



CROWNHILL TOPSOIL WASTE MANAGEMENT FACILITY NOISE AND VIBRATION MANAGEMENT PLAN

Unit 1009, Caerwent Army Training Estate,
Caerwent

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Title	Crownhill Topsoil – Noise and Vibration Management Plan		
Location	Unit 1009 Caerwent Army Training Estate		
Document Ref	CH010	Issue / Revision: ISSUE	00
File reference	CH010		
Date	18/07/19		
Prepared by	Julian Gregory	Signature <i>Julian Gregory</i>	Date 18/07/19
Checked by	Julian Gregory	Signature <i>Julian Gregory</i>	Date 19/07/19
Authorised by	Simon Stone	Signature	Date

Rev	Date	Purpose	Prepared by	Checked	Authorised
1	15/04/20	Address Schedule 5 comments	Julian Gregory	H Slater	J Gregory



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1. Site Details

Name of the applicant	Crownhill Topsoil
Activity address	Unit 1009 Caerwent Army Training Estate
National Grid Reference	ST 46457 92070

This Noise and Vibration Management Plan has been prepared for Crownhill Topsoil and Aggregates operations at Unit 1009 of the Caerwent Army Training Base.

Crownhill Topsoil and Aggregates's Waste Recovery Facility is proposed to be located at Unit 1009 of the Caerwent Army Training Estate.

The Army Training Estate is operated by the Ministry of Defence / Defence Infrastructure Organisation and managed by Landmarc. It is predominantly used for the training of MOD personnel and the storage of MOD assets. Sections of the site are now let to companies for use as commercial / industrial facilities.

Crownhill proposes to operate an Inert Waste Recovery facility at Unit 1009 which will include:

- The processing of inert soils and construction and demolition waste into topsoil and recycled aggregates;
- The sale of quarried aggregates and other building / construction products.

The company currently operate an aggregate wholesale / retail business from the facility, which requires the delivery, storage and re-loading of aggregates from Unit 1009.

2. Identification and evaluation of impacts

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.

2.1 Activities likely to generate noise and vibration

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

- Operation of a crusher – inert construction and demolition wastes will be loaded into the crusher using a 14t excavator or loading shovel. Crushed materials will be segregated into stockpiles of varying materials gradings, which will be managed by a 14t excavator.
- Operation of a screen – as above except screening as opposed to crushing.
- Excavation and loading – Materials will be stockpiled on site by type and grading. A loading shovel or excavator will be used to load materials into road wagons for transport to customers.
- Vehicle movements around the site – This applies primarily to receptors near highways within and adjacent to the site. The key receptor for these emissions will be properties near the site entrance.

Crownhill currently use the following equipment at Unit 1009 as part of their aggregate supply business:

- Mercedes Actros HGV 44t Tractor Unit – 2015
- 3No Mercedes Arocs 8x4 Tipper Trucks – 2018 – 2019
- Mercedes Arocs 8x4 20t Tipper fitted with a grab – 2019
- Mercedes Arocs 8x4 20t fitted with s hook loader – 2019
- Iveco 8x4 20t fitted with s grab – 2015
- 2No Transit 130 Tipper
- Doosan DL200 Loading Shovel – 2019
- JCB 411 Loading Shovel – 2010
- Merlo 42.7 Telehandler – 2018
- Doosan DX140 Excavator – 2019
- JCB 814 Power Slide Excavator – 1988

For the operation of the Inert Waste Recovery facility, Crownhill proposed to employ the following at the site:

- Terex Finlay 863 Screener – 2019
- Terex J960 Crusher – 2020

2.2 Potential Receptors:

The closest residential receptors to Unit 1009 are Great Llanmelin Farm, which is 670m west of the site and residential properties in Llanvair Road, which are approximately 1km from Unit 1009 but are approximately 70m from the site entrance from the A48 Trunk Road, at the MoD checkpoint. This is the point at which vehicles using the Unit 1009 facility, access and egress the Army Training Centre

There are many buildings within the MoD base, around Unit 1009. Some of these were used by troops on exercises for overnight shelter but following a review in 2019, they were assessed as being unsafe and have been sealed. Two new troop shelters have been constructed within the Army Training Base to accommodate troops on overnight

manoeuvres. These are located approximately 1.5km SE of Unit 1009 and are only used during the night and early morning. Due to the distance from Unit 1009 and the nature of their use, these will not be considered further within this assessment.

During Army operations at the base, troops may pass close to Unit 1009. These operations include gun fire using blank rounds, often with helicopter air support and this is the predominant noise source during these operations. Troop movements within the base, during exercises, are unpredictable and short term, we have therefore not considered these as receptors.

As the nearest residential receptors to Unit 1009 are over 600m away, we consider that the key receptors for noise and vibration from the operation of an Inert Waste Management Facility will therefore be animals and birds within Llanmelin Woods and members of the public within Llanmelin Woods Camp Hill Fort Scheduled Monument. This is approximately 340m NW at its nearest point (the section most visited by members of the public is approximately 400m NW). No noise sensitive premises (NSPs) have been identified within 500m of Unit 1009. We have however considered impacts on the residential properties at Great Llanmelin Farm and for residents in Llanvair Road, due to vehicle movements in and out of the Army Training Estate.

Noise impacts on workers at the site have been assessed via task based Risk Assessment and have been addressed through the Crownhill Health and Safety system, in line with the Control of Noise at Work Regulations, 2005. These will not be considered further within this plan.

2.3 Relevant Standards and Documentation

This noise and vibration assessment has been carried out in accordance with the two primary standards for noise and vibration assessments for construction and open sites:

- British Standard BS 7445-1:2003 - Description and measurement of environmental noise; and
- British Standard BS5228-1:2009+A1:2014 - Code of practice for noise and vibration control on construction and open sites.
- British Standard BS5228-2:2009 - Code of practice for noise and vibration control on construction and open sites.

2.4 Background Noise Measurements at Identified Receptors:

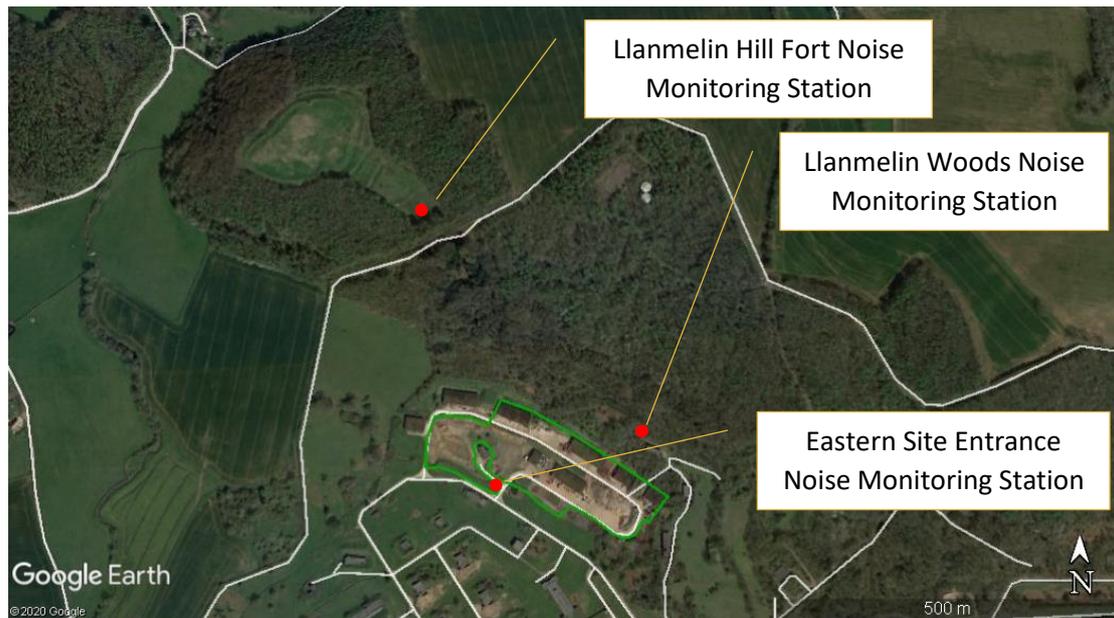
To enable comparison of predicted noise levels, background noise monitoring has been undertaken at identified receptors on two occasions. This has been undertaken as 4no 15min LA_{eq} at each identified receptor on two separate occasions (Note: this assessment

was undertaken during May 2020, during the COVID 19 Lockdown Period. Reduced human activity due to the lockdown measures may result in reduced environmental noise levels. This assessment should be repeated and this plan updated following the relaxation of lockdown measures)

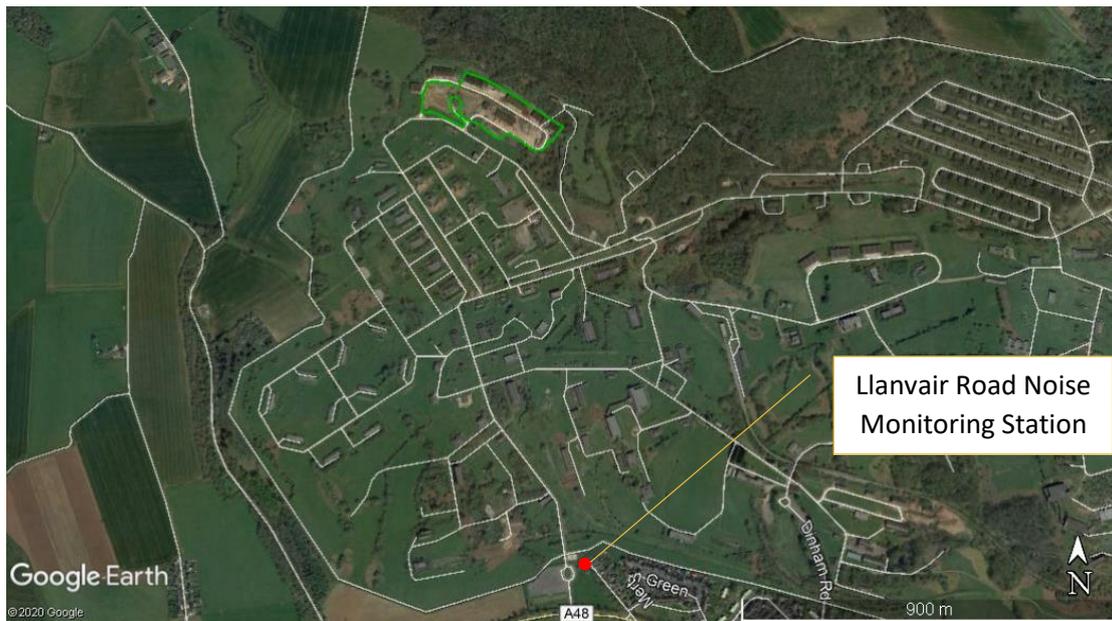
Attended noise measurements were taken at the following locations:

- Adjacent to the eastern entrance to Unit 1009 – Grid Ref: ST 46362 92062 (this location was used to gain an understanding of the current noise environment at Unit 1009. Data from this monitoring is reported but has not been used within this assessment)
- At the eastern side of Llanmelin Hill Fort – Grid Ref: ST 46363 92461
- In the edge of Llanmelin Woods north of Unit 1009 – Grid Ref: ST 46574 92145 (this is within the Army Training Estate boundary and hence members of the public will not be present)
- Outside No13 Llanvair Road – Grid Ref: ST 46668 90974

Baseline noise monitoring was not undertaken at Great Llanmelin Farm due to the presence of barking dogs, which were encountered on both occasions. Agricultural and road noise were the predominant noise sources at this location.



NOISE MONITORING LOCATIONS



NOISE MONITORING LOCATIONS

The sound level meter was set to record noise levels over 4no 15 minute periods during the operational period for the aggregates business currently operating at Unit 1009. These were then aggregated into a 1hr LA_{eq} . This method is used so that if an anomaly impacts one of the 15 minute time intervals, it does not abort an hours monitoring. No night time measurements were taken as within the terms of the MoD Lease, the site cannot operate during the night.

For each noise measurement, the noise climate, wind speed and direction, and the noise levels were recorded and noted. The meter automatically stored the LA_{eq} , LA_{min} , LA_{max} , Measurements were made with a fast (0.125s) time constant.

Equipment Used:

Noise Meter: Svantek 977 Sound Level Meter. To BS EN 60804 - Type I Serial No 36496;

Microphone: Svantek SV12L, Serial No 59937;

Pre-amp: Svantek SV12L, Serial No 10182;

Acoustic Calibrator: SV 30A Type 1

Noise Levels were measured in accordance with BS 7445: 1991 – Description and Measurement of Environmental Noise.

Calibration

The meter was calibrated at the start and end of each monitoring period with no drift. Readings can therefore be considered valid.

Weather – 04/05/20:

Temperature: 23oC

Wind Speed/Direction: 4mph/SE

Precipitation: None

Cloud Cover: 0 Oktas

Other Notable Atmospheric Conditions: Measurement undertaken during COVID 19 Lockdown period.

Weather – 20/05/20:

Temperature: 16oC

Wind Speed/Direction: Still

Precipitation: None

Cloud Cover: 2 Oktas

Other Notable Atmospheric Conditions: Measurement undertaken during COVID 19 Lockdown period.

Activities ongoing within Unit 1009 – 04/05/20 and 20/05/20 – Loading of aggregates into lorries and vans, using wheeled loading shovel and telehandler. Vehicle movement around the site.

2.4.1 Results

Eastern Site Entrance – Baseline Measurements:

Eastern Site Entrance – 04/05/2020:						
Start	Period#	A Leq	A Max	A Min	LAF (SPL)	A Peak
12:48:52	0	44.1	62.9	33.6	37.3	82.3
13:03:52	1	54.3	80.6	33.8	42.8	96.2
13:18:52	2	54.7	78.5	34.7	54.0	90.7
13:33:52	3	54.6	78.3	36.0	46.3	91.0
LA _{eq} 1hr =		53.4				

Eastern Site Entrance – 20/05/2020:						
Start	Period#	A Leq	A Max	A Min	LAF (SPL)	A Peak
07:47:12	0	51.3	77.6	34.8	44.4	91.5
08:03:12	1	47.3	74.8	33.9	41.1	89.9
08:18:12	2	51.6	77.5	34.1	52.9	91.4
08:33:12	3	56.2	81.4	35.5	50.2	97.7
LA _{eq} 1hr =		52.7				

Eastern Site Entrance Average Baseline LA_{eq} – 53.1dB

Llanmelin Woods – Baseline Measurements:

Llanmelin Woods – 04/05/2020:						
Start	Period#	A Leq	A Max	A Min	LAF (SPL)	A Peak
14:06:04	0	53.8	74.9	33.4	41.3	87.2
14:21:04	1	55.3	76.2	31.6	40.8	91.5
14:36:04	2	51.5	73.6	30.8	52.4	88.7
14:51:04	3	53.4	78.1	31.9	46.6	86.4
LA _{eq} 1hr =		53.7				

Llanmelin Woods – 20/05/2020:						
Start	Period#	A Leq	A Max	A Min	LAF (SPL)	A Peak
11:23:11	0	49.8	76.8	36.3	43.7	88.5
11:38:11	1	54.3	80.3	32.4	48.4	90.4
11:53:11	2	53.5	74.7	30.8	47.1	89.7
12:08:11	3	52.3	72.7	32.4	46.8	90.1
LA _{eq} 1hr =		52.8				

Llanvair Woods Hill Fort Average Baseline LA_{eq} – 53.3dB

Llanmelin Woods Hill Fort – Baseline Measurements

Llanmelin Woods Hill Fort – 04/05/2020:						
Start	Period#	A Leq	A Max	A Min	LAF (SPL)	A Peak
12:48:52	0	38.4	57.5	30.8	33.8	72.4
13:03:52	1	39.8	51.9	29.6	36.5	63.5
13:18:52	2	40.1	58.4	29.9	34.7	71.9
13:33:52	3	42.2	58.6	30.1	35.5	73.3
LA _{eq} 1hr =		40.4				

Llanmelin Woods Hill Fort – 20/05/2020:						
Start	Period#	A Leq	A Max	A Min	LAF (SPL)	A Peak
09:26:34	0	39.3	56.8	31.1	34.3	71.2
09:41:34	1	40.3	58.9	29.8	37.2	64.9
09:56:34	2	41.6	57.4	30.0	35.7	72.3
10:11:34	3	39.7	56.8	35.7	33.3	71.6
LA _{eq} 1hr =		40.3				

Llanvair Woods Hill Fort Average Baseline LA_{eq} – 40.4dB

Llanvair Road – Baseline Measurements

Llanvair Road – 04/05/2020:						
Start	Period#	A Leq	A Max	A Min	LAF (SPL)	A Peak
14:19:46	0	54	69.8	62.1	34.3	79.3
13:03:52	1	56.3	74.7	59.3	37.2	82.2
13:18:52	2	55.4	71.2	56.8	35.7	78.6
13:33:52	3	56.7	68.7	61.4	33.3	77.6
LA _{eq} 1hr =		55.7				

Llanvair Road – 20/05/2020:						
Start	Period#	A Leq	A Max	A Min	LAF (SPL)	A Peak
12:39:03	0	56.1	66.7	56.1	32.1	74.7
12:54:03	1	54.8	71.3	59.4	35.4	78.3
13:09:03	2	55.3	69.6	52.2	38.1	77.7
13:24:03	3	55.9	64.8	63.4	36.0	76.1
LA _{eq} 1hr =		55.6				

Llanvair Road Average Baseline LA_{eq} – 55.6dB

Notable noise sources were the opening of the steel flap on the loading skip on the telehandler and the opening of tail gates on wagons.

3. Assessment of Noise on Identified Receptors:

Proposed operations at Unit 1009 will be broadly similar to construction activities. BS 5228: 2009 provides methods for predicting and assessing construction noise and vibration based on details of construction activities. Noise predictions are based upon source measured levels for each relevant item of plant and the application of corrections for:

- Distance between the source and receptor location
- The percentage operating time of the plant
- Any attenuation between source and receptor

The source levels used for this assessment are taken from the Defra – Update of Noise Database for Prediction of Noise on Construction and Open Sites (updating Annex C of BS 5228).

Due to the distance of the site from residential receptors, impacts are considered unlikely. Key noise impacts are therefore likely to be on adjacent ecological receptors. However impacts on ecological and residential receptors and on other users of the MoD base, will be considered.

3.1 Potential Noise Sources

Noise sources have been determined as set out in the Defra – Update of Noise Database for Prediction of Noise on Construction and Open Sites – 2005, except for the *Screen Stockpiler for which figures have been used from Defra Update of Construction Plant Noise Database Phase 3: Noise measurement data for construction plant used on quarries – 2006.

The following noise sources have been considered within this report:

Plant	Quantity	Defra Noise Database Ref:	Sound Pressure Level 10m from source, dB	% on Time
Wheeled Loader	1	Table 6 - 34	76	50
14T Excavator	1	Table 2 - 25	69	50
Tracked Crusher – crushing concrete -	1	Table 1 - 15	84	90
Lorry 39t	4	Table 6 - 19	76	40
Wheeled loader – loading hopper	1	Table 6 - 32	75	60
Wheeled loader – loading lorry	1	Table 6 - 33	82	40
Screen stockpiler	1	*Table 1(b) - 15	81	90

PLANT INFORMATION USED FOR NOISE PREDICTIONS

We have used combinations of this plant to undertake noise predictions of three activities:

- Crushing of inert waste – for this activity we have assessed a wheeled loader loading the crusher, the crusher itself and a 14t excavator managing the stockpiles.
- Screening of inert waste – for this activity we have assessed a wheeled crusher loading the crusher, the screener itself and a 14t excavator managing the stockpiles.
- Loading multiple lorries – for this we have assessed a wheeled loader loading 39t lorries.

These calculations present a worst case scenario as the noise levels used are for older plant, whereas Crownhill uses predominantly Euro 5 or 6 modern plant which have lower noise outputs. Predicted levels do not however take account of distinctive noises such as loud bangs due to metal parts operating and loads being dropped.

3.2 Receptors

The following receptors were utilised for this calculation as it was felt that they represented the most vulnerable receptors.

Location Number	Description	Distance from Source (m)	Grid Reference
1	Llanmelin Woods	100	ST 46573 92196
2	Llanmelin Woods Camp Hill Fort Scheduled Monument	340	ST 46272 92461
3	Great Llanmelin Farm – to the west of the site.	670	ST 45590 92291
4	Residential properties on Llanvair Road	1,000	ST 46662 90978

RECEPTORS CONSIDERED AS PART OF ASSESSMENT

The following information was used for each receptor:

- Plant noise output at 10 (LWA);
- Plant quantity;
- Percentage “on time”;
- Distance from the plant to the receptor;
- Ground topography and screening effects.

For Great Llanmelin Farm and Llanvair Road it was assumed that the ground was soft as it is predominantly grass and scrub land between these receptors. Barrier attenuation was included for Llanmelin Woods and Llanmellin Hill Fort, due to the presence of the buildings / stockpiles along the northern boundary of Unit 1009 and steeply rising ground to the north and west.

For Great Llanmelin Farm and Llanvair Road, no barrier attenuation was used, although there are multiple buildings between the source and the receptors. Many of the buildings within the base are surrounded by earth blast mounds, which would provide significant screening for noise emissions.

The site is undulating and rises towards Llanmelin Woods, which would provide significant attenuation. When predicting noise received at a receptor, no barrier attenuation allowance should be made for vegetation, even trees, as it is extremely difficult to predict the attenuation effect due to the number of variables i.e. type and density of vegetation. In reality however, dense vegetation can provide significant screening.

3.3 Results of Noise Assessments

Full calculations and results can be seen at Appendix 1.

Crushing Operations – Predicted Noise Levels at Receptors

Receptor	Predicted Façade Level (dB LAeq 15mins)
1 – Llanmelin Woods	61.6
2 - Llanmelin Woods Camp Hill Fort	47.9
3 - Great Llanmelin Farm	42.4
4 - Residential properties on Llanvair Road	38.2

Screening Operations – Predicted Noise Levels at Receptors

Receptor	Predicted Façade Level (dB LAeq 15mins)
1 – Llanmelin Woods	59.9
2 - Llanmelin Woods Camp Hill Fort	48.8
3 - Great Llanmelin Farm	30.8
4 - Residential properties on Llanvair Road	36.4

Lorry Loading – Predicted Noise Levels at Receptors

Receptor	Predicted Façade Level (dB LAeq 15mins)
1 – Llanmelin Woods	58.0
2 - Llanmelin Woods Camp Hill Fort	45.8
3 - Great Llanmelin Farm	41.6
4 - Residential properties on Llanvair Road	37.3

Vehicle Movements at Site Entrance – Predicted Noise Levels at Receptors

The following are the results for commercial vehicle movements entering and exiting the Army Training Estate from the A48. We have assumed that there will be four vehicles per hour associated with Crownhills activities, each with a duration of less than 1 minute.

Receptor	Predicted Façade Level (dB LAeq 15mins)
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Llanvair Road	49.9
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3.4 Noise Impact Assessment

To assess the potential impact of noise which could be generated by the operation of an Inert Waste Management facility at Unit 1009, on residential properties, we have used the ABC method as described in BS5228-1: 2009. No assessment has been undertaken of night-time, evenings or weekends as the facility will not operate during these periods.

As ambient noise levels (rounded to the nearest 5dB) are less than Category A values (65dB), all locations will be considered as Category A.

3.1.1 Comparison of Predicted Noise Levels against Background:

Comparison of Baseline against Activity related noise outputs:

Receptor	Baseline Noise Level dB(A) LAeq 1hr	Predicted dB(A) LAeq 10hr – Crushing Operations	Predicted dB(A) LAeq 10hr – Screening Operations	Predicted dB(A) LAeq 10hr – Loading Operations
Llanmelin Woods	53.3	61.6	59.9	58.0
Llanmelin Woods Camp Hill Fort	40.4	47.9	48.8	45.8
Great Llanmelin Farm	N/A	42.4	40.8	41.6
Residential properties on Llanvair Road	55.6	38.2	36.4	37.3

Predicted dB(A) LAeq 10hr for the movement of aggregate and soil delivery vehicles as they enter and exit the site is 49.9dB(A).

Category A threshold values are 65dB. None of the predicted value for any of the proposed operations exceed this.

Using the 5dB(A) Change assessment described within BS 5228-1:2009, from the above table it can be seen that predicted noise levels from the operation of an inert waste management facility at Unit 1009 will exceed baseline levels within Llanmelin Woods and Llanmelin Woods Hill Fort by more than 5dB(A), which is classed as significant. This is however an assessment predominantly for residential receptors and other sensitive receptors. BS 5228-1:2009 does state 'For public open space, impact might be deemed to be significant if the total noise (pre-construction ambient plus construction noise) exceeds the pre-construction ambient noise (LAeq, Period) by 5 dB or more for a period of one month or more. However, the extent of the area impacted relative to the total available area also needs to be taken

into account.’ In respect of this, we believe that approximately 50% of the hillfort area would be impacted. There is parking for 20 cars at the Hillfort site and during the two monitoring visits no other visitors were noted. It is likely that this site is little visited by members of the public. Consideration should also be given to the overall noise level of the predicted noise. Even though it is +5dB(A) the levels are still low and general noise would be virtually indiscernible above other background noise from the A48 and other surrounding agricultural land uses. It is unlikely that this would have detriment on the enjoyment of the Hill Fort Site.

Key impacts are likely to be on wildlife within Llanmelin Woods. Little information exists on the impacts of noise on wildlife. It is likely that wildlife within Llanmelin Woods is habituated to some level of noise from operations at Unit 1009 and from the operation of the wider Army Training Estate, including loud bangs due to explosions and the site being frequently overflown by low level aircraft and helicopters. Predicted noise levels are below 60dB(A) with the exception of crushing operations which are marginally above this. Crushing operations will be undertaken infrequently and only for a few days at a time. It is difficult to make a definitive assessment on potential impacts on wildlife but due to the relatively low levels predicted and that no works will be undertaken during hours of darkness it is unlikely that impacts will be significant.

3.5 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
- 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 extremely unlikely.

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.

4. Control of Noise and Vibration

4.1 Noise Controls:

The following controls will be put in place to mitigate the potential impacts of noise from the operation of Crownhill Topsoil and Aggregates:

- The normal working hours within the Site shall be Monday to Friday between 07:00 and 19:00 hours and Saturday between 07:00 and 13:00, with no working on Sundays and public holidays.
- The works will adhere to BS 5228: parts 1 and 2, as well as BS 7385: parts 1 and 2.
- 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.

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.

5. 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.
- 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.

Induction records will be maintained to demonstrate that this training has been provided.

Regular toolbox talks will be given on environmental topics including the minimisation of noise and vibration as described above. A minimum of 2 environmental subject related toolbox talks will be given per annum with Toolbox Talk record sheets signed by all attendees to confirm they have received and understood the training provided.

6. Monitoring

6.2 Operational Threshold Limits

From calculations undertaken, the following limits have been set for the site. The key receptors will be Llanmelin Wood and the Llanmelin Woods Hill Fort Scheduled Monument.

Noise Limits at Site Boundary:

Day	Noise Level (LA _{eq}) at Site Boundary	Period of Measurement	Maximum Noise Level (LA _{Max})
Monday – Friday – 07:00 – 19:00	75 dB	15 mins	85 dB
Saturday – 07:00 – 13:00	75 dB	15 mins	85 dB
Sunday	No works		

Noise Limits at Llanmelin Woods:

Day	Noise Level (LA _{eq}) at Control Station	Period of Measurement	Maximum Noise Level (LA _{Max})
Monday – Friday: 07:00 – 19:00. Saturday: 07:00 – 13:00	65 dB	15 mins	75 dB
Sunday	No works		

Noise Limits at Llanmelin Woods Hill Fort:

Day	Noise Level (LA _{eq}) at Control Station	Period of Measurement	Maximum Noise Level (LA _{Max})
Monday – Friday: 07:00 – 19:00. Saturday: 07:00 – 13:00	55 dB	15 mins	65 dB
Sunday	No works		

6.3 Ad-hoc Noise Monitoring

Crownhill have purchased a Sound Level Meter (Casella CEL-240 Type II Sound Level Meter, compliant with IEC 61672) which they will use to undertake internal noise assessments. This is not a calibrated instrument but will allow for approximate assessments to be undertaken to determine instantaneous A weighted level of an activity.

This will be undertaken by the Site Manager twice per week during general operations and daily during crushing and screening operations. The results of this will be recorded.

If it is found that noise levels exceed 85dB(A) at 10m from the activity If it is assessed that noise limits may exceed the above limits, formal noise monitoring will be undertaken in accordance with BS 7445: 1991 – Description and Measurement of Environmental Noise.

6.4 Annual External Monitoring

Further external monitoring shall be carried out annually by an Acoustics Consultant using a minimum of a Type II noise meter complying with IEC 61672-1:2003, which will have been serviced and calibrated by the manufacturer within the last 12 months.

Annual noise monitoring will be undertaken at the control stations at:

- Llanmelin Woods;
- Llanmelin Woods Hill Fort;
- Llanvair Road.

Results from this monitoring will be compared against threshold values outlined above.

6.5 Vibration Monitoring

Due to the negligible potential for impacts from vibration at the site, no limits have been set and no monitoring is proposed.



Appendix 1 – Noise Calculations

Crushing of Inert Waste				
Plant	Quantity	Sound Pressure Level 10m	% on Time	Duration weeks
Tracked Crusher	1	84	90	1
Wheeled Loader	1	76	70	1
14T Excavator	1	69	30	1

Receptor	Static Noise Sources	Level at 10m	Activity LWA dB(A)	Distance to receptor m	On Time %	'On Time' Correction dB(A)	Hard or Soft Ground (S or H)	Distance Correction dB(A)	Is there a Barrier? (Y/N)	Source Height (m)	Receiver Height (m)	Barrier Height (m)	Source to Barrier Distance (m)	Barrier to Receptor Distance (m)	Barrier Correction dB(A)	Façade Correction dB(A)	LAeq,10hour (façade) dB(A)
Llanmelin	Tracked Crusher	84	112	100	70	-1.5	h	-48.0	Y	2.0	10.0	3.0	15.0	85.0	-4.6	3	60.9
Wood	Wheeled Loader	76	104	100	70	-1.5	h	-48.0	Y	2.0	10.0	3.0	15.0	85.0	-4.6	3	52.9
	14T Excavator	69	97	100	50	-3.0	h	-48.0	Y	2.0	10.0	3.0	15.0	85.0	-4.6	3	44.4
	TOTAL																61.6

Receptor	Static Noise Sources	Level at 10m	Activity LWA dB(A)	Distance to receptor m	On Time %	'On Time' Correction dB(A)	Hard or Soft Ground (S or H)	Distance Correction dB(A)	Is there a Barrier? (Y/N)	Source Height (m)	Receiver Height (m)	Barrier Height (m)	Source to Barrier Distance (m)	Barrier to Receptor Distance (m)	Barrier Correction dB(A)	Façade Correction dB(A)	LAeq,10hour (façade) dB(A)
Llanmelin	Tracked Crusher	84	112	340	70	-1.5	h	-58.6	y	2.0	24.0	3.0	6.0	334.0	-7.6	3	47.2
Wood	Wheeled Loader	76	104	340	70	-1.5	h	-58.6	y	2.0	24.0	3.0	6.0	334.0	-7.6	3	39.2
Hill Fort	14T Excavator	69	97	340	50	-3.0	h	-58.6	y	2.0	24.0	3.0	6.0	334.0	-7.6	3	30.8
	TOTAL																47.9

Receptor	Static Noise Sources	Level at 10m	Activity LWA dB(A)	Distance to receptor m	On Time %	'On Time' Correction dB(A)	Hard or Soft Ground (S or H)	Distance Correction dB(A)	Is there a Barrier? (Y/N)	Source Height (m)	Receiver Height (m)	Barrier Height (m)	Source to Barrier Distance (m)	Barrier to Receptor Distance (m)	Barrier Correction dB(A)	Façade Correction dB(A)	LAeq,10hour (façade) dB(A)
Llanmelin	Tracked Crusher	84	112	670	70	-1.5	s	-71.7	n	2.0	-2.0	5.0	6.0	664.0	0	3	41.8
Wood	Wheeled Loader	75	103	670	70	-1.5	s	-71.7	n	2.0	-2.0	5.0	6.0	664.0	0	3	32.8
Hill Fort	14T Excavator	69	97	670	50	-3.0	s	-71.7	n	2.0	-2.0	5.0	6.0	664.0	0	3	25.3
	TOTAL																42.4

Receptor	Static Noise Sources	Level at 10m	Activity LWA dB(A)	Distance to receptor m	On Time %	'On Time' Correction dB(A)	Hard or Soft Ground (S or H)	Distance Correction dB(A)	Is there a Barrier? (Y/N)	Source Height (m)	Receiver Height (m)	Barrier Height (m)	Source to Barrier Distance (m)	Barrier to Receptor Distance (m)	Barrier Correction dB(A)	Façade Correction dB(A)	LAeq,10hour (façade) dB(A)
Llanvair	Tracked Crusher	84	112	1000	70	-1.5	s	-76.0	n	2.0	-2.0	5.0	6.0	994.0	0	3	37.5
Road	Wheeled Loader	76	104	1000	70	-1.5	s	-76.0	n	2.0	-2.0	5.0	6.0	994.0	0	3	29.5
	14T Excavator	69	97	1000	50	-3.0	s	-76.0	n	2.0	-2.0	5.0	6.0	994.0	0	3	21.0
	TOTAL																38.2

Results Summary	Predicted Façade Level	
	1	61.6
	2	47.9
	3	42.4
	4	38.2

Results Summary	Predicted	
	Façade Level	
1	59.9	
2	48.8	
3	40.8	
4	36.4	

Lorry Loading				
Plant	Quantity	Sound Pressure Level 10m from source, dB	% on Time	Duration weeks
Wheeled Loader	1	82	100	10
Lorry 32t	4	76	25	10

Receptor	Static Noise Sources	Level at 10m	Activity LWA dB(A)	Distance to receptor m	On Time %	'On Time' Correction dB(A)	Hard or Soft Ground (S or H)	Distance Correction dB(A)	Is there a Barrier? (Y/N)	Source Height (m)	Receiver Height (m)	Barrier Height (m)	Source to Barrier Distance (m)	Barrier to Receiver Distance (m)	Barrier Correction dB(A)	Façade Correction dB(A)	Aeq,10hour (façade) dB(A)
1	Wheeled Loader	82	110	100	100	0.0	h	-48.0	y	2.0	10.0	3.0	6.0	94.0	-7.3	3	57.7
Llanmelin Wood	Lorry 32t	76	104	100	25	-6.0	h	-48.0	y	2.0	10.0	3.0	6.0	94.0	-7.3	3	45.7
TOTAL																	58.0

Receptor	Static Noise Sources	Level at 10m	Activity LWA dB(A)	Distance to receptor m	On Time %	'On Time' Correction dB(A)	Hard or Soft Ground (S or H)	Distance Correction dB(A)	Is there a Barrier? (Y/N)	Source Height (m)	Receiver Height (m)	Barrier Height (m)	Source to Barrier Distance (m)	Barrier to Receiver Distance (m)	Barrier Correction dB(A)	Façade Correction dB(A)	Aeq,10hour (façade) dB(A)
2	Wheeled Loader	82	110	340	100	0.0	h	-58.6	y	2.0	5.0	3.0	6.0	334.0	-8.9	3	45.5
Llanmelin Hill Fort	Lorry 32t	76	104	340	25	-6.0	h	-58.6	y	2.0	5.0	3.0	6.0	334.0	-8.9	3	33.5
TOTAL																	45.8

Receptor	Static Noise Sources	Level at 10m	Activity LWA dB(A)	Distance to receptor m	On Time %	'On Time' Correction dB(A)	Hard or Soft Ground (S or H)	Distance Correction dB(A)	Is there a Barrier? (Y/N)	Source Height (m)	Receiver Height (m)	Barrier Height (m)	Source to Barrier Distance (m)	Barrier to Receiver Distance (m)	Barrier Correction dB(A)	Façade Correction dB(A)	Aeq,10hour (façade) dB(A)
3	Wheeled Loader	82	110	670	100	0.0	s	-71.7	n	2.0	-2.0	5.0	6.0	664.0	0	3	41.3
Llanmelin Hill Fort	Lorry 32t	76	104	670	25	-6.0	s	-71.7	n	2.0	-2.0	5.0	6.0	664.0	0	3	29.3
TOTAL																	41.6

Receptor	Static Noise Sources	Level at 10m	Activity LWA dB(A)	Distance to receptor m	On Time %	'On Time' Correction dB(A)	Hard or Soft Ground (S or H)	Distance Correction dB(A)	Is there a Barrier? (Y/N)	Source Height (m)	Receiver Height (m)	Barrier Height (m)	Source to Barrier Distance (m)	Barrier to Receiver Distance (m)	Barrier Correction dB(A)	Façade Correction dB(A)	Aeq,10hour (façade) dB(A)
4	Wheeled Loader	82	110	1000	100	0.0	s	-76.0	n	2.0	-2.0	5.0	6.0	994.0	0	3	37.0
Llanvair Road	Lorry 32t	76	104	1000	25	-6.0	s	-76.0	n	2.0	-2.0	5.0	6.0	994.0	0	3	25.0
TOTAL																	37.3

Results Summary	Predicted Façade Level
1	58.0
2	45.8
3	41.6
4	37.3

Lorry Loading				
Plant	Quantity	Sound Pressure Level	% on Time	Duration weeks
Lorry 32t	1	76	10	1

Receptor	Static Noise Source	Level at 10m	Activity LW dB(A)	Distance to receptor m	On Time %	'On Time' Correction dB(A)	Hard or Soft Ground (S or H)	Distance Correction dB(A)	Is there a Barrier? (Y/N)	Source Height (m)	Receiver Height (m)	Barrier Height (m)	Source to Barrier Distance (m)	Barrier to Receiver Distance (m)	Barrier Correction dB(A)	Façade Correction dB(A)	L _{Aeq,10hour} (façade) dB(A)
4 Llanvair Road	Lorry 32t	76	104	70	10	-10.0	s	-47.1	n	2.0	3.0	5.0	6.0	64.0	0	3	49.9
TOTAL																	49.9