PURSER

Volume 2:

13

Noise and Vibration

13 Noise and Vibration

13.1 Introduction

This chapter of the EIAR has been prepared by Wave Dynamics Limited, an Acoustic Consultancy specialising in noise and vibration. This section addresses the potential noise and vibration impact of the proposed development located at the former Lisheen Mine Site, Killoran, Moyne, Thurles, Co. Tipperary

The assessment considers the noise and vibration impact on both the short-term construction phase and the permanent operational phase on the surrounding environment. The site is located adjacent to the former Lisheen Mine Sites, Co. Tipperary. The assessment of direct, indirect and cumulative noise and vibration impacts on the surrounding environment have been considered as part of the assessment. Mitigation measures are included, where relevant, to ensure the proposed development is constructed and operated to ensure minimal impact on the receiving environment (NSLs). Consideration has been given to existing and future developments in the surrounding area, as set out in Section 13.9.2.

This chapter was completed by Cathal Reck, Acoustic Consultant with Wave Dynamics. Cathal has experience of numerous planning stage assessments. Cathal's qualifications include; BSc (Hons) in Music Technology & Production, Certificate of Competence in Environmental Acoustics from the Institute of Acoustics. Cathal is a member of the Institute of Acoustics.

This chapter was peer reviewed by James Cousins, Managing Director | Principal Consultant with Wave Dynamics who has extensive experience in assessing noise and vibration impacts. James is an experienced acoustic consultant. His qualifications include; BSc (Hons) in Construction Management and Engineering, Pg Cert in Construction Law and Diploma in Acoustics and Noise Control (Institute of Acoustics) and an IOA Competence Cert in Building Acoustic Measurements. James is a member of both Engineers Ireland (MIEI) and the Institute of Acoustics (MIOA) and is the current SITRI Chairman.

13.1.1 Development Description

Nua Bioenergy Limited intends to apply for permission to construct a biomethane and bio-based fertiliser production facility, with an annual intake of up to 98,000 tonnes of feedstock per annum, at this site of c. 5.5 hectares at lands located at the former Lisheen Mine Site, Killoran, Moyne, Thurles, Co. Tipperary.

Details of the proposed development are set out in **Volume 2: Chapter 6** and the statutory notices accompanying the application.

13.2 Study Methodology

The assessment of the noise and vibration impacts has been undertaken with references to the relevant industry guidance documents and standards relating to environmental noise and vibration which are set out within the relevant sections of this chapter. In addition to specific noise and vibration guidance documents, the following guidelines and standards were considered and consulted for the purposes of this chapter:

- EPA Guidelines on the Information to be contained in Environmental Impact Statements, (EPA, 2002);
- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022);
- EPA Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), (EPA, 2003);
- EPA Advice Notes for Preparing Environmental Impact Statements, (Draft, September 2015)
- EPA NG4: Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities, (January 2016);
- Tipperary County Council Noise Action Plan 2019 – 2023;
- Tipperary County Council Draft Noise Action Plan 2023– 2028;
- ISO 1996-1:2016 Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedures;
- BS 5228-1:2009+A1:2014: Code of Practice for Noise and Vibration Control on Construction and Open Sites - Noise;
- BS 5228-2:2009+A1:2014: Code of Practice for Noise and Vibration Control on Construction and Open Sites – Vibration;
- British Standard BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration.
- Design Manual for Roads and Bridges LA 111 Noise and vibration May 2020.

The noise and vibration study has been undertaken using the following methodology:

- A baseline environmental noise survey has been undertaken in the vicinity of the subject site in order to characterise the existing baseline noise environment and to assess the character of the existing noise.
- A review of the applicable standards and guidelines has been conducted in order to set a range of acceptable noise and vibration criteria for the construction and operational phases of the proposed development.
- Predictive statistical calculations have been performed during the construction phase of the project at the nearest sensitive locations to the development site.
- Predictive modelling using SoundPlan 9.0 and statistical calculations have been performed to assess the potential impacts associated with the operational of the development at the most sensitive locations surrounding the development site; and
- Mitigation measures have been proposed to reduce, where necessary, the identified potential outward impacts relating to noise and vibration from the proposed development.

13.3 Existing and Receiving Environment (Baseline Situation)

A baseline noise survey was conducted to assess the on-site and background noise levels in the surrounding area of Killoran, Moyne, Thurles, Co. Tipperary. This survey aimed to establish reference background noise levels prior to any development or operational activities, ensuring a clear understanding of the existing acoustic environment. The data recorded will be instrumental in assessing any future noise impacts and determining whether additional noise mitigation measures may be required to comply with regulatory standards. Appendix 13.1 outlines the full unattended noise measurement results.

13.3.1 Site Description and Measurement Locations

The site is located in Killoran, Moyne, Thurles, Co. Tipperary. The proposed development is South of the Lisheen mine windfarm, and also in close proximity to a number of residential receptors, Figure 13.1 below depicts an arial view of the proposed anaerobic digester site along with the noise sensitive locations and Wave Dynamics measurement locations.

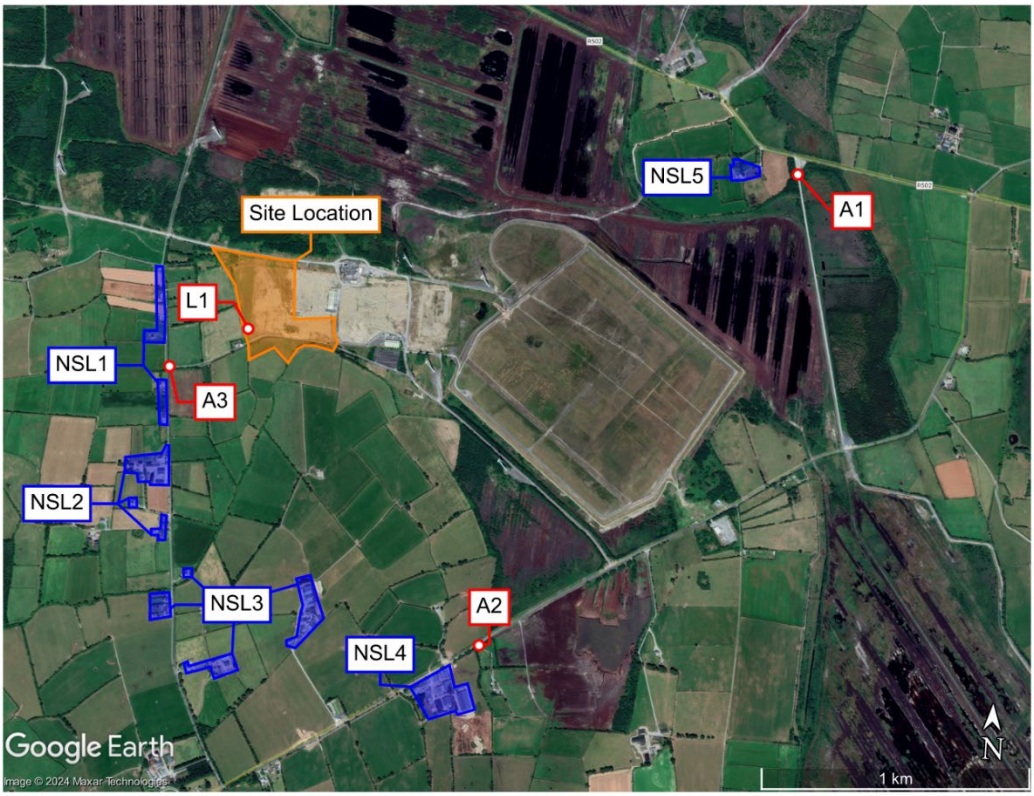

Figure 13.1: Aerial view of the site location, noise sensitive receptors, measurement locations, and the surrounding area.

13.3.2 Survey Methodology and Personnel

The attended and unattended surveys were completed by Daniel Cousins (Field Engineer).

13.3.2.1 Unattended Noise Measurements

Noise measurements were undertaken in general accordance with ISO 1996-1:2016 using ISO Class 1 sound analysers. Unattended measurements were taken from 12:05hrs on the 19th of June 2024 to 10:30hrs on 25th of June 2024. The noise logger was placed on the boundary of the site. The logger was deployed at 1.5m above ground level. Measurements were filtered for periods of unsuitable weather conditions where appropriate. The noise logger was calibrated before and after the survey and no significant drift was noted.

13.3.2.2 Attended Noise Measurements

Noise measurements were undertaken in general accordance with ISO 1996-1:2016 using Class 1 sound analysers. Attended measurements were taken for durations of 15 – 60 minutes in locations A1, A2, A3 and L1. As the windfarm was in close proximity to the proposed site, the measurement locations were selected to ensure noise from the windfarm would not have adverse impact on the measurements. Care was taken to avoid any effect on the measurements, the sound level meter was positioned at approximately 1.2m above ground level.

Figure 13.2: Attended measurement setup.

13.3.3 Survey Period

The attended noise measurements were undertaken on the 19th of June 2024 and 25th of June 2024. The unattended noise measurements were taken on the 19th of June 2024 at 12:05hrs until the 25th of June 2024 at 10:30hrs.

13.3.4 Measurement Equipment

A Class 1 sound level meter/noise logger in general accordance with IEC 61672-1:2013 was used for the attended measurements. Table 13.1 below summarises the measurement equipment used.

Description	WD Asset Number	Model	Serial No.	Calibration Certificate No.	Calibration Due Date
Sound Level Meter	SLM1	Nor 140	1405554	U45343/U45344/U45342	27/07/2025
Sound Level Meter	SLM3	Nor 140	1403082	SLM230219	27/09/2025
Sound Level Meter	SLM6	Nor 140	1405091	U44947/ U44945	27/07/2025
Calibrator	CAL3	Nor 1251	32096	AC240251	03/07/2025
Calibrator	CAL4	Larson Davis CAL200	21085	AC240249	29/06/2025

Table 13.1: Noise measurement equipment.

13.3.5 Noise Measurement Results

This section outlines the results of the attended noise measurements.

13.3.5.1 Attended Measurement Results

Table 13.2 below outlines the results of the attended measurement survey.

Measurement				Measured Noise Levels		
Location	Date	Time (hrs)	Duration (mins)	L_{Aeq} dB	L_{AFmax} dB	L_{A90} dB
L1	19/06/2024	11:00	15:00	37	67	32
A1	19/06/2024	11:52	60:00	44	67	26
A3	25/06/2024	04:59	15:00	37	59	33
A3	25/06/2024	05:16	15:00	40	61	33
A2	25/06/2024	05:37	15:00	54	80	36
A2	25/06/2024	05:53	15:00	45	60	34

Measurement				Measured Noise Levels		
Location	Date	Time (hrs)	Duration (mins)	L_{Aeq} dB	L_{AFmax} dB	L_{A90} dB
A1	25/06/2024	06:29	15:00	49	65	29
A1	25/06/2024	06:45	15:00	44	63	30
A2	25/06/2024	07:19	60:00	46	77	39
A3	25/06/2024	08:36	60:00	43	70	32
L1	25/06/2024	10:27	15:00	38	63	33

Table 13.2: Attended noise measurement results.

13.3.5.2 Subjective Noise Environment

The measurements were taken on a weekday, and a weekend to provide an accurate understanding of the noise climate during varying times.

The noise sources observed during the attended survey were:

- Local road traffic noise,
- Birdsong,
- Distant farm machinery,
- Cattle,
- Distant wind turbines.

13.3.5.3 Unattended Monitoring Results

Table 13.3 below outlines the results of the noise measurements at the unattended monitoring location L1. A full breakdown of the unattended monitoring is available on request.

Start Date	$L_{Aeq,\ 16\ hour}$ 07:00 – 23:00 dB	L_{night} ($L_{Aeq,8\ hour}$ 23:00 – 07:00) dB	L_{A90} (07:00 – 19:00) dB	L_{A90} (19:00 – 23:00) dB	L_{A90} (23:00 – 07:00) dB
19/06/2024	38(1)	42	29(1)	33	30
20/06/2024	40	40	32	38	34
21/06/2024	46	39	40	37	32
22/06/2024	41	38	34	31	30
23/06/2024	35	39	29	32	31
24/06/2024	39	35	35	35	32
25/06/2024	38(1)	N/A	32(1)	N/A	N/A

Table 13.3: Unattended measurement results.

1) Shortened measurement duration.

13.3.5.4 Discussion of Results

Based on both the attended and unattended noise measurements, the most dominant noise source in the area is road traffic noise emissions from the existing roads surrounding the development.

13.3.5.5 EPA Quiet Area Screening

Based on the background noise survey outlined in this section it was determined that the NSLs do not meet the definition of an "area of low background noise" as defined in EPA. Additionally, as all NSLs are located < 7.5km from a motorway (M8), the development does not meet the EPA definition of a "quiet area", thus the criteria for "quiet area" and the "areas of low background noise" criteria are not applicable for the project.

13.3.6 Weather Conditions for Monitoring Period

Good weather conditions were noted in general during the deployment and collection during the attended survey, with winds of less than 5 m/s and no rain for the attended surveys.
Where weather conditions during the unattended survey impacted on the results they were filtered where required.

13.3.7 Characteristics of the Proposed Development

The site is located in Killoran, Moyne, Thurles, Co. Tipperary. The proposed site is south of the Lisheen mine windfarm, and also in close proximity to a number of residential receptors to the west and south.

Nua Bioenergy Limited plans to establish a biomethane and bio-based fertiliser production facility on a 5.5 hectare site at the former Lisheen Mine in Co. Tipperary, with an annual feedstock intake of up to 98,000 tonnes. The facility will include anaerobic digestion tanks, a biomethane upgrading plant, a combined heat and power unit, storage sheds, an office building, parking, and various processing equipment. The development also involves site access, weighbridges, fuel and water storage, sustainable drainage systems, site lighting, and landscaping.

The facility is proposed to operate on a continuous basis, 24 hours per day.

13.4 Potential Impacts of the Proposed Development

This section discusses the potential noise and vibration impact of the proposed development on the surrounding noise sensitive locations.

13.4.1 Construction Phase

13.4.1.1 Assessment Criteria for Construction Phase – Noise

Tipperary County Council (TCC) Noise Action Plan 2019 - 2023 refers to BS5228-1:2009+A1 as the appropriate method for assessing construction noise from construction sites. Tipperary County Council Draft Noise Action Plan 2023– 2028 was also considered. BS 5228 takes into consideration the impact of the ambient noise at the noise sensitive receptor as follows:

Assessment category and threshold value period	Threshold value, in decibels (dB) (L_{Aeq})		
	Category A[1]	Category B[2]	Category C[3]
Daytime (07:00 – 19:00) and Saturdays (07:00 – 14:00)	65	70	75
Evenings and weekends [4]	55	60	65
Night-time (23:00 – 07:00)	45	50	55

Table 13.4: Likely construction noise impact.

Note 1: Category A: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are less than these values.

Note 2 Category B: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are the same as category A values.

Note 3: Category C: threshold values to use when ambient noise levels (when rounded to the nearest 5dB) are higher than category B values.

Note 4 19:00 – 23:00 weekdays, 13:00 – 23:00 Saturdays and 07:00 – 23:00 Sundays.

13.4.1.2 Assessment Criteria for Construction Phase – Vibration

The TCC Noise Action Plan does not contain guidance relating to vibration limits. Best practice guidance is taken from British Standard BS 5228:2009 + A1 2014 Code of Practice for Noise and Vibration Control on Construction and Open Sites - Part 2 Vibration.

The standard recommends that for a soundly constructed residential property and similar structures (in good repair), the threshold for minor or cosmetic (i.e. non- structural) damage should be taken as a Peak Particle Velocity (PPV) (in frequency range of predominant pulse) of 15mm/s at 4Hz increasing to 20mm/s at 15Hz and 50mm/s at 40Hz and above. Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of:

Allowable vibration (in terms of peak particle velocity) at the closest part of sensitive property to the source of vibration, at a frequency of:			
Building Type	**Less than 15Hz**	**15Hz to 40Hz**	**40Hz and above**
Light framed structures/residential buildings	12 mm/s	20 mm/s	50 mm/s

Table 13.5: Likely construction vibration impact.

13.4.1.3 Assessment Criteria for Operational Phase – Noise

The main potential source of operational noise from the development is plant, equipment and truck movements from operations on the development.

Tipperary County Council Noise Action Plan 2019 - 2023
Tipperary County Council (TCC) Noise Action Plan references standards such as EPA NG4 which has been adopted as the leading criteria for this project.

Tipperary County Council Draft Noise Action Plan 2023– 2028
Tipperary County Council (TCC) Noise Action Plan references standards such as EPA NG4 which has been adopted as the leading criteria for this project.

EPA NG4
EPA NG4 outlines that noise attributable solely to onsite activities from a licenced premises should not exceed the following limits:

- *Daytime (07:00hrs – 19:00hrs) – 55dB $L_{Ar,T}$*
- *Evening (19:00hrs – 23:00hrs) – 50dB $L_{Ar,T}$*
- *Night time (23:00hrs – 07:00hrs) – 45dB $L_{Aeq,T}$*

During daytime and evening periods rigorous efforts should be made to avoid clearly audible tones and impulsive noise at all sensitive locations. A penalty of 5dB for tonal and/or impulsive elements is to be applied to the daytime and evening measured $L_{Aeq,T}$ values to determine the appropriate rating level ($L_{Ar,T}$). In all cases, an assessment by a competent person will be required.

During the night-time period no tonal or impulsive noise from the facility should be clearly audible or measurable at any NSL.

13.4.1.4 Assessment Criteria for Operational Phase – Vibration

Following a review of the operations based on the information provided, there are no relevant sources of vibration associated with the operational phase of the development, therefore, vibration criteria has not been specified for this phase.

13.4.2 Construction Phase Assessment

This section outlines the assessment of noise and vibration from the construction of the proposed development.

13.4.2.1 Noise Limits

The criteria for the project is based on the criteria outlined in Table 13.4 and the background noise in the area. The project criteria for construction noise are outlined below in Table 13.6. The distance to the NSLs is based on the closest receiver for each NSL where the NSL reflects a number of dwellings/sensitive receivers at each NSL. Reference to the baseline survey results and guidance contained in BS 5228 Part 1 for construction noise levels threshold for significance affect from constriction activities is set as follows for the closest noise sensitive locations:

Construction Noise Limits			
Noise Sensitive Location	**Distance to the Centre of the Site (m)**	**Ambient Noise $L_{eq,T}$ dB(A)**	**Noise Limits $L_{eq,T}$ dB(A)**
NSL1	430	43	65
NSL2	550	43	65
NSL3	1050	43	65
NSL4	1560	46	65
NSL5	1970	44	65

Table 13.6: Project criteria

For the appropriate assessment period (i.e. daytime in this instance) the ambient noise level is determined and rounded to the nearest 5dB. If the noise generated by construction activities exceeds the appropriate category value, then a significant effect is deemed to occur.

13.4.2.2 Construction Noise Predictions

Construction noise for the site has been predicted based on our experience of other similar anaerobic digestor developments. A summary of the expected equipment, durations and operating times are provided in Table 13.7. The noise sources are assumed to be located at the centre of the site. The prediction methodology in BS5228 has been used to calculate the noise level over a typical day for each of the main construction stages.

Construction Phase	Item of Plant (BS 5228-1:2009+A1:2014 Ref)	Noise Level (L_{Aeq} at 10m dB(A))	On Time of 10 hr day
Site Setup	Digger	77	4 hours
	Carpentry tools	78	2 hours
	Skill saw	84	2 hours
Substructure	Excavators	77	2 Hours
	Con Saws	84	4 Hours
	Rail Saw	85	2 Hours
	Drills (Into Concrete)	89	3 Hours
	Dumper	81	3 Hours
	Cement Mixer (Discharge)	75	3 Hours
	Lorry Idling	80	2 Hours
	Telescopic Handler	71	5 Hours
	Concrete Pump	78	3 Hours
Superstructure	Drills (into Concrete)	89	2 Hours
	Power Tools	70	4 Hours
	Impact Steel	69	2 Hours
	Hammer	69	1 Hour
	Dumper	81	3 Hours
	Cement Mixer (Discharge)	75	2 Hours
	Lorry Idling	80	2 Hours
	Telescopic Handler	71	6 Hours
	Concrete Pump	78	2 Hours
External finishes	Hand Tools	70	5 Hours
	Con saw	84	2 Hours
Internal finishes	n/a	n/a	n/a

Table 13.7: Proposed construction equipment, noise levels and duration.

Table 13.8 summaries the predicted construction noise levels at the noise sensitive locations. Examination of the results indicate the construction noise **without mitigation** is predicted to exceed the noise limits during all stages of the development with the exception of external and internal finishes.

Location	Noise Limit	Predicted cumulative noise level (construction noise + ambient) With no mitigation L_{Aeq}, dB			
		Site Set Up	Substructure	Superstructure	External finishes
NSL1	65	63	71	69	61
NSL2	65	62	70	67	60
NSL3	65	59	67	64	58
NSL4	65	58	66	63	56
NSL5	66	56	65	62	56

Table 13.8: Predicted noise levels without mitigation for each stage.

The calculations set out above are based on assumed site construction works and a combination of the plant operating at the same time i.e. worst-case scenario on the site at the same time. In reality this will not be the case however the assessment has been based on worst case scenario.

Location	Noise Limit	Noise reduction required at each stage of works to meet criteria (dBA)			
		Site Set Up	Substructure	Superstructure	External finishes
NSL1	65	0	6	4	0
NSL2	65	0	5	2	0
NSL3	65	0	2	0	0
NSL4	65	0	1	0	0
NSL5	66	0	0	0	0

Table 13.9: Attenuation required based on the construction noise predictions.

Noise mitigation measures will be required at all stages of construction except for the internal finishes stage. A combination of the mitigation measures outlined in Noise Mitigation Recommendations should be used to reduce the levels of construction noise by the values listed in Table 13.9 above.

Traffic from Construction Vehicles

The potential noise impact of additional construction traffic on the surrounding area is expected to be negligible. The traffic in the area is expected to increase by a maximum of 8% due to construction traffic, this equates to 40 extra vehicle movements. However, this increase in traffic will not significantly affect the noise levels in the area. The additional vehicles represent a small proportion of the overall traffic. For example, if the traffic values were to double, this would equate to an increase of 3dB in the surrounding area. The increase in road traffic for construction vehicles is not expected to increase the noise levels in the surrounding area.

Location	Base 2024 (AADF)			Construction Traffic (AADF)			% impact		
	Car	HGV	Total	Car	HGV	Total	Car	HGV	Total
L3201	496	46	542	20	20	40	4%	43%	8%
L4115	891	74	965	20	20	40	2%	27%	4%
R639	3,192	228	3,420	10	10	20	0%	4%	1%

Table 13.10: Construction traffic AADF's.

This increase is deemed imperceptible and therefore will pose no adverse impact on the surrounding noise sensitive receptors. To put this in perspective Table 13.11 below from DMRB guidance outlines the magnitude of change in relation to increased road traffic. Based on the proposed number of construction traffic vehicles on the road, the magnitude of impact is predicted to be negligible.

Magnitude of Impact	Increase in Baseline Noise Level of Closest Public Road Used for Construction Traffic (dB)
Major	Greater than or equal to 5.0
Moderate	Greater than or equal to 3.0 and less than 5.0
Minor	Greater than or equal to 1.0 and less than 3.0
Negligible	Less than 1.0

Table 13.11: Magnitude of impact due to construction traffic on local roads.

13.4.2.3 Construction Vibration Predictions

Prediction of vibration levels at receptors is complex and dependent on several variables including the nature of the used equipment, the properties of the subsoil, the heterogeneity of the soil deposit, the distance to the receptor and the dynamic characteristic of the adjacent structures. Therefore, limits or threshold criteria as set out in BS5228-2 are applied for buildings and humans.

Based on our understanding of the project and the distances to the receptors it is not anticipated that there will be a negative vibration impact from the construction works.

13.4.2.4 Potential Cumulative Impacts

The predictions outlined in the assessment assume a worst-case scenario IE all sites operating at the same time. The Revive Environmental site is under construction at present, there is unlikely to be any noise impact from the construction of this site. There is potential for noise impacts on the surrounding area if both sites are under construction simultaneously, however, the mitigation measures outlined in this chapter will be sufficient in

reducing the noise levels from the construction of the proposed development. NUA Bioenegry has no control over the construction noise levels of the Revive Environmental site currently under construction, therefore cannot recommend mitigation against potential noise emissions.

The existing noise levels in the area have been considered as part of the assessment in combination with the construction noise. It is not predicted that the in combination affects from the construction noise and the existing noise sources will have an impact on based on the recommendations outlined in this chapter.

Once the development is completed, the potential noise impacts to the surrounding environment will include:

- Additional traffic,
- Operational noise from car parking, the operations from the site and the plant and equipment on the development.

These impacts are assessed in the following sections.

Once operational, there are no vibration sources associated with the development site based on the information provided.

13.4.2.5 Additional Traffic

Traffic data provided by Systra is outlined in the tables below. The additional traffic associated with the sites is expected to be less than 1000 vehicles per day. Only 3 to 4 members of staff will be on site at any time leading to little traffic generation. The development will typically generate an average of 8 two-way vehicle movements per hour and a total of 66 two-way trips per day. Vehicles that deliver material will also pick up the bio fertilizer, this efficiency reduces vehicle trips. For comparison, the mine would generate 240 two-way vehicle movements per day. The development operational traffic values are outlined in Table 13.12 below.

Location	Description	2024 7 Day AADF	2024 7 Day AADF HGV	HGV %
		Total	Total	Total
1	L3201, 1.6km Southwest of Clonsaul	542	46	8%
2	L4115, 3.6km NW of R639 junction	965	74	8%
3	R639, 500m west of L4115 junction	3420	228	7%
4	R639, 500m east of L4115 junction	3420	228	7%

Table 13.12: Proposed development operational traffic.

Location	Description	2024 7 Day AADF	2024 7 Day AADF HGV	HGV %
		Total	Total	Total
1	L3201, 1.6km Southwest of Clonsaul	542	46	8%
2	L4115, 3.6km NW of R639 junction	965	74	8%
3	R639, 500m west of L4115 junction	3420	228	7%
4	R639, 500m east of L4115 junction	3420	228	7%

Table 13.13: Baseline 2024 traffic flows.

Location	Description	DM 2041 7-day AADF (all veh)	DM 2041 7-day AADF (HGV)	HGV %
		Total	Total	Total
1	L3201, 1.6km Southwest of Clonsaul	615	52	8%
2	L4115, 3.6km NW of R639 junction	1,095	84	8%
3	R639, 500m west of L4115 junction	3,880	259	7%
4	R639, 500m east of L4115 junction	3,880	259	7%

Table 13.14: Do-Minimum 2041 AADT traffic flows.

Location	Description	DS 2041 AADF (DM + Dev Traffic)	DS 2041 % Impact (all traffic)	DS 2041 % HGVs
		Total	Total	Total
1	L3201, 1.6km Southwest of Clonsaul	669	8%	16%
2	L4115, 3.6km NW of R639 junction	1,149	5%	12%
3	R639, 500m west of L4115 junction	3,907	1%	7%
4	R639, 500m east of L4115 junction	3,907	1%	7%

Table 13.15: Do-Something 2041 AADT traffic flows.

Table 13.16 below outlines the predicted increase in noise level (LAeq,T) caused by the increase in road traffic for the 2041 do something scenario versus the 2041 do minimum scenario.

Location	Description	Difference between Baseline and DS-2041 (All Veh)	Difference between Baseline and DS-2041 (HGV)	Decibel increase (L_{Aeq} dB(A))
		Total	Total	Total
1	L3201, 1.6km Southwest of Clonsaul	127	55	0.5

Location	Description	Difference between Baseline and DS-2041 (All Veh)	Difference between Baseline and DS-2041 (HGV)	Decibel increase (L_{Aeq} dB(A))
		Total	Total	Total
2	L4115, 3.6km NW of R639 junction	184	54	0.5
3	R639, 500m west of L4115 junction	487	14	0
4	R639, 500m east of L4115 junction	487	14	0

Table 13.16: Difference from baseline traffic flow and predicted 2041 traffic flows with the additional of development traffic.

13.4.3 Operational Phase

This section outlines the predictive modelling assessment conducted on the operational stage of the development. A list of plant and equipment likely to be used in the finished development has been provided to WDA, along with estimated percentage on-times for each piece of plant and included in the assessment. Equal or approved plant and equipment are suitable for this project.
The typical operational noise sources fall under these categories:

- Energy Generation.
- Flaring.
- Gas Conditioning.
- Standby Power.
- Solid Feed System.
- Digesters.
- Post Digester.
- Storage Tank.
- Pumps of various uses.
- Wheel washing.

SoundPLAN 9.0 modelling software was developed to establish the noise levels from the development in a worst-case scenario. The software implements the algorithms contained in ISO 9613-1 and ISO 9613-2. The noise model considers:

- Distance attenuation,
- Source and receptor locations,
- Barrier effects (buildings, walls etc)
- Topographical elevations,
- Ground effects and absorption,
- Source sound power levels,
- Directivity and orientation of the source,
- Atmospheric attenuation and meteorological effects,

Figure 13.3 below highlights a snip of the 3D acoustic noise model undertaken for the operational phase of the proposed development.

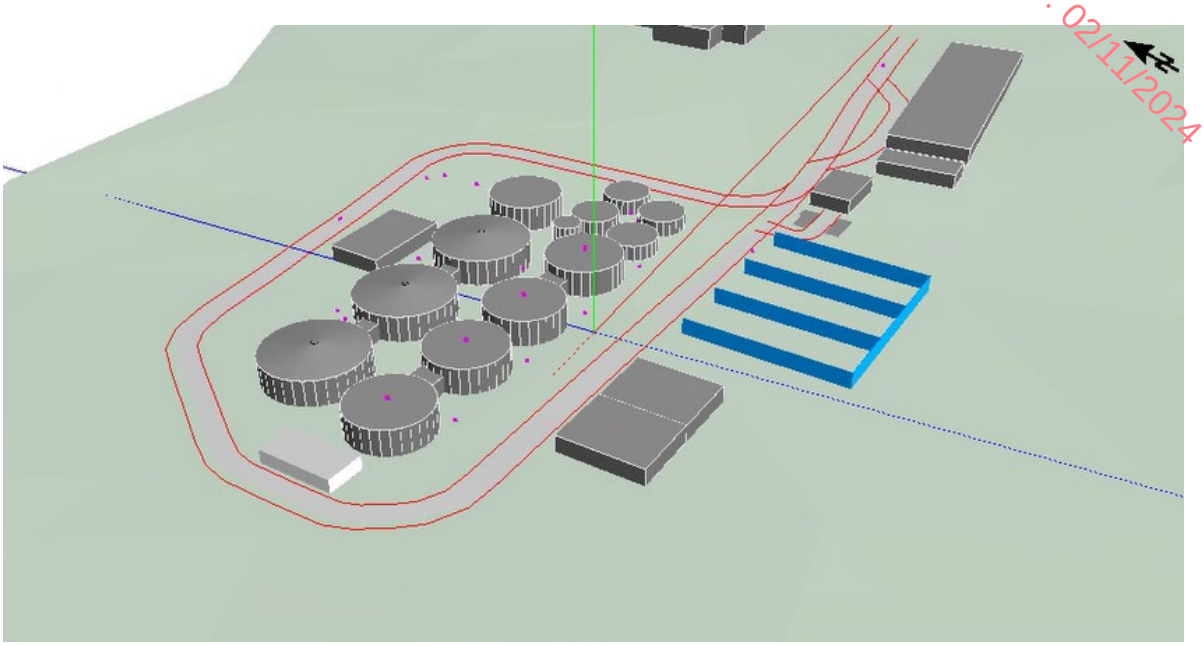

Figure 13.3: Screenshot of the noise model.

The acoustic model for the development has been developed based on attended noise survey, the proposed site location and predicted noise sources. As the site has potential to create noise impact at both day and nighttime, a worst-case scenario has been developed for both predicting the noise impact at the nearest noise sensitive locations. Table 13.17 below outlines the assumed sound power levels for the mobile machinery onsite.

Assumed Mobile Plant and Equipment Sound Power Spectrum									
Description	Source Sound Power Level L_w at Octave Band Centre Frequency, Hz								Overall Sound Power Level L_{wA} dB
	63	125	250	500	1000	2000	4000	8000	
Wheel Loader	102	94	92	92	91	88	87	78	96
Truck Driving	94	87	82	84	85	81	73	66	88

Table 13.17: Assumed sound power spectrums for mobile plant and equipment.

Table 13.18 below outlines the assumed sound power noise levels for the stationary plant and equipment on the development.

Description	No. of Sources	Source Sound Power Level L_w at at Octave Band Centre Frequency, Hz								Overall Sound Power Level L_{wA}	Assumed on Time
		63	125	250	500	1000	2000	4000	8000	dB	
CHP	1	90	90	89	88	87	86	85	84	93	100%
Intercooler and Dump Radiator	1	70	70	69	68	67	66	65	64	73	100%
Gas Compression	2	87	88	89	90	88	86	82	76	93	100%
Gas Cooling	2	76	77	78	79	77	75	71	65	82	100%
Havelberger Hopper	4	75	75	74	73	72	71	70	69	78	100%
Agitator Gear - Vertical	4	80	80	79	78	77	76	75	74	83	15%
Agitator Motor - Vertical	4	73	73	72	71	70	69	68	67	76	15%
Paddle Agitator – Horizontal	3	83	83	82	81	80	79	78	77	86	15%
Mixer	3	80	80	79	78	77	76	75	74	83	15%
Mixer	6	80	80	79	78	77	76	75	74	78	15%
Various Uses	2	72	73	74	75	73	71	67	61	68	100%
Washing	1	88	79	73	69	70	71	72	77	80	Based on AADT Figures

Table 13.18: Assumed sound power spectrum for noise sources.

Assumptions

The following general assumptions were made as part of the assessment:

- Assumed operational on a continuous basis for both day and nighttime operation (worst case).
- Assumed noise source spectrums as outlined in Table 13.17 and Table 13.18 above.
- Where the locations were not available for the plant and equipment the location was assumed based on data available and drawings provided.
- Modelling based on the drawings, layouts and information provided.
- Assumed total number of noise sources as per the tables above.
- Equipment plant on-times assumed based on our experience with other similar projects.
- Standby genset and emergency flaring not included in assessment as these are used in emergency events only.

- Lower number of deliveries modelled during the evening and nighttime periods.
- Steam cleaner operating at the same frequency of truck deliveries to the site, this is based on the development traffic AADT listed above in Table 13.12.
- The CHP is fully enclosed, performance of the enclosure is to achieve a minimum of Rw 27 dB. Table 13.19 outlines the minimum enclosure performance.
- Assumed wheel loader is in operation 100% of the time.

Description	Assumed CHP Enclosure Sound Reduction R dB at Octave Band Centre Frequency, Hz								Overall Sound Reduction R_W dB
	63	125	250	500	1000	2000	4000	8000	
CHP Enclosure	25	30	20	22	30	28	31	31	27

Table 13.19: CHP Enclosure minimum performance values.

Assumed truck movements:

- On average 7 hourly truck movements in line with AADT's outlined in Table 13.12 above.

For the predictions a receiver was placed at each NSL to calculate the worst-case noise impact. Where NSLs included a number of houses or noise sensitive locations multiple receivers were used to establish the worst case and most impacted NSL.

Table 13.20 below outlines the predicted operational noise level from the proposed development at the NSLs for both the day, evening and night-time scenarios. Based on the predicted noise level at the NSLs, the development is expected to achieve compliance with the EPA NG4 criteria for all periods.

Location	Day-Time Criteria (dBA) $L_{Aeq\ 12hr}$	Day-Time Predicted Results(dBA) $L_{Aeq\ 12hr}$	Evening Criteria (dBA) $L_{Aeq\ 4hr}$	Evening Predicted Results (dBA) $L_{Aeq\ 4hr}$	Night-Time Criteria (dBA) $L_{Aeq\ 8hr}$	Night-Time Predicted Results (dBA) $L_{Aeq\ 8hr}$	Compliance
NSL1	55	30	50	27	45	24	Compliant
NSL2	55	28	50	26	45	24	Compliant
NSL3	55	20	50	19	45	18	Compliant
NSL4	55	18	50	16	45	15	Compliant
NSL5	55	29	50	26	45	23	Compliant

Table 13.20: Predicted operational noise levels at each NSL.

Assessment time slices based on EPA NG4 criteria as follows:

- Daytime – 07:00hrs – 19:00hrs.
- Evening – 19:00hrs – 23:00hrs.
- Nighttime – 23:00hrs – 07:00hrs.

13.4.3.1 Potential Cumulative Impacts

The cumulative noise impact from the construction noise and operational noise has been predicted. In the event that the construction of the developments is phased there is the potential for both operational noise and construction noise impact. It is not predicted that this will have a significant impact provided the advice and guidance in this chapter is followed. This will most like also be for short periods of time and not long term.
The existing measured noise levels from the operation of the existing development on the boundaries of the development have been considered with the future operational noise levels. Taking into consideration the assessment outlined above, the predicted levels from the operational noise of the development, the existing noise levels and the distance from the development to the noise sensitive receptors it is not predicted that the development will have a significant impact on the receivers from operational noise. Further assessment of cumulative noise impacts with the assessment of other existing/approved developments in the surrounding area can be found in Section 13.9 Cumulative Effects

13.4.3.2 "Do Nothing" Impact

Under the Do-Nothing scenario, the prevailing noise environment at the closest noise sensitive locations will remain in line with those measured during the baseline study and hence will be of neutral effect in terms of noise.

13.5 Avoidance, Remedial & Mitigation Measures

This section outlines the avoidance, remedial and mitigation measures recommended for the construction and operational phase of the development.

13.5.1 Construction Phase

This section outlines the recommended noise mitigation measures for the construction phase of the project.

13.5.1.1 Noise Mitigation Recommendations

Best practice control measures for noise from construction sites are found within BS 5228 (2009 +A1 2014) part 1. Construction noise impacts are expected to vary during the construction phase of the project, this impact will

depend on the distance between the construction activities and noise sensitive receptor. The contractor will ensure that all best practice noise and control methods will be used, to ensure any negative noise impacts at off-site noise sensitive locations are minimised.
The best practice measures set out in BS 5228 (2009) Part 1 includes guidance on several aspects of construction site mitigation measures, this includes the

- selection of quiet plant and equipment;
- noise control at source of the noise;
- screening, and;
- public liaison.

13.5.1.2 General Recommendations

This section of the report sets out noise mitigation options and detailed comment on each one specifically for this site.

13.5.1.3 Selection of Plant and Equipment

The noise impact of all plant and equipment should be assessed prior to selection of the plant for the project. Where an item of plant is identified as noisy with the potential to cause a negative noise impact it should be reviewed to check if there is an alternative quieter version of the same plant to undertake the same construction task.

13.5.1.4 Noise Control at Source

Where replacing a noisy item of plant is not viable or practical, consideration should be given to control that noise at source. This includes modifying the piece of plant or equipment to generate less noise, using dampening to control vibration induced noise or rattling. Example best practice mitigation measures to be considered are as follows:

- All plant and equipment to be switched off when idling.
- The use of white noise reversing alarms.
- Restriction on the dropping and loading of materials to less sensitive hours.
- The use of local screening for noisy activities or works with hand tools
- Not dropping materials onto hard surfaces and using rubber mats etc for the dropping of materials.
- Ensure all plant and equipment is well maintained and cleaned, all lubrication should be in line with manufacturers guidelines.

13.5.1.5 Screening

Screening when used correctly can be an effective method of reducing the construction noise impact on the NSL's. The use of site hoarding and careful selection of areas for noise works, using buildings on the site, site offices and the building being constructed to screen noise from the works.

Local screening of noisy works with the use of temporary acoustic barriers, examples are provided below:

- https://ventac.com/acoustic-products/noisebreak-acoustic-barrier/
- https://echobarrier.com/

Figure 13.4: Temporary construction noise barrier © Ventac

13.5.1.6 Public Engagement

It is recommended that a public liaison officer should be put forward by the contractor to liaise with the local residents on matters relating to noise. Residents should be informed of any noise works scheduled where there is the potential to generate high levels of construction noise or if specialist works etc need to be conducted out of the working hours. This person should also be the point of contact for all complaints and be responsible for reviewing the noise monitoring results and exceedances.

13.5.1.7 Site Specific Recommendations

Table 13.21 below outlines the recommended site-specific noise mitigation measures based on the attenuation required in Table 13.9.

Construction Stage	Recommended Noise Mitigation Measure
Site Setup	Erect a minimum 2.4m high site hoarding that blocks the line of sight between noise source and receiver. Example construction for the site hording would be as follows: • A 2.4m high and 9mm plywood (4.5 kg/m^2). Barrier must be solid and not contain gaps at the bottom or between adjacent panels Local screening using the examples provided in Figure 13.4 are required around hand tools in addition to hoarding. An absorptive lining should be considered for screening around hand tools will need to have an absorptive lining to avoid reflections increasing noise at other receivers. On this project 6 NSL's have been identified it is recommended that a noise monitor should be placed on the boundary with each of nearest noise sensitive locations closest to the works. (NSL1 being worst case)
Substructure	Site hoarding to block line of sight. Local screening around noisy plant and equipment. Noise monitoring as above
Superstructure	Local screening around saws/hammers where possible. Use external new building to screen noise from works where possible. Noise monitoring as above
External finishes	Local screening around hand tools. Noise monitoring as above

Table 13.21: Attenuation required based on the construction noise predictions.

13.5.2 Operational Phase

The operational noise impact of the development is predicted to comply with the project criteria and therefore no additional mitigation is required.

13.6 Residual Impacts

This section outlines the residual impacts from the proposed development.

13.6.1 Construction Noise

There is the potential for some construction noise impact during the construction phase of the developments.

During the construction phase of the project there is the potential for some adverse effects on nearby noise sensitive properties due to noise emissions from site activities as summarised in Table 13.25 below. Set noise limits, hours of construction and the implementation of the mitigation measures outlined in this section will ensure that construction noise and vibration is limited to short term with slight/no significant effect.

Quality	Significance	Duration
Negative	Slight	Short-term

Table 13.22: Likely construction noise impact.

13.6.2 Vibration

Given the distance to the vibration sensitive receptors, the mitigation advice and our experience of measuring similar vibration effects it is not predicted that construction vibration will have a negative impact on the sensitive receptors.

13.6.3 Operational Noise

The noise impacts associated with the operation of the development is summarised in Table 13.26 below.

Quality	Significance	Duration
Neutral	Imperceptible	Long-term

Table 13.23: Likely operational noise impact.

It can be concluded based on the assessment and assumptions outlined in this section that, once operational, noise levels associated with the proposed development will not contribute any significant noise impact to its surrounding environment.

13.7 Indirect and/or Secondary Impacts

Taking into consideration the specified mitigation, the predicted impacts and the existing baseline environment It is not anticipated that there will be indirect and/or secondary impacts associated with the noise and vibration impact from the development.

13.8 Monitoring

This section outlines the noise and vibration monitoring recommended during the construction and operational phase of the development.

13.8.1 Construction Phase

This section outlines the monitoring recommendations for the construction phase of the development.

13.8.1.1 Construction Noise Monitoring

Construction noise monitoring will be undertaken at periodic sample periods on the boundary with the nearest noise sensitive receptors by the contractor. In this case NSL1 is the closest sensitive receptor, therefore, continuous noise monitoring should be observed at the boundary of the site in the direction of NSL1 for the during the substructure and superstructure phases of construction.

Noise monitoring should be conducted in accordance with the International Standard ISO 1996: 2017: Acoustics – Description, measurement and assessment of environmental noise.

13.8.1.2 Vibration Monitoring

It is not predicted that there will be any negative vibration impact at the sensitive locations, however vibration limits have been provided in this section should monitoring be required.

The Vibration monitoring stations should continually log vibration levels using the Peak Particle Velocity parameter (PPV, mm/s) in the X, Y and Z directions, in accordance with BS ISO 4866: 2010: Mechanical vibration and shock – Vibration of fixed structures – Guidelines for the measurement of vibrations and evaluation of their effects on structures.

Vibration Limits

The recommended vibration limits to avoid cosmetic damage to buildings, as set out in:

- British Standard BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration, and;
- British Standard BS5228-2: 2009 + A1: 2014: Code of practice for noise and vibration control on construction and open sites – Vibration.

The standards note that minor structural damage can occur at vibration magnitudes which are greater than twice those presented in Table 13.24 and major damage to a building structure is possible at vibration

magnitudes greater than four times the values set out in Table 13.24. Definitions of the damage categories are presented in BS 7385-1:1990.

Vibration PPV at the closest part of sensitive property to the source of vibration		
Frequency		
4 to 15 Hz	15 to 40Hz	40Hz and above
15 mm/s	20 mm/s	50 mm/s

Table 13.24: Transient vibration guide values for cosmetic damage

Note 1: At frequencies below 4 Hz, a maximum displacement of 0.6 mm (zero to peak) is not to be exceeded
Note 2: It should be noted that these values are at the base of the building.

13.8.2 Operational Phase

This section outlines the proposed monitoring for the operational phase.

13.8.2.1 Operational Noise Monitoring

The impact assessment has found that there are no significant noise impacts likely at nearby noise sensitive locations during the operational phase and therefore no remedial or reductive measures are required. The predictions are based on the information available at planning stage and when the actual plant to be used becomes available it should be verified to ensure compliance. General recommendations for the management of noise include:

A noise policy should be created for the site. The noise policy should include but is not limited to policies on the following:

- Trucks/vans should not be left to idle when loading/unloading or when parked on the site.
- Wheel loading operators should ensure they are not slamming/dropping buckets when loading feed.
- There should be no amplified music or announcements externally in the yard areas.
- Signage should be erected in the yard and in the car park to remind workers to be respectful to the company's neighbours.

13.8.2.2 Operational Vibration Monitoring

There are no sources of vibration associated with the operational phase of the development therefore no operational or reductive measures are required.

13.9 Interactions

The interaction between Noise and Vibration and other Chapters in this EIAR is primarily limited to Chapter 14 Traffic and Transportation. This noise and vibration assessment chapter has been prepared in consideration of and in conjunction with the relevant outputs of the Traffic and transportation chapter where appropriate.

13.9.1 Construction Phase

Traffic and Transportation (Chapter 14): Construction vehicles on site and on local roads will generate little to no additional noise in the surrounding area, due to the marginal increase in traffic on the roads. There will be no quantifiable increase in noise levels from the additional construction traffic on the surrounding roads.

13.9.2 Operational Phase

Traffic and Transportation (Chapter 14): There will be additional traffic once the development has reached the operational phase. These increase in road traffic noise levels from the additional traffic of the operational phase will be less than 1dB of an increase. This increase in road traffic noise will have no negative noise impact on the surrounding area.

13.9.3 Conclusion

Mitigation measures will not be required to reduce the noise impacts from the increased road traffic volumes during both the construction and operational phases of the development. This is due to the marginal increase in traffic volumes which equates to less than 1dB of an increase in road traffic noise levels in the surrounding area.

13.10 Cumulative Effects

The consideration of potential cumulative effects is an important stage in the EIA process. Although the proposed development may not result in significant residual effects in isolation, when the proposed development is considered cumulatively with other projects, significant residual effects may occur.

13.10.1 Methodology

The CEA has considered likely significant cumulative effects arising from other existing and/or approved projects that may arise during construction and operation of the proposed development.

The cumulative construction assessment considers the total effects of the proposed development and other identified projects being constructed concurrently. It is assumed that the construction of the proposed development starts in 2025/2026. Projects where construction has been completed prior to 2025/2026 are therefore not included in the cumulative construction assessment. The cumulative operational assessment considers the total effects of the proposed development and other identified projects operating concurrently.

13.10.2 Other Existing/Approved Developments

This section outlines existing/approved developments in the surrounding area. Table 13.22 below outlines the existing/approved developments in the area surrounding the proposed development assessed in this chapter. This table has been provided to WDA by Purser for use in this chapter. The list of other existing/approved has been screened as part of the cumulative assessment, developments within a 2.5km radius of the proposed anaerobic digester have been included as part of the cumulative assessment. Due to the distances between developments Wave Dynamics have determined that those in closest proximity warrant assessing of cumulative impacts, therefore everything outside of this radius has been omitted from the cumulative assessment. Further description of each development can be found underneath Table 13.22.

Project No.	Project Name	Planning Ref.	Project Description
1	Acorn Recycling Workshop and Truck Washout	Tipperary Co. Co. Reg. Ref. 2360281	Permission for development consisting of Workshop Building (1242 sq m), Truck Washout Building (64 sq m), commercial yard area, new boundary fence and entrance gates, an on-site Wastewater Treatment System and associated polishing filter bed percolation area, attenuation tank, bored well & water storage tank, rainwater harvesting tank, emergency storage tank, solar panels to roof of existing building and all associated site works - application is accompanied by an NIS.
2	Irish Bioeconomy Foundation Research and Development Unit	Tipperary Co. Co. Reg. Ref. 211171	Permission for the Change of use of the former Lisheen Mine maintenance depot to an agri-food sector Research and Development Unit for light industrial use with ancillary office space. The permitted development includes demolition of the existing loading bay canopy, Extension of the existing first floor accommodation by 169 sqm, Construction of an external stair to the rear, additional windows to the front and rear elevations with an external perforated printed mesh screen fixed to the front and south gable elevation, canopy over the front entrance door and an array of PV Panels fixed to the roof, Landscape works including a waste water treatment plant and car parking with 4 no. electric vehicle chargers.
3	Glanbia Biorefinery (1)	Tipperary Co. Co. Reg. Ref. 18601296	A 10-year planning permission for a biorefinery facility comprising of a process building with processing areas, plant rooms, stores, personnel & administrative areas; external bunded process & storage areas; vessels and tanks; CHP plant; an effluent & water treatment plant which includes bunded tanks & a building; sewage treatment plant; water storage tanks & site development works including demolition of an existing electrical building, roads, paved

Project No.	Project Name	Planning Ref.	Project Description
			areas, parking areas, drains and services, borewell, lighting, fire water retention tank, attenuation pond, site fencing, alterations to the discharge pipeline from the sewage treatment plant, weighbridges & weighbridge office, connection to an existing outfall pipeline and landscaping works. The application is accompanied by an Environmental Impact Assessment Report. This application relates to development which comprises or is for the purpose of an activity requiring an Integrated Pollution Prevention and Control Licence.
4	Glanbia Biorefinery (2) (Modifications to Biorefinery permitted under Application Reg.Ref. 18601296)	Tipperary Co. Co. Reg. Ref. 20129	A 10-year planning permission for modifications to Condition No. 1 of previously granted planning permission Ref. No. 18/601296. The modifications comprise an outfall drain and associated pumping station and monitoring chambers to discharge surface water and treated wastewater from the Biorefinery site through the townlands of Cooleeny and Derryfadda to the Drish River; a water supply pumphouse and associated site works including access road and security fencing in the townland of Derryville and a water supply pipeline from the pumphouse to the Biorefinery facility site. A Natura Impact Statement (NIS) will accompany the application. This application relates to development which comprises or is for the purpose of an activity requiring an Industrial Emissions Licence.
5	Soleirtricity Solar PV Farm	Tipperary Co. Co. Reg. Ref. 211128	Permission for a Solar PV development with a maximum export capacity (MEC) of up to 122MW comprising of ca. 214,800 no. photovoltaic panels laid out in arrays, the construction of a 38kV substation, (ca.57.31m2 x 4.45m tall) along with associated ancillary development including 30 no. Transformer Stations (ca. 7.27m2 x 2.6m) with an integrated bund, 716 string Inverters, 1 no. DNO Substation Building (16.28m2 x 5.42m), 1 No. Storage and maintenance building (ca. 57.31m2 x 4.45m tall), 38 no. CCTV cameras mounted on ca. 3.8m high poles, perimeter security fencing and all ancillary works, the total development area will be ca. 77ha.

Project No.	Project Name	Planning Ref.	Project Description
6	Revive Environmental	Tipperary Co. Co. Reg. Ref. 21709	Permission for a light industrial building consisting of a mechanical assembly workshop including an administration block and all associated site works at Cooleeny, Moyne, Thurles, Co. Tipperary. Permission includes for a building (3657 sq m) with a car park and access road, commercial yard area and access road, truck prep building (110 sq m), 2 m high boundary architectural fence, signage, public lighting, solar panels to the building roof, an on-site waste water treatment system and associated polishing filter bed percolation area, rainwater harvesting tank, emergency storage tank, attenuation tank, bored well and all associated site works - application is accompanied by a Natura Impact Statement (NIS)

Table 13.25: Other Existing/Approved developments in the surrounding area.

The committed developments within a 2.5 kilometre radius of the existing site have been reviewed. The potential in combination effects with the committed developments has been found to be negligible. Based on the developments that have submitted a noise impact assessment as part of an EIAR chapter or as a standalone document have all been deemed suitable developments for the area, with noise levels predicted to be in line with the existing noise climate and in line with EPA criteria. The combination of these chapters and the distances between the developments, and the predicted noise emissions of the proposed anaerobic digestion facility, lends that there will be no negative noise impact from the in-combination operation of the developments at the NSLs outlined in this chapter.

A breakdown of each development's interactions can be found below:

The Acorn recycling workshop and truck washout (Ref: 2360281) is approximately 700 meters away from the proposed anaerobic digestion facility located at the former Lisheen mines. A noise impact assessment was not conducted at planning stage, given the distance between the developments on the NSLs and the typical noise levels associated with similar development it is not predicted that noise from the recycling workshop would have an impact on the cumulative noise levels at the NSLs outlined in this report.

The Irish Bioeconomy Foundation Research and Development Unit (Ref: 211171) is approximately 250 meters from the proposed anaerobic digestion facility located at the former Lisheen mines site. A noise impact assessment was not conducted at planning stage, given the distance between the developments on the NSLs and the typical noise levels associated with similar development it is not predicted that noise from the recycling workshop would have an impact on the cumulative noise levels at the NSLs outlined in this report.

The Glanbia Biorefinery (Ref: 18601296) is approximately 630 meters from the proposed anaerobic digestion facility at the former Lisheen mines. The biorefinery is also located on lands of the former Lisheen mines a noise and vibration chapter was developed as part of the planning stage EIAR. The chapter finds that the operation of the biorefinery is likely to cause no noise impact at the closest sensitive receptor and is likely to produce noise levels similar to the existing noise levels in the area. The biorefinery will also be subject to EPA NG4 noise limits and surveying. Based on this, the predicted noise emissions of the proposed digester facility and the distance between the two sites, there is a high likelihood that there will be no negative noise impact from the in-combination operation of both developments.

The Soleirtricity Solar PV Farm (Ref: 211128) is located to the northeast of the former Lisheen mines and approximately 550 meters from the proposed anaerobic digestion facility at the former Lisheen mines. The noise and vibration chapter of the EIAR report has deemed the development will not have any negative noise impact on the surrounding environment, due to the operational noise being within EPA criteria and mitigation measures were not required. The solar farm will also be subject to EPA NG4 noise limits. Based on the findings in the EIAR chapter and the predicted results outlined in this assessment, and the attenuation of sound over large distances, there will be no likely in-combination effects that have a negative noise impact on the closest sensitive receptors.

Finally, the Revive Environmental (Ref: 21709) industrial site is located approximately 1450 meters from the proposed anaerobic digestion facility at the former Lisheen mines site and is currently under construction at the time of writing this chapter. A noise impact assessment was not conducted at planning stage, given the distance between the developments on the NSLs and the typical noise levels associated with similar development it is not predicted that operational or construction noise from the recycling workshop would have an impact on the cumulative noise levels at the NSLs outlined in this report.

The cumulative noise impact assessment indicates that the proposed development will have a negligible effect on the cumulative noise climate in the surrounding area. Operational noise levels from the development are significantly below the EPA NG4 criteria, with all noise sensitive locations predicted to be ≥20dB below the EPA NG4 criteria for all periods. To put this into context, noise levels in decibels (dB) are logarithmic, meaning that small differences in dB correspond to large differences in actual sound intensity. Specifically, when summing two noise levels where the difference is 10 dB or more, the contribution of the quieter noise is insignificant, and the total level is essentially equal to just the higher noise level. Therefore, as all NSLs are predicted to greater than 20dB below the EPA NG4 criteria based on the predicted operational noise levels, it is predicted that the proposed committed developments will not contribute to any noticeable increase in the overall cumulative noise levels.

13.10.3 Cumulative Effects Assessment

Section 13.10.2 above explains which projects were screened in/out for CEA for noise and vibration.

Table 13.23 below presents the results of the CEA in respect of noise and vibration. The project numbers mentioned in the table below correspond to the projects listed in Table 13.22.

Table 13.23 below presents a summary of the overall CEA of the screened-in projects in combination with the proposed development for noise and vibration.

Environmental Factor	"Screened-in" Projects	Significance of Effects
1	Acorn Recycling Workshop and Truck Washout	The significance of effects has been deemed negligible based on the noise levels of both developments' cumulative operations. A noise assessment was not conducted at planning stage for this development; therefore the council has deemed the potential noise impact of this development as insignificant.
2	Irish Bioeconomy Foundation Research and Development Unit	The significance of effects has been deemed negligible based on the noise levels of both developments' cumulative operations. The council has deemed the noise impact of this development insignificant based on the fact that there was no noise impact assessment present in the planning submission. The distance between the two developments also lends to the fact that the cumulative noise from both developments will have no negative cumulative noise impact.
3	Glanbia Biorefinery (1)	The significance of effects has been deemed negligible based on the noise levels of both developments' cumulative operations. Based on the noise and vibration chapter developed for the Biorefinery, the noise emissions from the facility are predicted to be in line with existing background noise levels. The combination of these noise levels and the predicted noise levels of the anaerobic digestion facility are significantly below background lends to the fact that there will be no negative cumulative noise and vibration impacts.
4	Glanbia Biorefinery (2) (Modifications to Biorefinerypermitted under Application Reg.Ref. 18601296)	The significance of effects has been deemed negligible based on the noise levels of both developments' cumulative operations.
5	Soleirtricity Solar PV Farm	The significance of effects has been deemed negligible based on the noise levels of both developments' cumulative operations. The EIAR noise and vibration chapter has deemed the noise levels from this facility in line with EPA guidelines, therefore the low noise levels of

Environmental Factor	"Screened-in" Projects	Significance of Effects
		the anaerobic digestion facility are significantly under those limits set by the EPA, lends to the fact that there will be no negative cumulative noise and vibration impacts.
6	Revive Environmental	The significance of effects has been deemed negligible based on the noise levels of both developments' cumulative operations. The distance between the two developments alone will result in no negative cumulative noise impacts and also the lack of a noise assessment for this development further refines that the council has deemed the potential noise of this development as not significant.

Table 13.26: Summary of the screened projects.

13.10.4 CEA Mitigation Measures

There are no mitigation measures required in the cumulative effects assessment, as the distance between developments is adequate enough to attenuate any potential noise impacts. Further to this the developments in the area that have noise and vibration assessments conducted for planning stage have all deemed the respective developments are compliant with EPA guidance and also existing background noise levels in the surrounding area.

13.10.5 Overall Cumulative Residual Effects

There are no residual effects from the cumulative noise and vibration assessment.

13.11 Difficulties Encountered When Compiling

No difficulties were encountered when compiling this section.

13.12 References

- EPA Guidelines on the Information to be contained in Environmental Impact Statements, (EPA, 2002);
- EPA Guidelines on the Information to be contained in Environmental Impact Assessment Reports (EPA, 2022);
- EPA Advice Notes on Current Practice (in the preparation of Environmental Impact Statements), (EPA, 2003);
- EPA Advice Notes for Preparing Environmental Impact Statements, (Draft, September 2015)
- EPA NG4: Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities, (January 2016);
- Tipperary County Council Noise Action Plan 2019 – 2023;
- Tipperary County Council DRAFT noise action plan 2023-2028;
- ISO 1996-1:2016 Acoustics – Description, measurement and assessment of environmental noise – Part 1: Basic quantities and assessment procedures;
- BS 5228-1:2009+A1:2014: Code of Practice for Noise and Vibration Control on Construction and Open Sites – Noise;
- BS 5228-2:2009+A1:2014: Code of Practice for Noise and Vibration Control on Construction and Open Sites – Vibration;
- British Standard BS7385: 1993: Evaluation and measurement for vibration in buildings Part 2: Guide to damage levels from ground borne vibration;
- Design Manual for Roads and Bridges LA 111 Noise and vibration May 2020.