limited to areas immediately in front of the bays;
- From discussions with the client it is understood that there will be three skips located in the skip area. Therefore, for this assessment, the noise source has been placed in the area of bay 17;
- It is understood that the drum crusher and shredder will be located in the process bays;
- During a typical 1-hour daytime period there will be 1 HGV delivery, 1 skip delivery, 5 minutes of reciprocal saw use, 30 minutes of drum crusher use and 30 minutes of shredder use;
- The shredder, reciprocal saw, and drum crusher are located at a height of 1m and are treated as point sources. The route of the forklift trucks and HGVs are located at a height of 0.7m and 1.5m respectively and are treated as a line source. The unloading/loading is treated as a point source, with a height of 1.5m; and
- It has been assumed that the structures associated with the storage facility and process facility are open on one side, and these have been incorporated into the model as barriers, with a cantilever to reflect the roof element.

3.11 Waste operations at the site will operate during the following times;

- Between 0800 hrs and 1800 hrs Monday to Friday; and
- Between 0800 hrs and 1300 hrs on Saturdays and Sundays.

3.12 All other activities will operate between 0800 hrs and 2000 hrs, which includes any maintenance activities.

4. NOISE ASSESSMENT

4.1 The results of the noise modelling exercise have been used to compare the predicted noise levels against the existing background noise levels at the nearby receptors.

Baseline noise monitoring

4.2 To inform the assessment, a detailed baseline noise survey was undertaken at the Site. This survey was undertaken to determine the current prevailing noise climate at the nearest noise sensitive receptors to the installation.

4.3 This survey was conducted between approximately 13:30 hours on Thursday 16th February and 12:30 hours on Friday 17th February 2017.

4.4 The adopted noise survey measurement location, which was considered to be representative of the nearest noise sensitive receptors, is shown in **Figure 4.1**, and described as follows:

- **Measurement Location 1** (ML1) a free field location at the northern boundary, approximately 28 metres to the south of the nearest rail line.

Figure 4.1: Noise monitoring location

4.5 The measurement location was used to collect long-term, unmanned measurement data representative of the existing noise climate at receptors to the north of the rail line over continuous periods of the daytime, evening and night-time. All measurements were subject to free-field conditions.

4.6 It was observed during installation and recovery of the equipment that, during the daytime, the main source of noise in the area was rail traffic including a mix of passenger trains every few minutes and occasional freight train pass-bys noted. It was also noted that a freight train was being held at the measurement location for a short period during

the collection of the equipment. In addition, there were regular vehicle movements on the business park roads and the background noise level was perceived to be dominated by distant road traffic noise. There was negligible noise noted from the surrounding existing businesses.

4.7 During a visit to the nearest existing dwellings on New Road it was noted that the noise climate was dominated by road traffic on New Road. There are several shop units with associated fixed plant on New Road and this was audible at times from the measurement location.

4.8 Over the course of the baseline noise survey, meteorological conditions remained conducive to environmental noise measurement, remaining dry and winds ranging from still conditions to a light breeze. On setting up of the equipment, the wind was predominantly from the west and was noted to be between 1m/s and 2m/s. Conditions were dry and cloudy. On collection of the meter, conditions were dry with approximately 50% cloud cover.

4.9 The noise survey was carried out using the type 1 specification noise measurement equipment detailed in **Table 4.1** below.

Table 4.1: Noise Measurement Equipment

Equipment	Make and Model	Serial Number
Sound Level Meter	01dB DUO	10129
Calibrator	01dB-Stell Cal21	34323957

4.10 The meter had been calibrated to traceable standards within the preceding two years and the calibrator within the preceding 12 months. The noise meter was calibrated both prior to and upon completion of the survey and no significant drift was noted.

4.11 The measured noise levels are presented in **Table 4.2** below.

Table 4.2: Noise Measurement Results, dB(A)

Period	Sample Period	$L_{Aeq,T}$	$L_{A90,T}$	Typical L_{AFmax}
Daytime (07:00 – 23:00)	16-hour[2]	60.9	47.7	-
	1-hour range	58.9 – 62.6	45.0 – 51.6	-
Night-time (23:00 – 07:00)	8-hour	58.1	41.9	81.0
	15-minute range	42.7 – 63.1	40.1 – 48.7	-

[1] The typical L_{AFmax} has been defined by the 10th highest maximum 1-second noise level associated with discrete events.

[2] Data collected over a 14-hour period is considered representative of the full 16-hour period.

Determination of background sound levels

4.12 For existing noise sensitive receptors located near to the northern boundary of the Site, the noise measurements from Measurement Location 1 are considered to be representative of the existing noise climate in these areas.

4.13 BS 4142 advises that the measurement time interval for background noise measurements should be 'should be sufficient to obtain a representative or typical value of the background sound level'.

4.14 Consideration has been given to the appropriate background sound levels, and an analysis is provided in **Table 4.3** below.

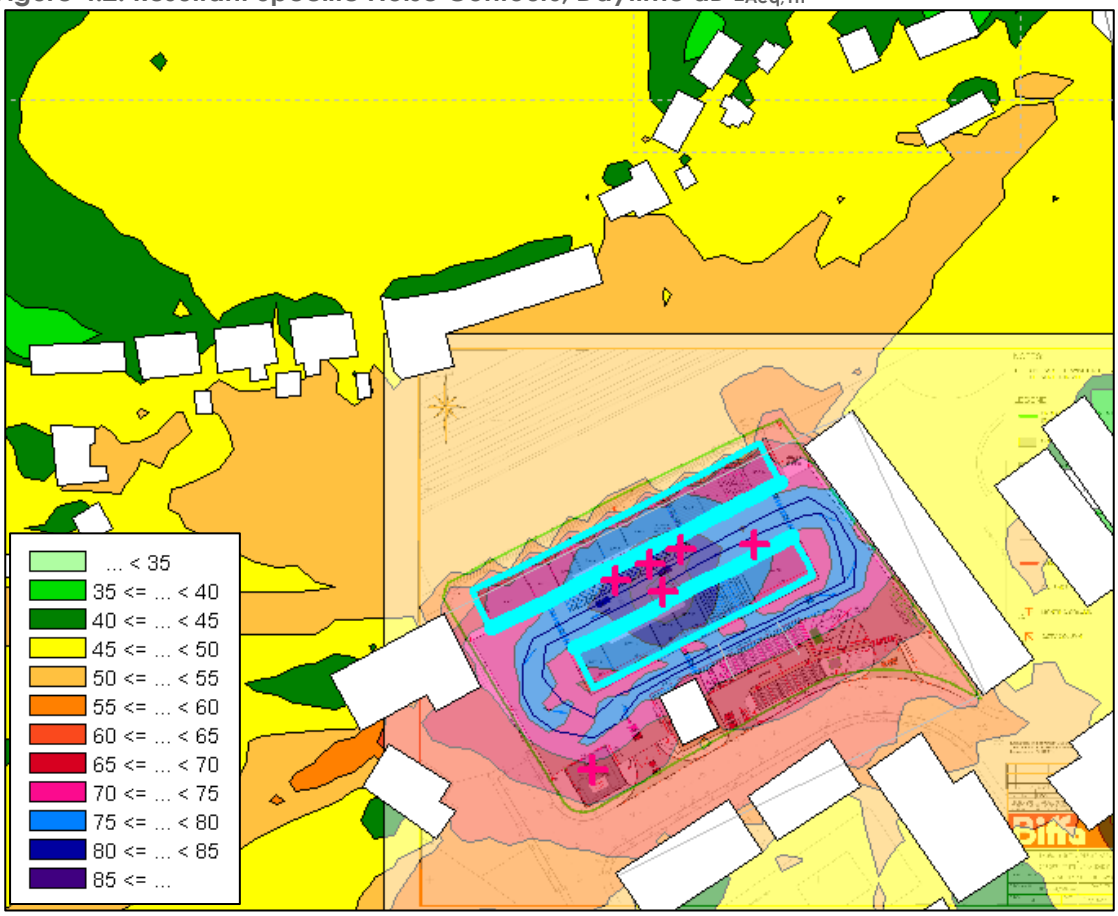
Table 4.3: Determination of background sound levels

Parameter	Daytime (0700-2300)
Minimum	45 $L_{A90,1hr}$
Maximum	52 $L_{A90,1hr}$
Linear average	49 $L_{A90,1hr}$
Most common	50 $L_{A90,1hr}$
Period $L_{A90,T}$	48 $L_{A90,16hr}$
Selected background sound level	**49 $L_{A90,T}$[1]**
[1] based on the linear average L_{A90} value	

Assessment of normal site operations

4.15 For the purposes of the assessment, the predicted noise levels associated with operational noise have been predicted in outdoor living areas at a height of 1.5m for the daytime period only. The assessment has been undertaken in accordance with BS 4142:2014+A1:2019. As the specific noise levels are significantly below the ambient measured noise levels at ML1 and given the intervening distance between the nearest receptors and installation boundary, no character corrections have been applied. Furthermore, the bay areas are screened from nearby receptors, with a small number of receptors only having a direct line of sight to the internal road. **Figure 4.2** shows the resultant noise contours at 1.5m above local ground height.

Figure 4.2: Resultant Specific Noise Contours, Daytime dB $L_{Aeq,1h}$



4.16 The highest predicted specific noise level at the receptors to the north east is 51 dB(A), equating to a rating level of 51 dB(A). The defined background noise level during the daytime is 49 dB $L_{A90,1h}$ for the daytime. Therefore, the daytime BS4142 assessment is **2 dB above background** which indicates a **low** impact.

4.17 The highest predicted specific noise level at the receptors to the north west is 51 dB(A), equating to a rating level of 51 dB(A). The defined background noise level during the daytime is 49 dB $L_{A90,1h}$ for the daytime. Therefore, the daytime BS4142 assessment is **2 dB above background** which indicates a **low** impact.

4.18 It is therefore considered that mitigation is not considered warranted at this time. However, it is worth noting that should the shredder be similar to the one included within the assessment, then its placement should be limited to bays 13 and/or 14 to ensure maximum benefit from screening by the development itself.

4.19 There are a number of assumptions in the acoustic data regarding the make-up of the building facades, as well as the selection of equipment itself. It is important to note that the assessment is based on a number of assumptions regarding noise output of candidate items of plant which will be subject to final selection.

5. BAT

5.1 The design of the Waste Centre is employing basic good practice measures to control noise. This involves consideration to the orientation of the installation, the implementation of a one-way system around the site for vehicles and placing on-site structures between the noise sources and nearest receptors to provide some screening.

5.2 Noise from the site is anticipated to be indistinguishable against the existing ambient noise environment. The rating level of the noise as defined in BS4142:2014 will be marginally above the pre-existing background sound levels. Should the shredder be similar to the one included within the assessment, then its placement should be limited to bays 13 and/or 14 to ensure maximum benefit from screening by the development itself.

5.3 Noise modelling has been undertaken as part of the design of the site and this model is still "live" and can be periodically updated as more information is known to assist with the ongoing management of noise.

5.4 These elements comprise the indicative requirements of the permitting regulations to demonstrate the achievement of BAT for the Waste Centre. This, together with the information contained within this report on background noise levels, noise source information and methods of noise control, should ably demonstrate to the EA that BAT has been achieved for this project.

6. CONCLUSION

6.1 BWB Consulting Ltd has been appointed by Biffa Waste Services to undertake a noise impact assessment to support an Environmental Permitting application for a Waste Centre at Lamby Way, Cardiff.

6.2 The results of a detailed noise modelling exercise undertaken by BWB have been assessed against relevant guidance and the results of a baseline noise survey at the nearest noise sensitive receptors.

6.3 The results of the assessment indicate that, based on the current design, there will be, at worst, a low impact from noise on local receptors.

6.4 It is considered that the site is low risk from a noise perspective.

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 (2x10-5Pa).
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_{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_{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.

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