



NOISE AND VIBRATION IMPACT ASSESSMENT



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Reviewed by	Tom Meads	28/02/2025	<i>T Meads</i>
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1 INTRODUCTION:

This Noise Impact Assessment (NIA) has been updated to align with BS 4142:2014+A1:2019, which sets out methods for rating and assessing industrial and commercial sound in relation to residential dwellings. This assessment considers existing background noise levels, specific sound sources from site operations, and provides mitigation where impacts may occur.

1.1 AIMS AND OBJECTIVES:

To assess potential noise impacts from operations at SGM Waste Management's site and determine likely effects on nearby sensitive receptors, primarily residential properties, in line with BS 4142:2014+A1:2019 Methods for rating and assessing industrial and commercial sound.

1.2 USE OF THIS DOCUMENT:

This document is to be used in conjunction with the following:

- Environmental Management System, EMS (SGM01)
- Non-Technical Summary (SGM02).
- Drainage Strategy (SGM05).
- Preliminary Ecological Appraisal (SGM07).
- Site Condition Report(SGM04); and
- Site Specific Risk Assessment (SGM08)
- Fire Prevention and Mitigation Strategy (SGM06).

All personnel involved in the operation of the site will be given a Toolbox Talk on the contents of the above documentation to ensure that all practices outlined are adhered to.

2 SITE DETAILS:

Sluice Farm Broad Street Common, Peterstone Wentloog, Cardiff, United Kingdom, CF3 2TN Please refer to the Site Location Plan in EMS (SGM01).

Grid Reference: ST 25327 79395

Post Code for Site: CF3 2TN

The site is located at Sluice Farm, off Wentloog Avenue, Peterson Wentloog, Cardiff. The site is accessed directly from Wentloog Avenue, via a dedicated site access. There is a secondary access into the carpark and office area of the site.

The site forms part of the family farm and is an agricultural diversification business. The area occupied by the waste management facility was previously used for horse livery, but it was found that due to the poor productivity of the ground and market forces the business was not sustainable and hence not commercially viable.



The site lies within the Peterson and Wentloog SSSI, but the site is outside the SSSI boundary and is not classified as SSSI.

3 RECEPTOR DETAILS:

The site lies within the Peterson and Wentloog SSSI, but the site is outside the SSSI boundary and is not classified as SSSI.

Nearest Noise-Sensitive Receptor (NSR): Sluice House, 25m west of the site, Figure 3. There is a further residential property on Wentloog Avenue approximately 110m from the site boundary.

The site is surrounded by the Rhymney and Peterstone SSSI and potential noise and vibration impacts need to be considered on this. Potential receptors here are birds feeding and nesting within trees and hedgerows, amphibians within the reens and terrestrial habitat, mammals and reptiles.

Noise impacts on workers at the site have been assessed via task-based Risk Assessment and have been addressed through the SGM Waste Management Health and Safety system. These will not be considered further within this plan.

4 ROLES AND RESPONSIBILITIES:

George Knight Eddins shall have overall responsibility for overseeing the management of the environmental aspects of the operation of the facility and will have responsibility for the day-to-day management of the site.

4.1 CONTACT DETAILS:

George Knight Eddins

Mob: 07491380076

Email: sgmwastemanagement1@gmail.com

5 CONTROL OF NOISE

For an impact to occur, there needs to be a source, a receptor and a pathway for the source to reach the receptor. For noise the pathway is air and for vibration the pathway is the ground and the materials within it.

5.1 ACTIVITIES LIKELY TO GENERATE NOISE

For the purpose of assessing noise and vibration emissions from the site, the following activities (sources) will be considered:



- Operation of a screen – inert construction and demolition wastes will be screened using the trommell within the Materials Recovery Facility building on the eastern side of the site. Materials will be loaded using either a 9t excavator or a telehandler. Screened materials will be segregated into stockpiles of varying materials gradings, which will be managed by the telehandler with a bucket attached. These will be loaded into bins or lorries within the MRF, or moved to the inert waste storage area.
- Excavation and loading – Materials will be stockpiled on site by type and grading. A loading shovel / excavator will be used to load materials into road wagons for transport to customers.
- Vehicle movements around the site – The HGV site access will be via the access along the western site boundary. The key receptor for these emissions will be the residential property west of the site on the western side of the Tarwick Reen.

5.2 ASSESSMENT OF AMBIENT SOUND AT IDENTIFIED RECEPTORS:

Noise monitoring was conducted at position NSM01, Figure 3. Measurements were taken under free-field conditions, 1.5 m above ground, and at least 3.5 m from reflecting surfaces. All measurements followed BS 4142 procedures:

- Equipment used: Svantek SV307A Class 1 sound level meter (IEC 61672-1 compliant.)
- Calibration: Before and after use.
- Weather: Dry with wind speeds <5 m/s.

5.2.1 Receptors

Due to the proximity of the property to the site, Sluice House will be used as the nearest receptor.

The following information was used for each receptor:

- Plant noise output at 10m (LWA)
- Plant quantity
- Percentage “on time”
- Distance from the plant to the receptor

It was assumed that the ground was hard as it is predominantly concrete slab or compacted graded stone. Calculations were undertaken with and without barrier attenuation. There is a 3.5m high landscape / screening bund along the sites western boundary, between the site and the ree and a mature Leylandii hedge between the ree and the receiver property. No allowance has been made for the attenuation effect of the Materials Recovery Facility building, inside which the Tromell will be located and the majority of the waste handling / processing operations will be undertaken.

The site is level with Sluice House at approximately the same level as the site.



6 CALCULATION OF SPECIFIC SOUND LEVEL

The Waste Management Facility is not yet operational and hence it is not possible to undertake monitoring of the Specific noise source. We have therefore used the methodology set out in BS 5228-1:2009 +A1:2014 to calculate the operational noise output of activities at the site, as the operation have a lot similarities with construction activities, including the plant and equipment used.

Within these calculations, the site has been assessed as being hard ground (concrete slab or compacted graded stone surfaces), barrier attenuation has been allowed for due to the landscape bund along the western site boundary but no attenuation effects have been allowed for the Materials Recovery Facility building or the legato concrete block dividers, which will have a significant attenuation effect within the site.

6.1.1 Results of BS 5228 Calculations for Predicted Specific Sound Level

Full calculations and results can be seen at Appendix 1.

Screening Operations

This will include the tipping of wastes within the MRF, loading of wastes into the Tromell screen, screening and re-loading inert wastes into a bin or lorry. A distance of 110m from the receiver has been assigned as the Tromell is located the eastern side of the site within the MRF building. There is also significant screening between the source and receiver in the form of the MRF building and concrete walled bays. Only the landscape bund has been considered in terms of screening.

Receptor	Predicted Specific Sound Level (dB LAeq 1hr)
Sluice House	53.5

Tipping and Loading of Lorries

We have assumed this activity will be undertaken within the Inert Waste Handling / Storage area and have assigned a source to receiver distance of 60m. In reality most of the tipping and loading activities at the site will be within the MRF. The calculation takes into account the screening effect of the environmental bund, but no other factors. Again the ground conditions have been assigned as hard, although in reality they are crushed stone, which will have an attenuation effect.

Receptor	Predicted Specific Sound Level (dB LAeq 1hr)
Sluice House	52.4

Vehicle Movements at Site Entrance

The following are the results for commercial vehicle movements entering and exiting the site at the western entrance, nearest the receiver property. We have assumed that there will be four vehicles per hour associated with SGM Waste Management's activities, each with a duration of less than 1 minute.



Receptor	Predicted Specific Sound Level (dB LAeq 1hr)
Sluice House	52.0

RATING LEVEL

The Rating Level for the site has been assessed using the Subjective Method. Noise outputs from the site will not be consistent and will vary greatly throughout the working day depending on the activities being undertaken. Operations will be the same on a day to day basis but will vary in duration and the periods of the working shift in which they are undertaken.

Key variance of noise outputs will be higher than average prominent impulses, such as the lowering of bins / skips to the ground (particularly empty skips / bins), the tipping of materials and the initial loading of inert materials into bins / wagons (there is an initial sound output as the first layer of inert material is placed onto the bed of the vehicle).

The sound of vehicles entering and exiting the site will be constant but the activity will be intermittent, with lorries only entering at approximately 15 minute intervals and taking under 1 minute to pass the eastern boundary of the site, before they move away from the receptor.

We have therefore assigned a correction of +5dB for Impulsivity.

The site will only operate during the day.

7 BASELINE NOISE MONITORING

Sluice House includes a livery, farm buildings, and horse stables. The property requires the use of a telehandler and tractor for waste removal, as well as transporting feed and bedding.

Noise and vibration monitoring was conducted to establish baseline levels, with monitors placed outside the residential property at Sluice House, seen in figure 3.

Table 1 - Measurement position

Measurement Position	Description
NMS01	<p>Measurement of sound under free-field conditions, at a height of 1.5 metres above ground level, at the Western end of Sluice House (in the centre of the outbuildings that house horse feed, and machinery). This is a residential property with commercial uses.</p> <p>The sound environment at this location was predominantly farm equipment, including a telehandler, supporting the livery. Occasional customer traffic on to the property was also observed.</p>



Figure 1 - Location of Noise and Vibration Monitor

7.1.1 Baseline Noise Monitoring

Table 2 - Summary of Baseline Noise Measurement Results

Measurement Position	Period	Day (07:00 – 23:00) – Noise Level, dB		Night (23:00 – 07:00) – Noise Level, dB	
		LAeq,T	LA90	LAeq,T	LA90
MP1	09/12/24	59.6	53.0	42.3	49.0
	10/12/24	54.8	52.2	43.6	48.7
	11/12/24	51.5	50.1	42.8	47.1
	12/12/24	55.7	51.3	42.0	43.8

8 BS4142 ASSESSMENT

The following table summarises the BS4142 assessment for each activity:

The following table summarises the BS4142 assessment for each activity:

Table 3 – BS 4142 assessment for each activity

Activity	Specific Level (dB) (Calculated)	Correction Impulsivity (dB)	Rating Level (dB)	Background LA90 (dB)	Difference (dB)	Impact Classification
Screening of CDI waste	53.5	+5	58.5	52	+6.5	Moderate impact
Tipping / Loading skips and lorries	52.4	+5	57.4	52	+5.4	Low impact
Vehicle movements	52	+5	57.0	52	+5.0	Low impact

8.1 INTERPRETATION

Each activity individually results in a moderate adverse impact at the nearest residential receptor. While none of the activities alone exceeds the background by more than 10 dB, the cumulative effect (if all occur simultaneously) would result in a significant adverse impact (+13 dB above background).

In addition to individual assessments, a cumulative assessment has been undertaken to account for the combined effect of all activities occurring simultaneously. This scenario is not possible as the plant used for the loading of lorries is duplicated with the screening of waste operation and therefore cannot operate simultaneously.

Table 4 – BS 4142 assessment of the screening of CDI Waste and Vehicle Movements Combined

Combined Specific Level (dB)	Rating Level (dB)	Background LA90 (dB)	Difference (dB)	Impact Classification
55.8	60.8	52.0	+8.8	Moderate adverse impact

These calculations do not take account of the following mitigating factors:

- The screening impact of the MRF Building;
- The screening impact of the concrete block walls within and surrounding the MRF building;
- The screening effect of stockpiles of processed inert waste within the Inert Waste Storage Yard;
- Calculations of the Specific Sound Level were made using data from Annex C of BS 5228-1:2009+A1:2014, which is conservative against noise outputs from modern plant, particularly HGVs. Unfortunately due to the variability in the operation of these vehicles, manufacturers do not publish typical sound pressure data.
- The soft ground between the western access road and the receptor;
- The attenuation effect of the reën;

The effects of these mitigating factors are difficult to predict, as they are likely to be variable, but it is anticipated that they will result in a significant reduction in noise levels received at the receptor.



- Further restrictions to working hours, to exclude unsociable hours i.e. early mornings.
- Consultation with the residents of Sluice House to avoid sensitive times.

Environmental noise monitoring should be undertaken following the procedure within Section 6 of BS 4142:2014+A1:2019 to determine the actual Specific Level for the facility. This assessment can then be repeated and the outcomes used to inform further mitigation as required.

9 BASELINE VIBRATION MONITORING

A Vibrock V901 remote monitoring unit was set up at the nearest receptor, Sluice House to undertake baseline vibration monitoring over a period of 4 days.

Table 5 - Vibrock Breach Limit

Limit Level	Start Time	End Time	Weekdays	Saturdays	Sundays
2 mm/s	00:00	23:59	Yes	Yes	Yes

9.1 DAILY MAXIMUM VALUES

All daily maximum values were below breach limits.

Table 6 - Daily maximum values

Date	Time	Parameter	Value (mm/s)
09/12/24	02:00:00	Ch1 velocity	0.422
10/12/24	10:00:00	Ch1 velocity	0.361
11/12/24	09:00:00	Ch1 velocity	0.321
12/12/24	00:00:00	Ch1 velocity	0.321



9.2 MAXIMUM HOURLY VIBRATION VALUES

Daily maximum vibration values for each hour. Results show no breach readings.

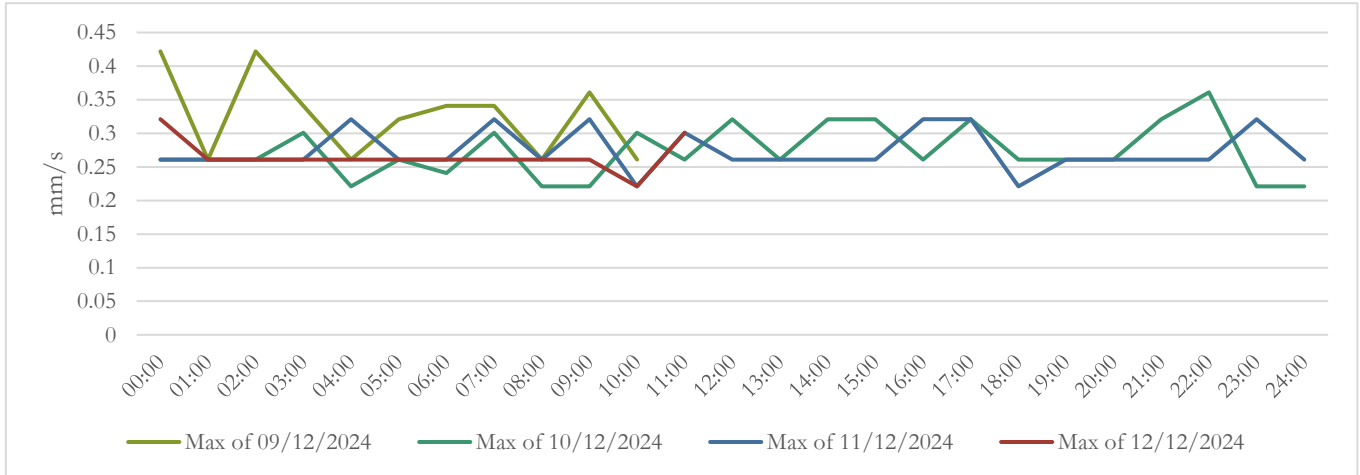


Figure 2 - Maximum hourly baseline vibration values

9.3 VIBRATION ASSESSMENT

The baseline vibration readings indicate no significant fluctuations or correlation with day or night activities. The maximum recorded value of 0.422 mm/s remained well below the breach limit.

10 ASSESSMENT OF VIBRATION IMPACTS

The threshold of perception in residential environments is identified at an exposure level of 0.3mm/s peak particle velocity (PPV) in accordance with guidance in BS 5228: Part 2. Complaint is likely where vibration exceeds 1.0mm/s PPV at residential properties but this exposure can be tolerated if prior warning and explanation has been given to residents. Above 10mm/s PPV the vibration is likely to be intolerable for any more than a very brief exposure.

BS 6472: 2008 Part 1 (Guide to evaluation of human exposure to vibration in buildings. Vibration sources other than blasting) provides guidance on human response to vibration in buildings.

BS 6472 part 1 provides guidance on assessing human response to vibration in buildings over the frequency range 0.5Hz to 80Hz. It describes frequency weighting curves for whole body vibration and introduces criteria in terms of Vibration Dose Value (VDV). VDV is a cumulative measure of the perceptible vibration experienced over a specified time period.

The document suggests that the perception thresholds in terms of vertical weighted peak acceleration for seated or standing individuals are:

- 0.01 ms⁻² – 25% of the population



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- 0.015 ms⁻² – 50% of the population
- 0.02 ms⁻² – 75% of the population

BS 6472 also advises that adverse comment about building vibrations may occur when building vibration levels are only slightly above the threshold of perception.

For the assessment of impulsive and intermittent vibration, such as occurs from construction activities, BS 6472 uses the VDV to define the relationship between disturbance and the magnitude and duration of exposure.

Activities at the site are unlikely to produce significant levels of ground-borne vibration and the underlying geology is rock overlain with alluvium, which does not readily transfer ground-borne vibration.

Due to the distances to residential receptors and the nature of the activities being undertaken i.e. no dynamic compaction activities, disturbance to residents is unlikely. Tarwick Reen will also form a barrier to ground borne vibration.

No data is available on vibration levels which are likely to cause disturbance to wildlife.

Prediction of vibration likely to be generated by certain activities is not possible due to the huge range of variables involved i.e. ground conditions, surface on which the machinery is located, nature of loading of the machinery. For example, an empty dumper will produce more ground borne vibration than a full one as it is more likely to bounce.

The best assessment of ground borne vibration from plant and activities is human perception. If it is believed that excessive vibration is being produced by the activities being undertaken, it is likely that an item of plant or machinery is not operating correctly.

Once the facility becomes operational, the residents of Sluice House will be consulted regarding potential vibration impacts. If there is a perception that vibration levels have increased since the facility has been operational, further assessment will be undertaken.

11 CONTROL OF NOISE AND VIBRATION

11.1 NOISE AND VIBRATION CONTROLS:

The following controls will be put in place to mitigate the potential impacts of noise from the operation of SGM Waste:

- The normal working hours within the Site shall be Monday to Friday between 07:30 and 17:00 hours and Saturday between 07:30 and 13:00, with no working on Sundays and public holidays.
- Consultation will be undertaken with the residents of Sluice House prior to the commencement of crushing operations.
- There is a 3.5m high landscape (acoustic screening) earth bund along the section of the western boundary adjacent to Sluice House, which overlaps the property and will



screen noise from the site. This bund has been shaped to a natural profile and is a minimum of 9m from the ree so as not to shade the ree.

- All vehicles and mechanical plant used, will be Euro 5 or 6 and shall be fitted with effective exhaust silencers and shall be maintained in good and efficient working order to ensure effective noise reduction.
- Vehicles and plant will be serviced in line with manufacturers guidance.
- All compressors shall be 'sound reduced' models fitted with properly lined and sealed acoustic covers which shall be kept closed whenever the machines are in use,
- Machines in intermittent use shall be shut down in the intervening periods between work or throttled down to a minimum. Ensure equipment is turned off when not in use.
- All audible warning systems and alarms shall be designed, where reasonably practicable, to minimise noise.
- Plant known to exhibit acoustic directivity, i.e. emit noise strongly in one direction, shall be oriented so that the noise is directed away from noise sensitive receptors;
- Items such as pumps, generators and compressors will be positioned as far away from sensitive receptors as possible. If noise levels are still too high, screening and hoarding will be used to protect the area.
- Items such as pumps, generators and compressors will be positioned as far away from sensitive receptors as possible. If noise levels are still too high, screening and hoarding will be used to protect the area.
- Where possible carry out loading and unloading during working hours and away from noise sensitive areas.
- Crushing and screening plant will be positioned to utilise the sites natural profile and existing buildings as acoustic attenuation.
- Acoustic covers to engines shall be kept closed at all times during operation.
- Materials shall be lowered where possible and not dropped. The surfaces onto which the materials are being moved shall be covered by resilient material.

11.1.1 Substitution

- Where reasonably practicable, plant and/or methods of work causing significant levels of noise and vibration should be replaced by other less intrusive plant and/or methods of working.

11.2 TRAINING:

All staff will be briefed into the contents of this plan during site inductions. Key issues they will be made aware of are:

- The receptors of noise and vibration and why they are sensitive to noise and vibration.



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- Site operational hours.
- The requirement to locate noisy activities away from sensitive receptors and positioned so that stockpiles and buildings provide screening for noisy activities.
- That plant and machinery must be shut down when not in use.
- Indicators that plant is emitting excessive noise or vibration, indicating that it is not operating correctly or that operating practices should be amended.

12 MONITORING

Environmental noise monitoring should be undertaken following the procedure within Section 6 of BS 4142:2014+A1:2019 to determine the actual Specific Level for the facility. This assessment can then be repeated and the outcomes used to inform further mitigation as required.

Vibration levels will also be monitored where appropriate. If exceedance is recorded, corrective actions will include:

- Temporary cessation of activities
- Deployment of additional barriers
- Alteration of working practices

A log of noise and vibration monitoring, equipment checks, and any complaints will be maintained and reviewed monthly.

13 CONCLUSION

This assessment, prepared in accordance with BS 4142:2014+A1:2019, identifies that the operation of the MRF, including the screening of CDI Waste, has potential to have a Moderate impact on the residents of Sluice House.

The tipping and loading of skips / bins and HGV vehicle movements along the western section of the access road has potential to have a Low impact on the residents of sluice house.

However, this assessment has used predicted noise levels calculated using the process detailed in BS 5228-1:2009 +A1:2014, using sound pressure data for plant and machinery from Annex C of BS 5228. Due to the variability of the structure and layout of the site i.e. locations of inert waste bunds, full skips and concrete block dividing walls and the complex geography of the site, there is only a Moderate Level of Confidence in the accuracy of these calculations. These calculations likely present a worst case scenario.

In order to provide a higher level of confidence, noise measurement should be undertaken following the procedure within Section 6 of BS 4142:2014+A1:2019, once the site is operational. Due to the variability of operations at the site, monitoring should be



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undertaken over a period of at least 7 days, including the weekend, when the facility will not be operational. This will allow accurate determination of the Specific Sound Level for the facility. This data can then be used to reassess the facility in line with BS 4142.

This data can then be used to inform additional mitigation / operational restrictions, as required.

In line with **BS 6472-1**, the site's activities are not expected to generate significant Vibration Dose Values (VDV), given the absence of dynamic compaction, the relatively large distance to receptors (~100 m), and the low transmissivity of the underlying geology (alluvium over rock).

Vibration emissions associated with the site's operations are not expected to result in significant adverse impact under current or foreseeable conditions.