

Limerick WWTP Upgrade and Regional Bioresource Centre

ElAR Chapter 10 - Noise and Vibration

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Formerly JB Barry Partners who became part of Egis in 2023

Table of Contents

10	NOISE AND VIBRATION	1
10.1	Introduction	1
10.1.1	Outline Project Description	1
10.2	Methodology	3
10.2.1	Study Area	3
10.2.2	Relevant Legislation, Policy and Guidelines	4
10.2.3	Appraisal Method for the Assessment of Impacts	9
10.2.4	Data Collection and Collation	10
10.3	Consultation	11
10.4	Baseline Environment	11
10.4.1	Baseline Noise Surveys	11
10.5	Potential Impacts	15
10.5.1	'Do Nothing' Scenario	15
10.5.2	Construction Phase	18
10.5.3	Operational Phase	24
10.6	Mitigation Measures	29
10.6.1	Construction Phase	29
10.6.2	Operational Phase	30
10.7	Residual Impacts	30
10.7.1	Construction Phase	30
10.7.2	Operational Phase	31
10.8	Cumulative and In-Combination Impact Assessment	31
10.8.1	Cumulative impact assessment	31
10.8.2	Interactions	32
10.9	Difficulties encountered in Compiling Information	32
10.10	References	33

List of Figures

Figure 10-1	Site Location map	2
Figure 10-2	Extract from EPA Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) - Steps to be Followed in Order to Derive Appropriate Noise Limit Criteria (Ref. EPA Guidance Note (NG4) (EPA 2016))	5
Figure 10-3	Nearest Sensitive Residential Receiver Locations to the Proposed Development and Baseline Noise Monitoring Locations (NML)	11
Figure 10-4	Limerick Agglomeration Strategic Noise Map. Road traffic (major only) Lden [LDEN is the noise level of day, evening and night (i.e. 24 hour noise level). Daytime extends from 07:00 to 19:00 ($L_{Aeq,12h}$), evening extends from 19:00 to 23:00 ($L_{Aeq,4h}$) and night-time extends from 23:00 to 07:00 ($L_{Aeq,8h}$)]	13
Figure 10-5	Limerick Agglomeration Strategic Noise Map. Road traffic (All Roads) Lnight [LNight is the noise level the noise level of night only (i.e. 23:00 to 07:00 $L_{Aeq,8h}$)]	14
Figure 10-6	Noise monitoring locations at existing Limerick WWTP site	16
Figure 10-7	Noise monitoring location at existing Corcanree PS site	17
Figure 10-8	Distance between excavation and estuary channel Limerick WWTP	21
Figure 10-9	Distance between excavation and estuary channel Corcanree PS	22

List of Tables

Table 10-1 Noise Limit Criteria to be Applied Depending on the Results of the Screening Processes.....	5
Table 10-2 Guideline Values for Community Noise in Specific Environments (WHO 1999)	7
Table 10-3 Impact from the Change in Sound Levels (IEMA 2014).....	7
Table 10-4 Noise Effects Descriptors (IEMA 2014).....	7
Table 10-5 Relationship Between Noise Impact, Effect and Significance (IEMA 2014)	8
Table 10-6 Noise Level Prediction Parameters, Sources and Assumptions	9
Table 10-7 Distance from Nearest Sensitive Residential Receiver Locations to the Proposed Development	9
Table 10-8 Quiet Area Screening of the Development Location - Step 1	12
Table 10-9 Results of the Baseline Noise Survey	13
Table 10-10 Recommended Operational Noise Limits (Based on EPA Guidance (EPA 2016))	14
Table 10-11 Noise levels in close proximity to the main noise sources identified on the existing Limerick WWTP & Corcanree PS site	17
Table 10-12 Construction Noise Threshold Levels Based on the BS 5228 'ABC' Method	18
Table 10-13 Typical Noise Levels During Different Construction Processes as Referenced from BS 5228-1:2009+A1:2014	19
Table 10-14 Worst-Case Sound Power Level from Construction Works Likely to Take Place During the Construction Phase of Proposed Development (Ref: BS 5228).....	20
Table 10-15 Predicted Worst-Case Construction Noise Levels Due to Plant and Equipment Noise Levels (as outlined in BS5228).	21
Table 10-16 Typical Piling Noise Levels (LAeq,T @ 10 m) [taken from relevant information available in BS 5228:2009].....	22
Table 10-17 Predicted Piling Noise Levels with Distance Attenuation (Free-field spherical spreading with no screening or reflections, i.e. worst-case NOISE propagation conditions).	23
Table 10-18 Vibration levels from CFA Piling Rig & Driven sheet steel piling [taken from relevant information available in BS 5228:2009].	23
Table 10-19 Summary of Predicted Construction Phase Impacts	24
Table 10-20 Predicted Worst-Case 1-Hour Noise Levels at Sensitive Receiver Locations when operating the Proposed Development upgraded plant	25
Table 10-21 BS 4142 Assessment of the Predicted Specific Noise Levels from the UPgraded Plant during Daytime	26
Table 10-22 BS 4142 Assessment of the Predicted Specific Noise Levels from the Upgraded Plant during Night-Time.....	27
Table 10-23 Summary of Predicted Operational Phase Impacts	29
Table 10-24 Summary of Predicted Construction Phase Impacts Following the Implementation of Mitigation and Monitoring Measures	30
Table 10-25 Summary of Predicted Operational Phase Impacts Following the Implementation of Mitigation and Monitoring Measures	31
Table 10-26 Assessment of Potential cumulative impact from OTHER Proposed Developments.....	32

Glossary and Defined Terms

Acronym	Description
AA	Appropriate Assessment
AASR	Appropriate Assessment Screening Report
ACP	An Coimisiún Pleanála
AD	Anaerobic Digestion
AGS	Aerobic Granular Sludge
AER	Annual Environmental Report
BOD	Biochemical Oxygen Demand
BC	Bioresource Centre
C	Carbon
CAFÉ	Clean Air for Europe Directive
CHP	Combined Heat and Power
DIN	Dissolved Inorganic Nitrogen
ECJ	European Court of Justice
EIAR	Environmental Impact Assessment Report
ELV	Emission Limit Value
EPA	Environmental Protection Agency
ESB	Electrical Supply Board
EU	European Union
FOG	Fats Oils and Grease
FST	Final Settling Tank
GHG	Greenhouse Gas
HGV	Heavy Goods Vehicle
MLPS	Main Lift Pumping Station
MCA	Multi-Criteria Analysis
MRP	Molybdate Reactive Phosphate
IDA	Industrial Development Agency
IFAS	Integrated Fixed-Film Activated Sludge
N	Nitrogen
NDP	National Development Plan
NHA	National Heritage Area
NIS	Natura Impact Statement
NPF	National Planning Framework
NSO	National Strategic Outcomes
NSS	National Spatial Strategy
NWSMP	National Wastewater Sludge Management Plan
P	Phosphorous
PE	Population Equivalent - The amount of wastewater received at a treatment plant (and its design capacity) is measured in units known as population equivalent (or PE). The wastewater received from all sources, e.g. industrial, tourism, commercial, residential, etc., is converted into these units, with one unit of PE representing the wastewater treatment load typically generated by a single person.
PFF	Pass Forward Flow
PFT	Picket Fence Thickener
pNHA	Proposed National Heritage Area

Acronym	Description
SEA	Strategic Environmental Assessment
SBR	Sequencing Batch Reactor
RBC	Sludge Hub Centre
SIA	Stable Isotope Analysis
SID	Strategic Infrastructure Development
Sludge	Solid by-products of wastewater
SPA	Special Protection Area
SS	Suspended Solids
UWWTD	Urban Wastewater Treatment Directive
WFD	Water Framework Directive
WWDA	Wastewater Discharge Authorisation
WWTP	Wastewater Treatment Plant
WSPS	Water Services Policy Statement
ZTV	Zone of Theoretical Visibility
PS	Pumping Station
QI	Qualifying Interest
RAS	Return Activated Sludge
RBC	Regional Bioresource Centre
RSES	Regional Spatial and Economic Strategy
SAC	Special Area of Conservation
TDS	Total Dry Solids
THP	Thermal Hydrolysis Process

Departments and Stakeholders

Acronym (where applicable)	Departments & Stakeholders
ACP	An Coimisiún Pleanála
DPER	Department of Public Expenditure and Reform
CACNaT	Department of Climate Action, Communication Networks and Transport
DCCAE	Department of Communications, Climate Action and Environment – Changed in 2020
DCHG	Department of Culture, Heritage and the Gaeltacht – Changed in 2020
DoF	Department of Finance
DHPLG	Department of Housing, Planning and Local Government – Changed in 2020
HLGaH	Department of Housing, Local Government and Heritage
EPA	Environmental Protection Agency
GSI	Geological Survey Ireland
GWS	Group Water Schemes
IFI	Inland Fisheries Ireland
IR	Irish Rail (Iarnród Éireann)
UÉ	Uisce Éireann
LCCC	Limerick City & County Council
LA	Local Authority
NMS	National Monuments Service
NPWS	National Parks & Wildlife Service
NRA	National Roads Authority
NTA	National Transport Authority
OPW	Office of Public Works
OSi	Ordnance Survey Ireland
SRA	Southern Regional Assembly

10 NOISE AND VIBRATION

10.1 Introduction

This chapter of the Environmental Impact Assessment Report (EIAR) assesses the impact of the Limerick Wastewater Treatment Plant Upgrade (hereafter referred to as the 'Proposed Development') on noise and vibration levels during the Construction and Operational Phases.

This noise and vibration impact assessment has been prepared to assess the potential noise and vibration impact of the Proposed Development on the nearest residential properties and sensitive receivers in the vicinity of the Proposed Development site.

The construction activities of the Proposed Development have been examined to identify those that have the potential to give rise to noise and vibration and a suitable construction impact assessment has been undertaken. As appropriate, Construction Phase mitigation measures have been outlined. The existing plant will continue to operate during the construction of the Proposed Development. Decommissioning of Limerick WWTP and Corcanree PS is not envisaged at this time.

The assessment and evaluation of the potential noise and vibration impact arising from the Proposed Development involved the following:

- Reference to the Environmental Protection Agency (EPA) Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (EPA 2016);
- Baseline Noise Survey – noise monitoring survey representative of daytime and night-time periods to determine the existing noise climate in proximity to the sensitive residential receivers in the vicinity of the Proposed Development site;
- Identification and assessment of potential noise and vibration sources from the construction of the Proposed Development;
- Identification and assessment of potential noise and vibration sources from the operation of the upgraded treatment plant;
- Noise level and impact prediction;
- An assessment based on British Standard (BS) 4142: 2014+A1:2019 'Method of Rating and Assessing Industrial and Commercial Noise' has been carried out to assess the potential for 'adverse impact' at the nearest noise sensitive receptor locations due to the proposed operations;
- A comparison of the measured noise levels and the noise impact on the nearest sensitive residential and sensitive receptor against relevant guidelines and standards; and
- A recommendation of appropriate construction and operational noise and vibration mitigation measures.

A full description of the Proposed Development including the detailed design information is provided in Chapter 3, The Proposed Development of this EIAR.

Decommissioning of the Proposed Development is not envisaged at this time. Given the scale of the existing infrastructure, it is anticipated that Uisce Éireann will continue phased development to salvage and re-use as much of the installed infrastructure as possible as the demand in Limerick grows. Consolidating additional infrastructure at this location is considered beneficial and will help minimise future capital investment. The proposed layouts are designed to optimise land take and preserve capacity for future expansion. On this basis, decommissioning has been screened out.

10.1.1 Outline Project Description

The Proposed Development will cater for future population growth and industrial development in the area, in line with population projections for Limerick as set out in the National Planning Framework (NPF) Implementation Roadmap and the Regional Spatial & Economic Strategy for the Southern Region (RSES). It will provide 20% Headroom allowance, in line with Uisce Éireann guidelines for large urban settlements. It will also ensure the WWTP continues to comply with requirements of the EPA Wastewater Discharge License (WWDL), Urban Wastewater Treatment Regulations (UWWTR) and other relevant Uisce Éireann Guidelines.

The initial upgrade works will cater for the +10-year growth projections, increasing the plant capacity from 130,000 PE to 285,000 PE including a future industrial committed load of 27,500 PE. There will be provision made in the civil infrastructural development of the plant (tank sizing and pipework) for the +25-year growth projections of 325,000 PE. However, a separate planning permission will be required before any uplift above 285,000 PE can be constructed.

The proximity of the sites to the river are shown in Figure 10-1.

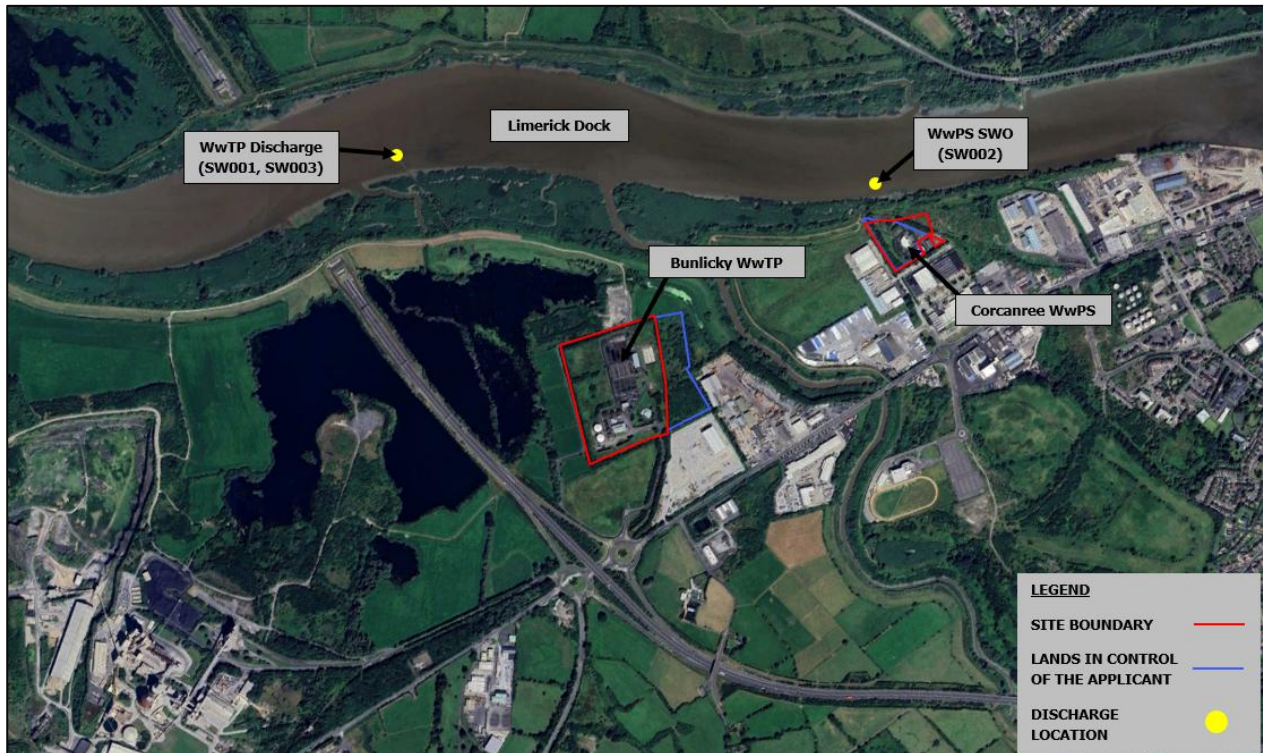


FIGURE 10-1 SITE LOCATION MAP

The proposed works for the proposed WwTP upgrade include the following:

- Construct a new 157,000 PE inlet works and AGS process stream to operate in parallel with the existing WWTP arrangement.
- Divert 1 no. rising main from Corcanree PS to the new process stream, allowing a 50:50 flow split between the new and existing works.
- Retain Mungret pumping arrangement through existing works.
- Retain the existing 1.1km outfall pipe to the River Shannon.

The proposed works required to facilitate sludge reception at the Regional Bioresource Centre (RBC) are as follows;

- Upgrade existing imported sludge reception facility.
- Installation of new dewatered sludge cake reception facility.
- New mechanical thickening system and associated polymer dosing
- Retain & refurbish existing 2. No digester feed tanks as pre-THP dewatering feed tanks.
- Upgrade mixing system & transfer pumps for pre-THP dewatering blend tank.
- New odour control system to cater for overall Bioresource Centre installation.
- New dewatering and storage installation for pre-THP dewatering and cake imports.
- New Thermal Hydrolysis Process (THP) with capacity of 50 TDS/day.
- Options for introduction of new AD tank to allow operational flexibility.
- Biogas production and storage.
- Combined Heat and Power Engine (CHP) Biomethane production options.

- New digested sludge tank adjacent to existing digesters.
- New digested sludge dewatering.
- Export storage silo installation adjacent to dewatering facility.
- New centrate return PS located adjacent to digested sludge dewatering installation.
- Upgraded wash water system with added UV treatment/consider expanded new system designed for full regional BC associated demands only.

The proposed works at the Corcanree PS site include the following:

- Complete acquisition of SFPC lands (greenfield) to the east of Corcanree PS site.
- Construct new 12,500m³ stormwater storage tank with gravity overflow to existing Corcanree outfall chamber.
- Upgrade existing foul pumps to increase pumping capacity to the WWTP (< 1,100l/s per rising main).

The main potential noise sources from the operation of the Proposed Development will be due to the following:

- Noise from water movements within tanks and associated noise from pumps, blowers and internal operations within buildings; and
- Traffic flows associated with the Proposed Development.

10.2 Methodology

10.2.1 Study Area

The Proposed Development and the work requirements are split between Limerick WwTP and Corcanree Pumping Station (PS), both of which are situated on the banks of Limerick Dock, where the Lower River Shannon converges with the Shannon Estuary.

The EPA definition of a Noise Sensitive Location (NSL) is “Any dwelling house, hotel or hostel, health building, sensitive establishment, place of worship or entertainment, or any other facility or area of high amenity which for its proper enjoyment requires the absence of noise at nuisance levels”. The assessment has addressed nearby sensitive residential and sensitive locations. There is no particular designated amenity area in the immediate vicinity, i.e. there is no public park within 100m of the proposed development at which a discernible noise nuisance could be experienced, etc.

The nearest sensitive receivers are located as follows (See Figure 9-3);

- SR 1 - Residential property at a distance of approximately 480m to the south of the WwTP site boundary.
- SR 2 - Residential property at a distance of approximately 1,050m to the north-east of the WwTP site and at a distance of approximately 810m to the north-west of the Corcanree PS site boundary.
- SR 3 - Residential property at a distance of approximately 570m to the north-east of the Corcanree PS site boundary.
- SR 4 - Residential property at a distance of approximately 630m to the north-east of the Corcanree PS site boundary.
- SR 5 - Amenity park area at a distance of approximately 500m to the north-east of the Corcanree PS site boundary.
- SR 6 - Office property at a distance of approximately 400m to the south of the WwTP site boundary.
- SR 7 - Dock Road halting site at a distance of approximately 780m to the east of the WwTP site boundary and approximately 350m to the south of the Corcanree PS site boundary.

10.2.2 Relevant Legislation, Policy and Guidelines

10.2.2.1 EPA Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)

The EPA Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (EPA 2016) assists licensed sites with the assessment of their potential and actual noise impact on the local environment. This guidance note was updated in January 2016 to provide clear guidance in relation to the background understanding of environmental noise, monitoring and assessment of noise impact as well as applying applicable noise criteria and outlining suitable approaches to noise mitigation design and specification as well as Best Available Techniques (BAT). The guidance note advises that noise assessment periods are now expressed in terms of day, evening and night and outlines recommended minimum durations for environmental noise surveys. The January 2016 update also provides additional information and clarifications including the following:

- Updated guidance to reflect the publication of BS 4142;
- Examples of circumstances where it may be appropriate to use detailed reference methods for the assessment of tonality and impulsivity; and
- Guidance on the use of L_{AF90} in instances where extraneous noise sources may have an influence on measured L_{Aeq} values.

In the EPA Guidance Note (NG4) (EPA 2016) the steps to be followed in order to derive appropriate noise limit criteria are outlined as follows;

Step 1 – Quiet Area Screening of the Development Location

Step 2 – Baseline Environmental Noise Survey

Step 3 – Screen for Areas of Low Background Noise

Step 4 – Determine Appropriate Noise Criteria

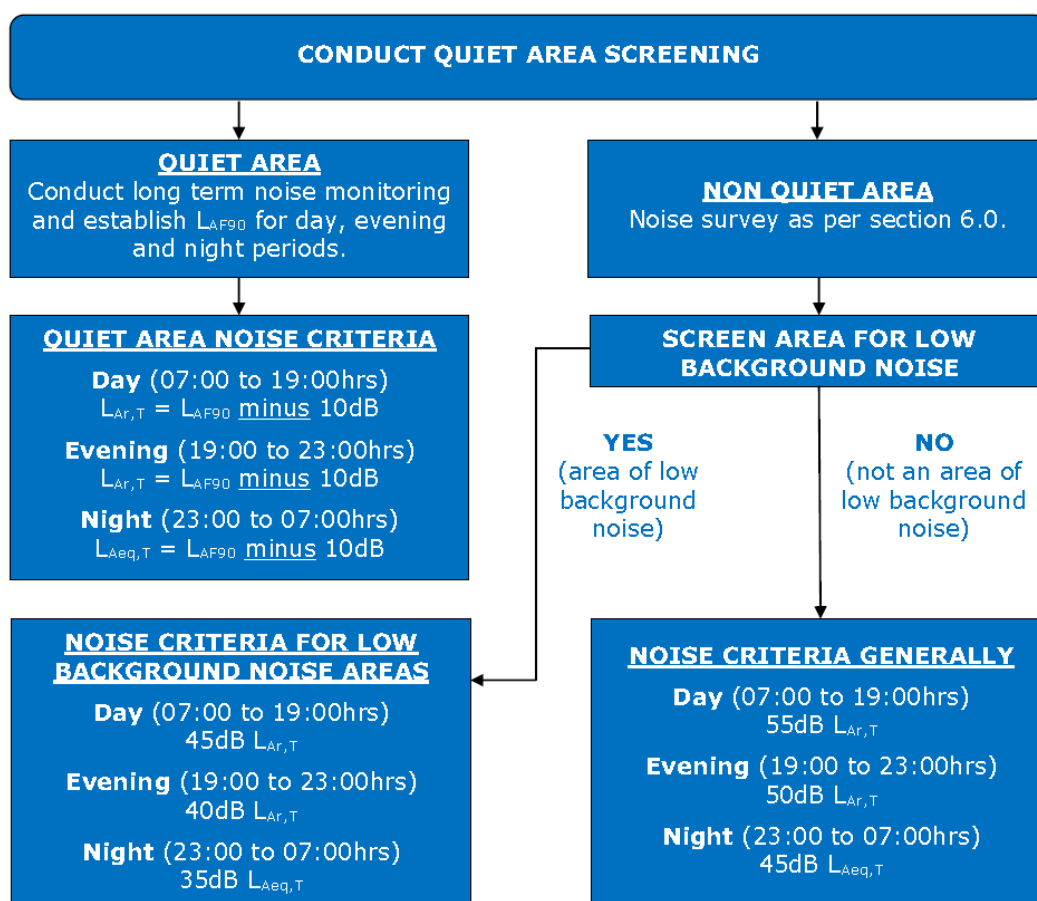


FIGURE 10-2 EXTRACT FROM EPA GUIDANCE NOTE FOR NOISE: LICENCE APPLICATIONS, SURVEYS AND ASSESSMENTS IN RELATION TO SCHEDULED ACTIVITIES (NG4) - STEPS TO BE FOLLOWED IN ORDER TO DERIVE APPROPRIATE NOISE LIMIT CRITERIA (REF. EPA GUIDANCE NOTE (NG4) (EPA 2016))

Table 10-1 below outlines the noise limit criteria to be applied depending on the results of the screening processes in Steps 1 and 3, and the noise survey discussed in Step 2.

TABLE 10-1 NOISE LIMIT CRITERIA TO BE APPLIED DEPENDING ON THE RESULTS OF THE SCREENING PROCESSES

SCENARIO	Daytime Noise Criterion, dB $L_{Ar,T}$ (07:00 TO 19:00HRS)	Evening Noise Criterion, dB $L_{Ar,T}$ (19:00 TO 23:00HRS)	Night-time Noise Criterion, dB $L_{Aeq,T}$ (23:00 TO 07:00HRS)
Quiet area	Noise from the licensed site to be at least 10db below the average daytime background noise level measured during the baseline noise survey.	Noise from the licensed site to be at least 10db below the average evening background noise level measured during the baseline noise survey.	Noise from the licensed site to be at least 10db below the average night-time background noise level measured during the baseline noise survey.
Areas of low background noise	45db	40db	35db
All other areas	55db	50db	45db

10.2.2.2 BS 4142+A1:2019 Method of Rating and Assessing Industrial and Commercial Noise

BS 4142+A1:2019 'Method of Rating and Assessing Industrial and Commercial Noise' (BSI 2019) describes methods for rating and assessing sound of an industrial or commercial nature. It enables the effects of this noise on people nearby to be assessed and the associated risks to be minimised. It is designed to give

consistent results across situations ranging from a single air-conditioning unit to a large industrial installation. BS 4142 takes account of the advances in technology and improves the accuracy of final assessments. The revised standard:

- Helps assess sound levels at proposed new residential premises.
- Enables the investigation of complaints by determining sound levels.
- Reduces the likelihood of financial penalties.
- Supports current UK planning guidance and Environment Agency guidance.

BS 4142 states that:

'the significance of sound of an industrial and/or commercial nature depends upon both the margin by which the rating level of the specific sound source exceeds the background sound level and the context in which the sound occurs. An effective assessment cannot be conducted without an understanding of the reason(s) for the assessment and the context in which the sound occurs/will occur. When making assessments and arriving at decisions, therefore, it is essential to place the sound in context'.

BS 4142 states that you should 'obtain an initial estimate of the impact of the specific sound by subtracting the measured background sound level from the rating level', and consider the following;

'(a) Typically, the greater this difference between the rating level of the specific sound source and the background sound level, the greater the magnitude of the impact.

(b) A difference of around +10 dB or more is likely to be an indication of a significant adverse impact, depending on the context.

(c) A difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context.

(d) The lower the rating level is relative to the measured background sound level, the less likely it is that the specific sound source will have an adverse impact or a significant adverse impact. Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact, depending on the context'.

BS 4142 states that 'adverse impacts include, but are not limited to, annoyance and sleep disturbance. Not all adverse impacts will lead to complaints and not every complaint is proof of an adverse impact'

10.2.2.3 World Health Organisation Guidelines for Community Noise

The World Health Organisation (WHO) has published Guidelines for Community Noise (WHO 1999), the outcome of a WHO expert task force meeting in April 1999. The WHO guidelines recommend a daytime limit of 50 – 55 decibels (dB(A)) for outdoor living areas. The report states that:

'to protect the majority of people from being seriously annoyed during the daytime, the outdoor sound level from steady continuous noise should not exceed 55 dB LAeq on balconies, terraces and in outdoor living areas. To protect the majority of people from being moderately annoyed during the daytime, the outdoor sound level should not exceed 50 dB LAeq. Where it is practical and feasible, the lower outdoor sound level should be considered the maximum desirable sound level for new development'.

According to the WHO guidelines noise impacts within dwellings include annoyance, speech interference and sleep disturbance. WHO considers that for bedrooms, the critical effect is sleep disturbance. Guideline values for bedrooms consider that the sleep disturbance criteria should be taken as internal noise levels of 30 dB LAeq or 45 dB L_{Amax} or external levels of 45 dB LAeq or 60 dB L_{Amax}. Table 10-2 outlines the WHO Guideline noise levels applicable to residential properties.

TABLE 10-2 GUIDELINE VALUES FOR COMMUNITY NOISE IN SPECIFIC ENVIRONMENTS (WHO 1999)

SPECIFIC ENVIRONMENT	CRITICAL HEALTH EFFECTS	L _{Aeq} (DB)	Time Base (HRS)	L _{Amax} (DB)
Outdoor living area during daytime	Serious annoyance, daytime & evening	55	16	-
	moderate annoyance, daytime & evening	50	16	-
Outside bedrooms during night-time	Sleep disturbance, window open (outdoor values)	45	8	60

10.2.2.4 Institute of Environmental Management and Assessment (IEMA) Guidelines for Noise Impact Assessment (2014)

The Guidelines for Noise Impact Assessment (produced by IEMA) address the key principles of noise impact assessment and are applicable to all development proposals where noise effects are likely to occur. The guidelines state that the noise level threshold and significance should be determined, based upon the specific evidence and likely subjective response to noise. The criteria above reflect the key benchmarks that relate to human perception of sound. A change of 3 dB(A) is generally considered to be the smallest change in environmental noise that is perceptible to the human ear under most normal conditions. A 10 dB(A) change in noise represents a doubling or halving of the noise level. The difference between the minimum perceptible change and the doubling or halving of the noise level is split to provide greater definition to the assessment of changes in noise level. An impact scale offered by the IEMA guidelines is shown in Table 10-3, the noise effects descriptors offered by the IEMA guidelines are shown in Table 10-4 and the definition of the relationship between noise impact, effect and significance offered by the IEMA guidelines are shown in Table 10-5.

TABLE 10-3 IMPACT FROM THE CHANGE IN SOUND LEVELS (IEMA 2014)

Sound Level Change L _{pAeqT} (positive or negative) T = either 16hr day or 8hr night	Long-Term Classification	Short-Term Classification
>0 dB and <1 dB	Negligible	Negligible
>1 dB and <3 dB		Minor
>3 dB and <5 dB	Minor	Moderate
>5 dB and <10 dB	Moderate	Major
>10 dB	Major	

TABLE 10-4 NOISE EFFECTS DESCRIPTORS (IEMA 2014)

Level of Impact	Description
Very Substantial	Greater than 10 dB L _{Aeq} change in sound level perceived at a receiver of great sensitivity to noise
Substantial	Greater than 5 dB L _{Aeq} change in sound level at a noise sensitive receiver, or a 5 to 9.9 dB L _{Aeq} change in sound level at a receiver of great sensitivity to noise
Moderate	A 3 to 4.9 dB L _{Aeq} change in a sound level at a sensitive or highly sensitive noise receiver, or a greater than 5 dB L _{Aeq} change in sound level at a receiver of some sensitivity
Slight	A 3 to 2.9 dB L _{Aeq} change in a sound level at a receiver of some sensitivity
None/not significant	Less than 2.9 dB L _{Aeq} change in sound level and/or all receivers of negligible sensitivity to noise or marginal to the zone of the influence of the proposed development

To determine the overall noise impact, the magnitude and sensitivity to changes in noise levels, the Noise Effects Descriptors presented in Table 10-5 are offered by the IEMA guidelines.

TABLE 10-5 RELATIONSHIP BETWEEN NOISE IMPACT, EFFECT AND SIGNIFICANCE (IEMA 2014)

Magnitude (Nature of Impact)		Description of Effect (on a specific sensitive receiver)	Significance
Beneficial	Substantial	Receiver Perception = Marked Change Causes a material change in behaviour and/or attitude, e.g. individuals begin to engage in activities previously avoided due to preceding environmental noise conditions. Quality of life enhanced due to change in character of the area.	More Likely to be Significant (Greater justification needed- based on impact magnitude and receiver sensitivities- to justify a non-significant effect)
	Moderate	Receiver Perception = Noticeable Improvement Improved noise climate resulting in small change in behaviour and/or attitude, e.g. turning down volume of television; speaking more quietly; opening windows. Affects the character of the area such that there is a perceived change in the quality of life.	↑ ↓ (Greater justification needed- based on impact magnitude and receiver sensitivities- to justify a significant effect)
	Slight	Receiver Perception = Just Noticeable Improvement Noise impact can be heard, but does not result in any change in behaviour or attitude. Can slightly affect character of the area but not such that there is a perceived change in quality of life.	Less Likely to be Significant
-	Negligible	N/A = no discernible effect on receiver	Not Significant
Adverse	Slight	Receiver Perception = Non-intrusive Noise impact can be heard, but does not cause change in behaviour or attitude, e.g. turning up volume of television, speaking more loudly; closing windows. Can slightly affect the character of the area but not such that there is a perceived change in the quality of life.	Less Likely to be Significant Greater justification needed- based on impact magnitude and receiver sensitivities- to justify a significant effect)
	Moderate	Receiver Perception = Intrusive Noise impact can be heard and causes small changes in behaviour and/or attitude, e.g. turning up volume of television; speaking more loudly; closing windows. Potential for non-awaking sleep disturbance. Affects the character of area such that there is a perceived change in the quality of life.	↑ ↓ Greater justification needed- based on impact magnitude and receiver sensitivities- to justify a non-significant effect)
	Substantial	Receiver perception = Disruptive Causes material change in behaviour and /or attitude, e.g. avoiding certain activities during periods of intrusion. Potential for sleep disturbance resulting in getting to sleep, premature awakening, and difficulty in getting back to sleep. Quality of life diminished due to change in character of area.	More Likely to be Significant
	Severe	Receiver Perception = Physically Harmful Significant Changes in behaviour and/or an inability to mitigate effect of noise leading to psychological stress or psychological effects, e.g. regular sleep deprivation / awakening ; loss of appetite, significant, medically definable harm, e.g. auditory and non-auditory.	Significant

10.2.2.5 ISO 1996-1:2016 Acoustics — Description, measurement and assessment of environmental noise — Part 1: Basic quantities and assessment procedures

ISO 1996-1:2016 Acoustics — Description, measurement and assessment of environmental noise — Part 1: Basic quantities and assessment procedures (ISO 2016) defines the basic quantities to be used for the description of noise in community environments and describes assessment procedures. It also specifies methods to assess environmental noise and gives guidance on predicting the potential annoyance response of a community to long-term exposure from various types of environmental noises. Application of the method to predict annoyance response is limited to areas where people reside and to related long-term land uses. ISO 1996-1:2016 describes adjustments for sounds that have different characteristics. The term rating level is used to describe physical sound predictions or measurements to which one or more adjustments have been added. Based on these rating levels, the long-term community response can be estimated. The potential noise is assessed either singly or in combination, allowing for consideration, when deemed necessary by responsible authorities, of the special characteristics of their impulsiveness, tonality and low-frequency content, and for the different characteristics of road traffic noise, other forms of transportation noise (such as aircraft noise) and industrial noise.

10.2.3 Appraisal Method for the Assessment of Impacts

10.2.3.1 Noise Prediction Methodology

Noise level prediction has been undertaken to predict the potential worst-case noise impact from the Proposed Development on the nearest sensitive receivers to the site. Noise level prediction using the methodology outlined in BS5228 has been used to determine if the future noise impact will be in compliance with the relevant guidelines as outlined above. The noise level prediction has been based on relevant emission parameters and spatial settings. Table 10-6 outlines the parameters, sources, settings and assumptions that have been incorporated into the noise level prediction.

TABLE 10-6 NOISE LEVEL PREDICTION PARAMETERS, SOURCES AND ASSUMPTIONS

PARAMETER	DETAILS
Horizontal distances	Scaled development drawings outlining the noise levels specific distances from each potential noise source as taken from Osi mapping.
Proposed Development dimensions	Scaled development drawings. including location of proposed tanks, existing buildings and dimensions.

The following receiver locations in proximity to the Limerick WWTP & Corcanree PS sites have been selected for detailed assessment in the noise impact predictions. Given the longer travel distances involved, all other receivers in the wider area surrounding the Limerick WWTP site will experience lower noise levels. Table 10-7 outlines the location of the sensitive residential and sensitive receivers' input into the noise impact predictions and their locations are shown in Figure 10-3.

TABLE 10-7 DISTANCE FROM NEAREST SENSITIVE RESIDENTIAL RECEIVER LOCATIONS TO THE PROPOSED DEVELOPMENT

Receiver Reference	Irish Grid Reference		Distance to Nearest existing Limerick WWTP & Corcanree PS site Boundary (m)
	X (m)	Y (m)	
SR1 (Residential)	154926	155124	~480m
SR2 (Residential)	154959	156857	~1050m
SR3 (Residential)	155565	156746	~570m
SR4 (Residential)	155767	156733	~630m
SR5 (Amenity area)	155589	156668	~500m
SR6 (Office)	154935	155238	~400m

SR7 (Residential Halting Site)	155515	155780	~350m
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10.2.4 Data Collection and Collation

10.2.4.1 Baseline Noise Survey Methodology

A daytime and night-time baseline noise monitoring survey was carried out in proximity to the existing Limerick WWTP & Corcanree PS sites at locations representative of the nearest residential properties on Thursday 17th April 2025. The noise monitoring survey was undertaken in accordance with the methodologies outlined in ISO 1996 and BS 4142. A Cirrus Optimus Green Sound Level Meter CR:171B (Serial No. G068599, Calibration Date – 29/06/2023) was used for the noise surveys and a Cirrus Acoustic Calibrator CR:515 (Serial No. 72824, Calibration Date – 13/04/2024) was used to calibrate the sound level meter before and after the survey period. A wind shield was used on the microphone throughout the survey and the sound level meter was calibrated before and after the survey period. The sound level meter was placed at a height of approximately 1.25m above ground level at the monitoring locations (see Figure 10-3 below). The noise monitoring survey durations in proximity to the nearest noise sensitive receiver locations were undertaken over 30-minute periods. The meteorological conditions during the noise survey periods were noted as ideal with no periods of rainfall or higher wind speeds greater than 5m/s. The weather conditions during the noise survey on Thursday 17th April 2025 were noted to be calm to light breeze, with a temperature of approximately 14°C during daytime and a temperature of approximately 10°C during night-time with no rainfall.

A noise monitoring survey was carried out in proximity to the main existing noise sources on the Limerick WWTP & Corcanree PS sites on 16th April 2025. A Norsonic Nor140 Sound Level Meter (Serial No. 1402988 – Calibration Date – 13/04/2023) was used during the noise monitoring survey.

The measurement parameters recorded and reported during the baseline noise survey are defined as follows:

- A-weighted Decibel (dBA): Decibels measured on a sound level meter incorporating a frequency weighting (A Weighting) which differentiates between sound of different frequency (pitch) in a similar way to the human ear. This takes account of the fact that the human ear has different sensitivities to sound at different frequencies;
- LAeq is the A-weighted equivalent continuous steady sound level during the sample period;
- LA10 is the A-weighted sound level that is exceeded for 10% of the sample period and is generally used to quantify traffic noise;
- LA90 is the A-weighted sound level that is exceeded for 90% of the sample period and is generally used to quantify background noise;
- LAmin is the minimum A-weighted sound level measured during the sample period; and
- LAmx is the maximum A-weighted sound level measured during the sample period.

Frequency analysis was also undertaken to determine if there is an existing tonal noise impact from passing vehicles or local noise sources. BS 4142 states the following with regard to the:

'Objective method for assessing the audibility of tones in sound: One-third octave method; The test for the presence of a prominent, discrete-frequency spectral component (tone) typically compares the LZeq,T sound pressure level averaged over the time when the tone is present in a one-third-octave band with the time-average linear sound pressure levels in the adjacent one-third-octave bands. For a prominent, discrete tone to be identified as present, the time-averaged sound pressure level in the one-third-octave band of interest is required to exceed the time-averaged sound pressure levels of both adjacent one-third-octave bands by some constant level difference. The level differences between adjacent one-third-octave bands that identify a tone are:

- 15 dB in the low-frequency one-third-octave bands (25 Hz to 125 Hz);
- 8 dB in the middle-frequency one-third-octave bands (160 Hz to 400 Hz); and
- 5 dB in the high-frequency one-third-octave bands (500 Hz to 10 000 Hz)'.

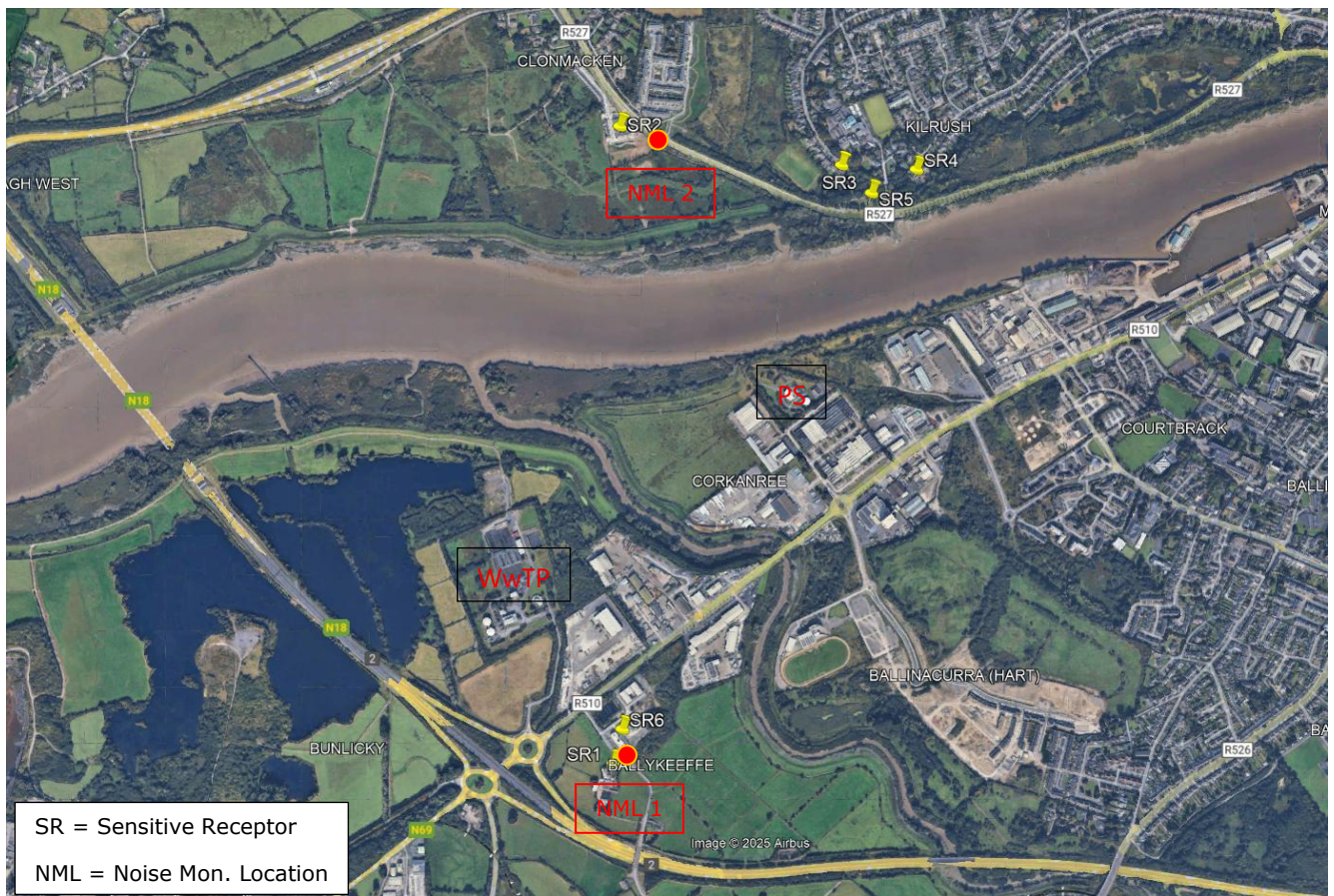


FIGURE 10-3 NEAREST SENSITIVE RESIDENTIAL RECEIVER LOCATIONS TO THE PROPOSED DEVELOPMENT AND BASELINE NOISE MONITORING LOCATIONS (NML)

Baseline noise measurements were undertaken in proximity to the nearest residential receivers and in proximity to the existing on-site noise sources in accordance with ISO 1996-1:2016, and as shown in Figure 10-3. All noise measurement data was downloaded at the company office, exported from the manufacturer's software and stored as Microsoft Excel spreadsheet files. The procedures for the interpretation of the noise monitoring data during specific time periods as outlined in the Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (EPA 2016) have been used to assess noise levels during the daytime (07:00-19:00) and night-time (23:00-07:00) monitoring periods.

10.3 Consultation

The baseline and impact assessments for noise and vibration have included the review of all responses received in respect of stakeholder submissions and concerns regarding noise. The compiled feedback from engagement with both public bodies and private individuals, with regard to noise and vibration, has been considered within the overall design and reviewed as part of the assessment.

10.4 Baseline Environment

10.4.1 Baseline Noise Surveys

10.4.1.1 Operational Noise Limits

Step 1 - Baseline Area Description

The existing environment in the area of the Proposed Development is described in accordance with the Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4) (EPA 2016).

TABLE 10-8 QUIET AREA SCREENING OF THE DEVELOPMENT LOCATION - STEP 1

Site Details	
Site Name	Limerick WWTP & Corcanree PS sites
Licence Application Reference	N/A
Site Address	Ballykeefe, Clonmacken & Kilrush townlands, to the west of Limerick.
Quiet Area Screening of the Development Location	
Screening Question	Answer – Yes / No
Is the site >3km away from urban areas with a population >1,000 people?	No
Is the site >10km away from urban areas with a population >5,000 people?	No
Is the site >15km away from urban areas with a population >10,000 people?	No
Is the site >3km away from any local industry?	No
Is the site >10km away from any major industry centre?	No
Is the site >5km away from any national primary route?	No
Is the site >9.5km away from any motorway or dual carriageway?	No
QUIET AREA?	No.
Other Relevant Comments	The site is not considered to be a “Quiet Area” as per the EPA NG4 definition.

Step – 2 Baseline Noise Surveys

The screening process in Step 1 has not identified a 'quiet area', and a noise measurement survey has been undertaken in proximity to the nearest residential properties to the Limerick WWTP site to determine a representative prevailing background noise level for the area. The noise monitoring locations are shown in Figure 10-3.

The baseline noise surveys were undertaken in proximity to the nearest residential properties to the Limerick WWTP site during the following periods and weather conditions:

- Morning on Thursday 17th April 2025 - weather conditions during the assessment period were dry and mild (~14°C), wind direction was from a west-south westerly direction and wind strength was characterised as “Light Air” using the Beaufort scale.
- Early night-time on Thursday 17th April 2025 - weather conditions during the assessment period were dry and cool (~9°C), wind direction was from a south westerly direction and wind strength was characterised as “Calm” to “Light Air” using the Beaufort scale.
- During both survey periods, the Limerick WWTP & Corcanree PS sites were both in normal operation. The noise surveys were undertaken during weather conditions in accordance with ISO 1996: 2016 which were likely to allow for noise to propagate outward from the sites.

During the noise surveys, a series of 30-minute noise level measurements were undertaken at each measurement location in proximity to the noise sensitive receivers. All sources of noise from the Limerick WWTP & Corcanree PS sites, as well as noise sources from any other source were noted. Road traffic was noted to dominate at all monitoring locations outside of the Limerick WWTP & Corcanree PS sites. The Limerick WWTP & Corcanree PS sites were noted to be inaudible outside the relevant site boundaries.

The results of the baseline noise survey are presented in Table 10-9.

TABLE 10-9 RESULTS OF THE BASELINE NOISE SURVEY

Measurement Location	Time	Duration	L _{Aeq} (dB)	L _{Amax} (dB)	L _{Amin} (dB)	L _{A10} (dB)	L _{A90} (dB)	Notes
NML 1 - Day	09:33	00:30:00	57.3	80	48.3	57.9	51.9	Distant traffic dominant. WwTP & PS inaudible. Light breeze.
NML 1 - Night	23:03	00:30:00	56.1	78.9	46.2	56.4	49.9	
NML 2 - Day	10:14	00:30:00	54.1	81.5	44.7	54.6	48.8	Distant traffic dominant. WwTP & PS inaudible. Light breeze.
NML 2 - Night	23:52	00:30:00	53.2	78.9	42.7	53.5	46.7	

The existing daytime and night-time noise levels are in excess of the World Health Organisation (WHO) Guidelines for Community Noise (WHO 1999).

The Limerick Agglomeration Strategic Noise Maps for road traffic from the Environmental Noise Directive (END) Round Four - European Communities, Environmental Noise Regulations 2018 – 2021, clearly indicate that road traffic noise is a significant noise source at the nearest residential properties to the Proposed Development. These maps also verify the on-site findings that the Limerick WWTP & Corcanree PS sites are inaudible relative to the existing background daytime and night-time road traffic noise levels.

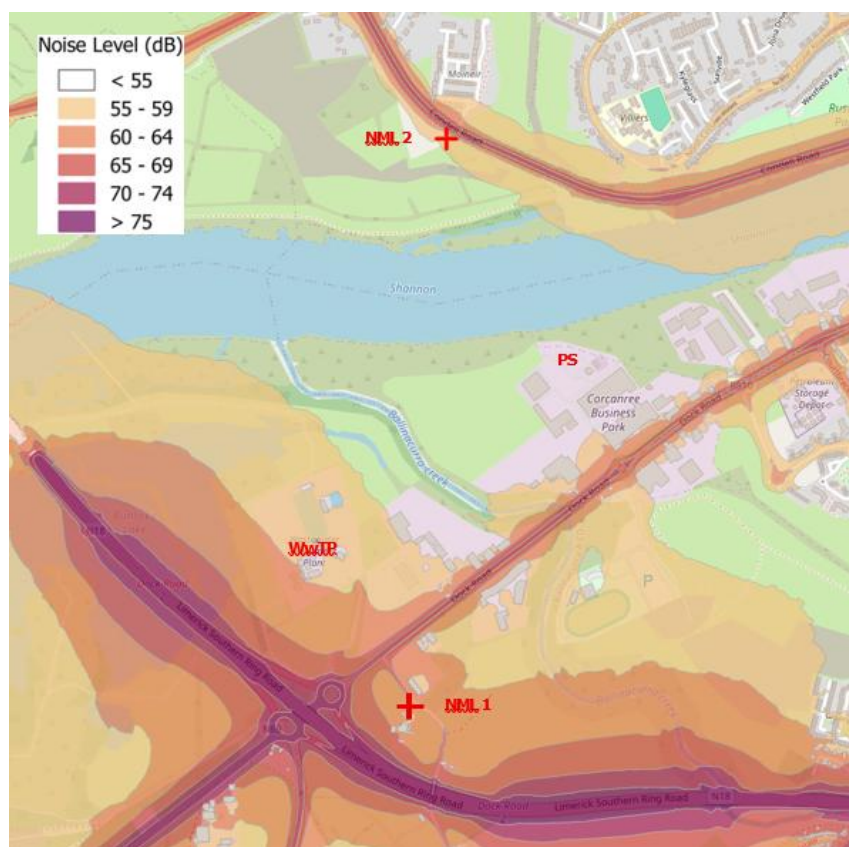


FIGURE 10-4 LIMERICK AGGLOMERATION STRATEGIC NOISE MAP. ROAD TRAFFIC (MAJOR ONLY) LDEN [LDEN IS THE NOISE LEVEL OF DAY, EVENING AND NIGHT (I.E. 24 HOUR NOISE LEVEL). DAYTIME EXTENDS FROM 07:00 TO 19:00 (L_{AEQ,12H}), EVENING EXTENDS FROM 19:00 TO 23:00 (L_{AEQ,4H}) AND NIGHT-TIME EXTENDS FROM 23:00 TO 07:00 (L_{AEQ,8H}).]

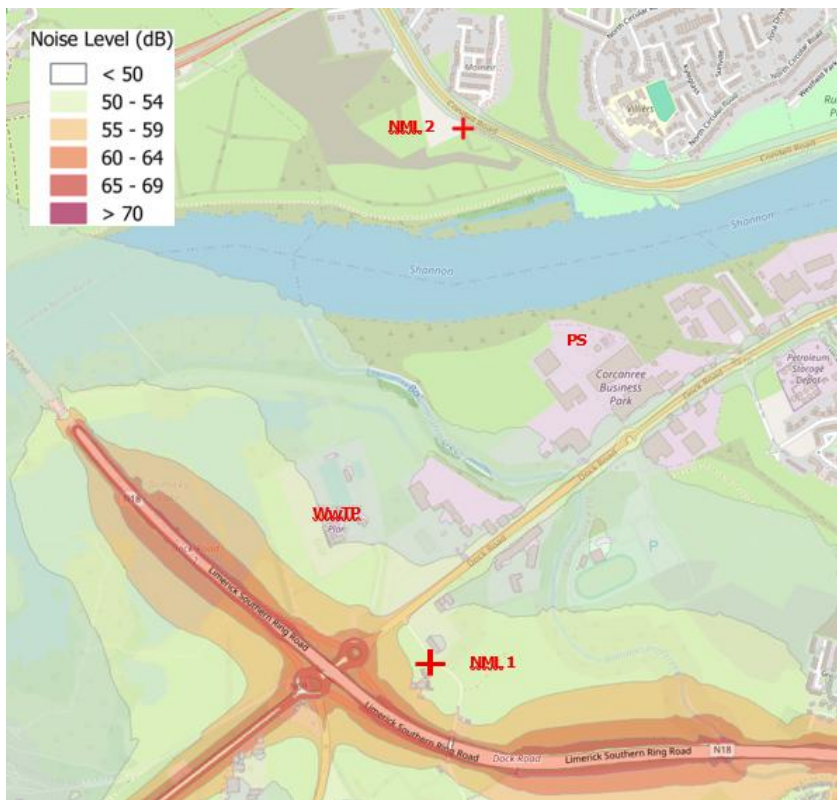


FIGURE 10-5 LIMERICK AGGLOMERATION STRATEGIC NOISE MAP. ROAD TRAFFIC (ALL ROADS) L_{NIGHT} [L_{NIGHT} IS THE NOISE LEVEL THE NOISE LEVEL OF NIGHT ONLY (I.E. 23:00 TO 07:00 L_{Aeq,8H})]

Step 3 – Screen for Areas of Low Background Noise

The existing environment in the area of the Proposed Development site has been described in accordance with the EPA Guidance Note for Noise (NG4) (EPA 2016). For all areas not identified as Quiet Areas in Step 1, the existing background noise levels measured during the environmental noise survey, should be examined to determine if they satisfy the following criteria:

- Average Daytime Background Noise Level $\leq 40\text{dB LAF90}$ – No
- Average Evening Background Noise Level $\leq 35\text{dB LAF90}$ – No
- Average Night-time Background Noise Level $\leq 30\text{dB LAF90}$ – No

As none of the three above criteria are satisfied, this location is not deemed to be an area of low background noise, and the reduced noise limits detailed in Step 4 are not applicable at receivers in proximity to this Proposed Development location.

Step 4 - Determine Appropriate Operational Noise Criteria

The operational noise limit criteria have been determined based on the results of the screening processes discussed in Steps 1 and 3, and the noise survey discussed in Step 2 above. This location is not deemed to be an 'area of low background noise' or a 'quiet area' and the operational noise limits detailed in Table 10-10 are applicable at receivers in proximity to this Proposed Development location.

TABLE 10-10 RECOMMENDED OPERATIONAL NOISE LIMITS (BASED ON EPA GUIDANCE (EPA 2016))

Scenario	Daytime Noise Criterion, dB L _{Ar,T} (07:00 to 19:00hrs)	Evening Noise Criterion, dB L _{Ar,T} (19:00 to 23:00hrs)	Night-time Noise Criterion, dB L _{Aeq,T} (23:00 to 07:00hrs)
All other areas	55dB	50dB	45dB

10.5 Potential Impacts

10.5.1 'Do Nothing' Scenario

The operation of the existing Limerick WWTP & Corcanree PS site currently has no significant impact on noise levels at existing residential properties in the surrounding area.

It is understood that the operation of the existing Limerick WWTP & Corcanree PS sites have not resulted in noise complaints. The nearest residential properties are located relatively remote from the Limerick WWTP & Corcanree PS site boundary. The nearest sensitive receiver location SR 1 is a residential property at a distance of approximately 480m to the south of the Limerick WWTP site boundary. The nearest sensitive receiver location SR 3 is a residential property at a distance of approximately 570m to the north-east of the Corcanree PS site boundary. This will remain unchanged with the Proposed Development in operation.

During a noise survey on the afternoon of 16th April 2025, noise level measurements were undertaken in close proximity at specific distances from the main noise sources identified on the existing Limerick WWTP & Corcanree PS site. This allowed for sound power level calculation and for a noise prediction of existing operational noise levels at the nearest sensitive receiver locations to be developed. This was then utilised to include for the Proposed Development works and to determine the resultant future predicted worst-case noise level at the nearest residential properties.

The treatment processes at the existing Limerick WWTP include the following:

- Fine inlet screening with screenings removal, washing and compaction.
- Grit trap complete with classifier.
- Primary treatment - tanks with chemically enhanced primary treatment.
- 3 No. plug flow rectangular aeration tanks with Fine Bubble Diffused Aeration (FBDA).
- 5 No. rectangular secondary clarifiers.
- 1 No. Storm holding tank.
- Final effluent Pumping Station.
- Outfall to the Upper Shannon Estuary with Emergency gravity overflow.
- Sludge treatment facility.
- 2 No. Anaerobic digestors.
- 1 No. 400kWe CHP.
- Sludge dewatering building with 3 no. centrifuges.

The existing Corcanree pumping station consists of the following elements;

- Pumping station with inlet chamber and two separate streams (Incl. foul wet wells, storm screens and storm wet wells).
- 8 no. storm pumps.
- 4 no. dry well centrifugal pumps.
- Storm syphon chamber.
- Storm and emergency overflow chambers.
- Overflow culvert to Limerick Dock.
- Southern interceptor sewer shaft.
- Emergency generator building.
- Air valve & surge chamber on 900mm twin rising main.

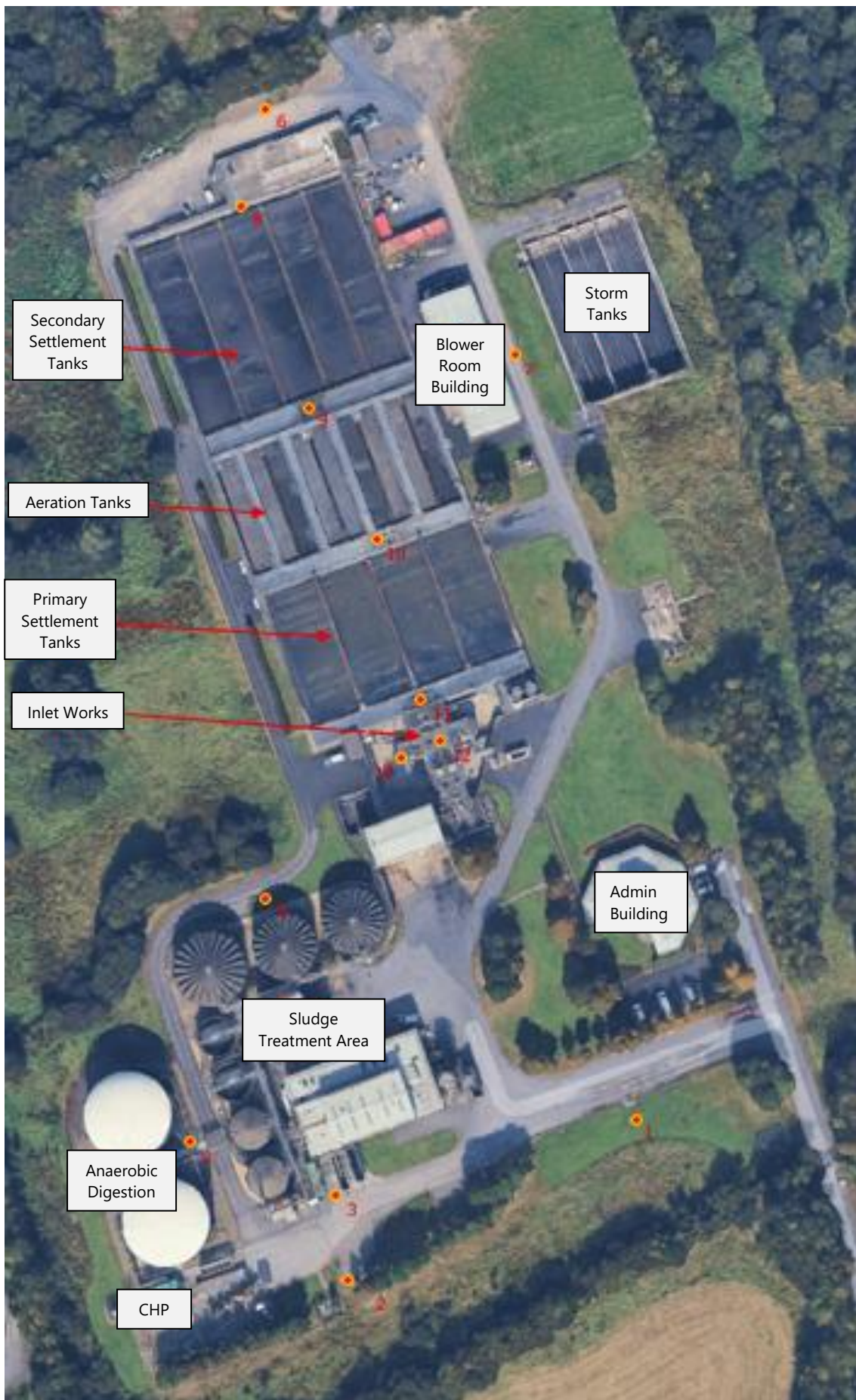


FIGURE 10-6 NOISE MONITORING LOCATIONS AT EXISTING LIMERICK WWTP SITE



FIGURE 10-7 NOISE MONITORING LOCATION AT EXISTING CORCANREE PS SITE

TABLE 10-11 NOISE LEVELS IN CLOSE PROXIMITY TO THE MAIN NOISE SOURCES IDENTIFIED ON THE EXISTING LIMERICK WWTP & CORCANREE PS SITE

NML	Location	L _{Aeq} (dB)	L _{AFMax} (dB)	L _{AFMin} (dB)
Noise monitoring locations at existing Limerick WWTP site				
1	Opposite Admin Building	66.4	83.2	54.2
2	Opposite Sludge Treatment	64.6	67	61.6
3	Opposite Sludge Treatment	72.5	80.8	70.8
4	At Sludge Anaerobic Digester Plant	58	62	55.4
5	At Primary Import Balancing Tanks	51.2	57	48.8
6	At Northern Boundary	49.7	54.9	47.4
7	At Blower Room Building	71.6	73.3	69.6
8	Secondary Settlement Tanks	67.5	68.4	66.7
9	Secondary Settlement Tanks / Aeration Tanks	76.9	79.1	75.8
10	Aeration Tanks / Primary Settlement Tanks	75.8	76.6	73.6
11	Inlet Works Area	65.6	70.3	64.6
12	Inlet Works Area	64.2	68.1	63
13	Inlet Works Area	76.1	77	75.4
Noise monitoring location at existing Corcanree PS site				
14	External @ PS	47.6	51.9	45.6

The results of the noise survey in close proximity to the main noise sources identified on the existing Limerick WWTP site indicate that as expected the highest noise levels occur in proximity to the blowers and pumps on site. The noise levels recorded at the southern site perimeter locations, Ref. 1 & 2, indicate noise levels of approximately 65 dB LAeq, which are dominated by sludge plant activities. The noise levels recorded at the inlet works – secondary treatment tank locations, Ref. 8 & 13, indicate noise levels of approximately 65 - 75 dB LAeq, which are dominated by pumps & their associated motors and wastewater movement.

The results of the noise survey in close proximity to the main noise sources identified on the existing Corcanree PS site indicate that very low noise levels occur on site, which are totally inaudible off-site.

In terms of an assessment of the noise impact of the 'Do-Nothing Scenario' it can be stated that if the proposed scheme were not to proceed, the existing noise and vibration environment would remain unchanged.

10.5.2 Construction Phase

10.5.2.1 Construction Noise Limits

There are no Irish statutory limits regarding construction noise. BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1: Noise (BSI 2014) provides guidance on assessing the potential significance of noise effects from construction activities in Annex E.

In relation to Construction Noise Limits, BS 5228 details the 'ABC method', which recommends a construction noise limit based on the existing ambient noise level. General and short-term construction noise impacts that are deemed typical of any construction site noise sources, including activities such as ground preparation, site clearance, foundation earthworks, roadway construction, erection of new buildings, etc. are assessed in accordance with the 'ABC method' defined in BS 5228. The ambient noise levels have been determined through the baseline noise survey and then rounded to the nearest 5dB to determine the appropriate category (A, B or C) and subsequent threshold value. A potential significant effect is indicated if the construction noise level exceeds the appropriate category threshold value. If the existing ambient level exceeds the threshold category threshold values, then a potential significant impact is indicated when the total noise level, including both the ambient noise and the various contributions of construction noise, is greater than the ambient noise level by more than 3dB. Table 10-12, reproduced from BS 5228, demonstrates the criteria for selection of a noise limit for a specific receiver location.

TABLE 10-12 CONSTRUCTION NOISE THRESHOLD LEVELS BASED ON THE BS 5228 'ABC' METHOD

Assessment Category and Threshold Value Period (L _{Aeq})	Threshold Value, in decibels (dB)		
	Category A	Category B	Category C
Night time (23.00 to 07.00)	45	50	55
Evening and weekends (D)	55	60	65
Daytime (07.00 – 19.00) and Saturdays (08.00 - 14.00)	65	70	75

Notes:

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

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

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

No night-time construction works will take place, except in exceptional circumstances. At the nearest noise sensitive receivers, the ambient noise levels (rounded to the nearest 5 dB) are approximately 55 dB LAeq,T during daytime. Therefore, all noise sensitive receivers fall into Category A of the 'ABC' assessment

methodology and daytime construction noise will be subject to a limit of 65 dB LAeq,T when assessed at the noise sensitive receiver location.

10.5.2.2 Construction Noise Impact Prediction

There is the potential for temporary and intermittent increases in noise levels during the Construction Phase of the Proposed Development at the nearest residential properties. The main sources of noise due to construction of the Proposed Development will be from activities such as truck movements of excavated and construction materials as well as excavator, loader and concrete mixer noise sources. Sheet-piling will also be required. During the Construction Phase, the Proposed Development will generate heavy goods vehicle (HGV) movements. The noise impact of passing HGVs will be short-term at receiver locations in the area. The construction of the Proposed Development will include associated construction site traffic, comprising of contractors' vehicles and cars.

Construction noise can be assessed in terms of the equivalent continuous sound level and/or in terms of the maximum level. The level of sound that arises from a construction site depends on a number of factors and the estimation procedures need to take into account the following significant factors:

- The sound power outputs of processes and plant;
- The periods of operation of processes and plant;
- The distances from sources to receivers;
- The presence of screening by barriers;
- The reflection of sound;
- Ground attenuation;
- Meteorological conditions (particularly wind speed and direction); and
- Atmospheric absorption.

Table 10-13 outlines the noise levels from typical road construction noise sources during different phases of the construction process as referenced from BS 5228.

TABLE 10-13 TYPICAL NOISE LEVELS DURING DIFFERENT CONSTRUCTION PROCESSES AS REFERENCED FROM BS 5228-1:2009+A1:2014

Ref No.	Equipment	A-Weighted Sound Pressure Level, L_{Aeq} , dB @ 10m
Table C.2 Sound level data on site preparation		
Clearing Site & Ground Excavation / Earthworks		
1	Dozer ✕ (142 kW, 20T)	75 ✕
3	Tracked excavator (102 kW, 22T)	78
12	Dozer (142 kW, 20T)	80
14	Tracked excavator (226 kW, 40T)	79
Loading Lorries		
27	Wheeled loader (493 kW)	80
Distribution of Material		
30	Dump truck (tipping fill) (306 kW, 29T)	79
31	Dump truck (empty) (306 kW, 29T)	87
Rolling and Compaction		
37	Roller (rolling fill) ✕	79 ✕
Table C.4 Sound level data on general site activities		
Distribution of Materials		

Ref No.	Equipment	A-Weighted Sound Pressure Level, L_{Aeq} , dB @ 10m
1	Articulated dump truck ✕	81 ✕
Mixing & Pumping Concrete		
20	Concrete mixer truck	80
Trenching		
63	Tracked excavator	77
Power for Site Cabins		
84	Diesel generator	74
Pumping Water		
88	Water pump (diesel) (10 kW, 100Kg)	68
Sweeping and Dust Suppression		
90	Road sweeper (70 kW)	76
91	Dust suppression unit trailer	78

✕ Drive-by maximum sound pressure level in L_{Amax} (overall level)

Worst-case on-site noise levels from construction works likely to take place during the Construction Phase of the Proposed Development are outlined in Table 10-14.

TABLE 10-14 WORST-CASE SOUND POWER LEVEL FROM CONSTRUCTION WORKS LIKELY TO TAKE PLACE DURING THE CONSTRUCTION PHASE OF PROPOSED DEVELOPMENT (REF: BS 5228)

Activity	Plant	L_{Aeq} at 10m	Equivalent L_w used in Noise Prediction
Clearing Site & Ground excavation/earthworks	Dozer, Tipping Lorries, Dump Trucks, Rolling & Compaction (drive by)	79 dB - 87 dB	Construction activities represented as three continuous distinct area of works on site = Point Source L_w 115 dB(A) @ height of 2m.
Distribution of materials	Articulated dump truck ✕	81 dB	
Mixing & Pumping concrete	Concrete mixer truck	80 dB	

✕ Drive-by maximum sound pressure level in L_{Amax} (overall level)

Worst-case construction noise levels at noise sensitive receivers in the area of the Proposed Development have been predicted as outlined in Table 10-15.

The closest residential noise sensitive receiver (SR 1) is approximately 480m to the south of the existing Limerick WWTP site boundary and approximately 585m south from the nearest construction areas of the Proposed Development.

The closest residential noise sensitive receiver (SR 7) is approximately 350m to the south of the Corcanree PS site boundary and approximately 375m south from the nearest construction areas of the Proposed Development.

The predicted noise levels are shown in Appendix 10.1 in Volume 4 of this EIAR.

A worst-case assessment of construction noise from the Proposed Development indicates that there will be no exceedance of the daytime construction noise limit of 65 dB $L_{Aeq,T}$ at the noise sensitive receivers in the area. It will be incumbent on the contractor to ensure that construction works are undertaken with particular sensitivity to ensure no significant construction noise impact and on-site construction activities result in no exceedance of the construction noise limit. As stated, all construction works will take place during daytime hours and so the relative construction noise impact will not be significant.

TABLE 10-15 PREDICTED WORST-CASE CONSTRUCTION NOISE LEVELS DUE TO PLANT AND EQUIPMENT NOISE LEVELS (AS OUTLINED IN BS5228).

Receiver	Predicted Worst-Case Construction Noise Level
At SR1 due to construction works at Limerick WWTP site	47 dB L_{Aeq} , 1 Hour
At SR2 due to construction works at Limerick WWTP site	42 dB L_{Aeq} , 1 Hour
At SR2 due to construction works at Corcanree PS site	45 dB L_{Aeq} , 1 Hour
At SR3 due to construction works at Corcanree PS site	49 dB L_{Aeq} , 1 Hour
Suggested Construction Noise Limit Value	65 dB L_{Aeq} , 1 Hour

The predicted construction noise level at all other residential receiver locations in the area will be lower than the construction noise levels predicted in Table 10-15.

AONA Environmental has been advised of the following in terms of the type of piling to be undertaken and the proximity of piling activities to the nearest sensitive locations;

Main WWTP AGS Tank;

- Excavation soil consists of alluvial silt/ clay / made ground.
- CFA piling is firstly required for structural support.
- Tank excavation depth extends 4m below ground.
- Sheet piles will be installed to support the excavation and maintain operational stability.
- 400m distance from excavation site to nearest transitional waterbody.
- 0.5km distance from excavation site to the edge of the main estuary channel.

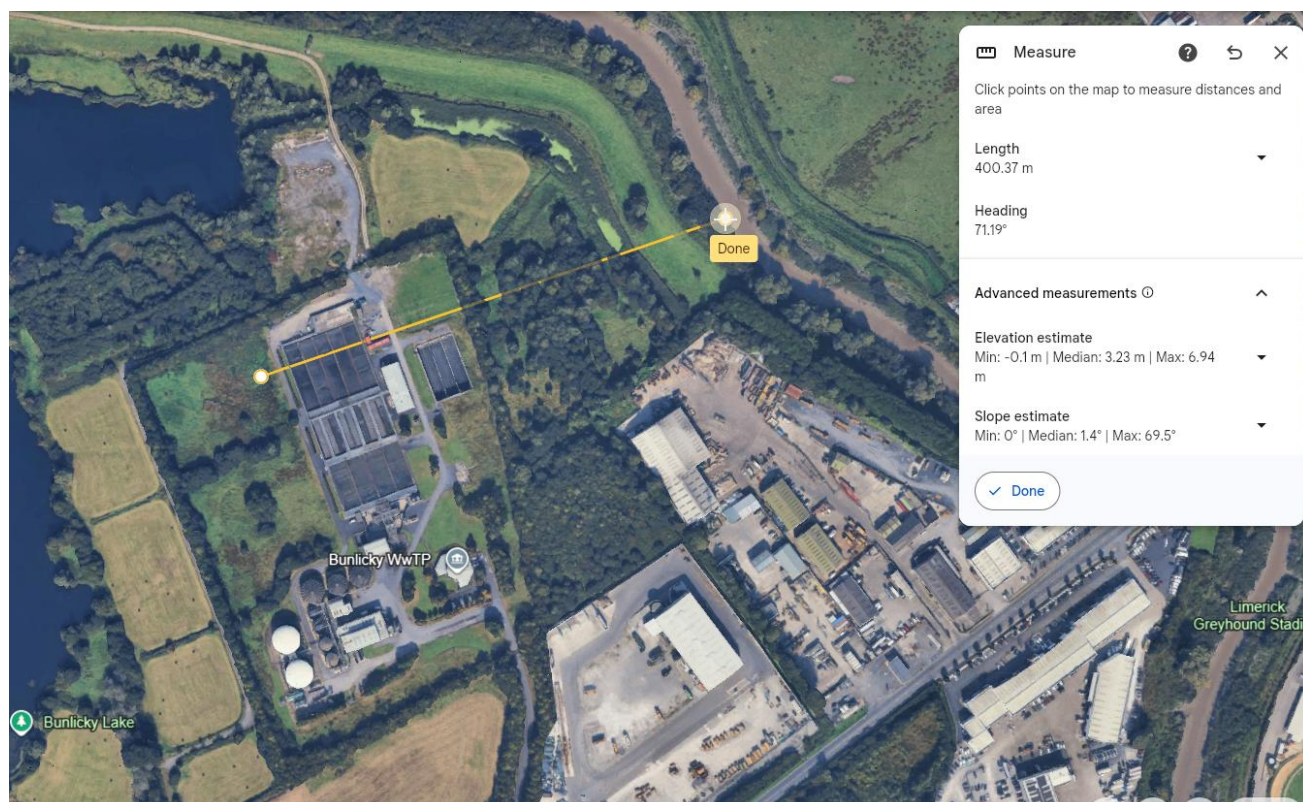


FIGURE 10-8: DISTANCE BETWEEN EXCAVATION AND ESTUARY CHANNEL LIMERICK WWTP

Corcanree Storm Tank;

- Layer 1 (0–7 m): soft silt/clay, saturated
- Layer 2 (8–11 m): glacial till / stiff soil

- Layer 3 (12–15 m): stiff clay / rock
- Low-impact vibratory piling method, such as CFA piling.
- Short term sheet piling is possible
- 50 m distance from excavation site to the edge of the main estuary channel.

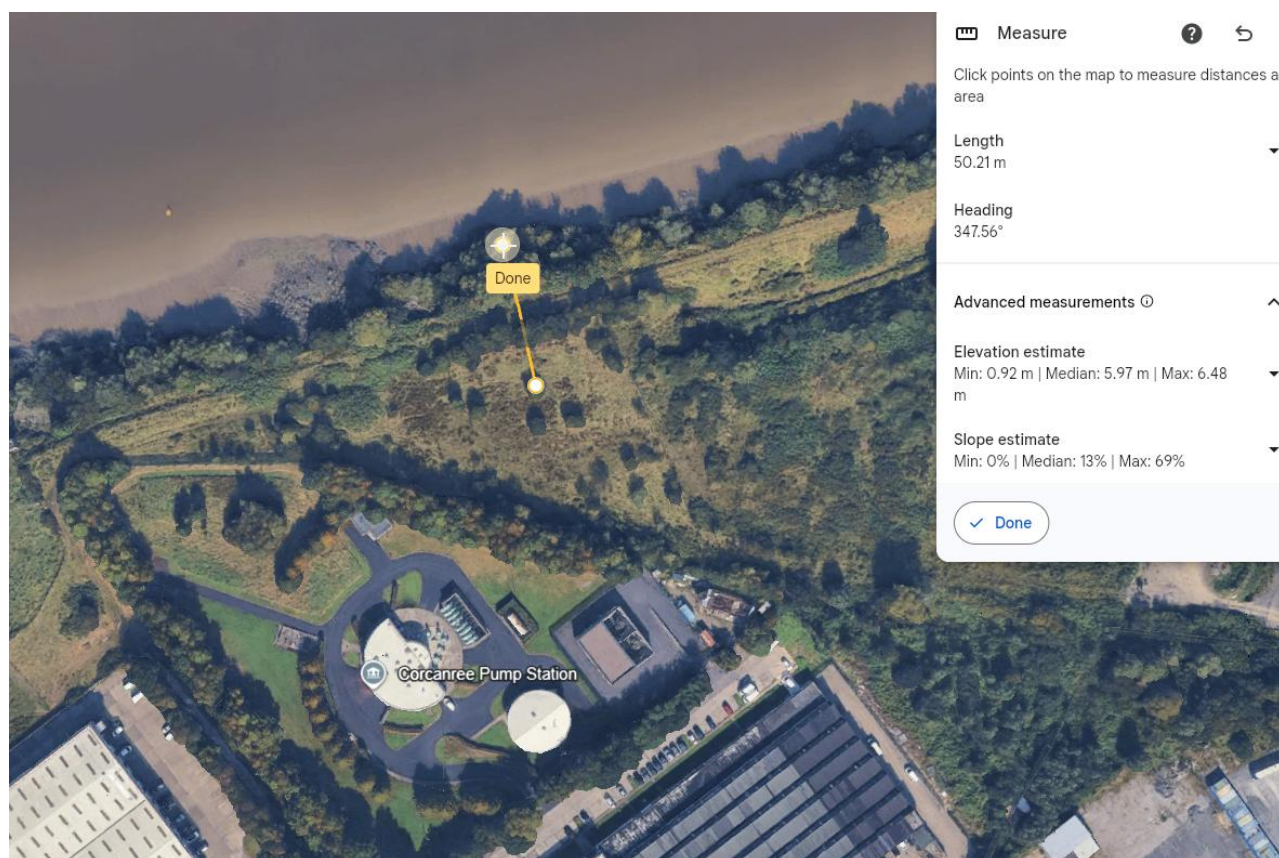


FIGURE 10-9: DISTANCE BETWEEN EXCAVATION AND ESTUARY CHANNEL CORCANREE PS

It is expected that Continuous Flight Auger (CFA) Piling will be undertaken at the proposed AGS tank for a duration of 6-7 weeks, while sheet piling is expected to occur for a period of up to 10 days at each site.

Sheet piling can be quite loud but is dependent on the type of piling undertaken. Impact-driven sheet piles (Percussive Hammer) is the loudest piling method while vibratory driven sheet piles is significantly quieter. CFA piling is also a significantly quieter piling method due to the augered nature of the process.

TABLE 10-16 TYPICAL PILING NOISE LEVELS (L_{Aeq,T} @ 10 M) [TAKEN FROM RELEVANT INFORMATION AVAILABLE IN BS 5228:2009].

Piling Method	BS 5228 Plant Category	Noise Character Description	L _{Aeq,T} @ 10m
Driven Sheet Piles (Impact Hammer)	Piling rig (impact)	Impulsive	95 dB(A)
Driven Sheet Piles (Vibratory Hammer)	Piling rig (vibratory)	Continuous / low frequency	85 dB(A)
CFA Piling Rig	Bored piling rig	Continuous mechanical	85 dB(A)

TABLE 10-17 PREDICTED PILING NOISE LEVELS WITH DISTANCE ATTENUATION (FREE-FIELD SPHERICAL SPREADING WITH NO SCREENING OR REFLECTIONS, I.E. WORST-CASE NOISE PROPAGATION CONDITIONS).

Piling Method	L _{Aeq,T} @ 10 m	L _{Aeq,T} @ 50 m	L _{Aeq,T} @ 100 m	L _{Aeq,T} @ 150 m	L _{Aeq,T} @ 200 m	L _{Aeq,T} @ 250 m
Driven Sheet Piles (Impact Hammer)	95 dB	81 dB	75 dB	71.5 dB	69 dB	67 dB
Driven Sheet Piles (Vibratory Hammer)	85 dB	71 dB	65 dB	61.5 dB	59 dB	57 dB
CFA piling	85 dB	71 dB	65 dB	61.5 dB	59 dB	57 dB

A pragmatic approach needs to be taken when assessing the significance of noise effects of any construction project. The significance of the piling noise from the project has been determined by considering the change in the ambient noise level with the period of construction noise on-going. BS5228 states that noise levels generated by construction activities are deemed to be significant if the total noise (pre-construction ambient plus construction noise) exceeds the pre-construction ambient noise by 5 dB or more, subject to lower cut-off values of 65 dB, 55 dB and 45 dB L_{Aeq, Period}, from construction noise alone, for the daytime, evening and night-time periods, respectively; and a duration of one month or more, unless works of a shorter duration are likely to result in significant impact.

Based on the estimated short duration of sheet piling works and the significant distances to the nearest receiver locations, there will be an insignificant short-term piling noise impact at the nearest sensitive receivers due to the proposed sheet piling works. Beyond a distance from source of 250m there will be no significant piling noise impact. All sensitive receiver locations are in excess of 250m from the proposed piling locations.

The Construction Phase noise impact at the identified sensitive receptors is therefore predicted to be a **Negative, Slight, Short-Term impact**.

10.5.2.3 Construction Vibration Impact Prediction

No blasting is proposed as part of the Construction Phase of the Proposed Development. As stated, the nearest residential properties are located relatively remote from the Limerick WWTP boundary with the nearest sensitive receiver location being SR1, a residential property at a distance of approximately 480m to the south of the WwTP site boundary. The residential noise sensitive receiver (SR 7) is approximately 350m to the south of the Corcanree PS site boundary. Therefore, there will be no potential for a vibration impact due to blasting at the nearest residential properties.

10.5.2.4 Predicted Vibration Impact from Piling

The maximum likely vibration level from the Proposed Development site at the nearest sensitive location has been predicted based on the relevant information available in BS 5228-2:2009 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration.

Relevant vibration data for driven sheet steel piling in a similar substrate and for CFA piling carried out in a range of different soil conditions, as quoted from BS5228 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration is shown in Table 10-18.

TABLE 10-18 VIBRATION LEVELS FROM CFA PILING RIG & DRIVEN SHEET STEEL PILING [TAKEN FROM RELEVANT INFORMATION AVAILABLE IN BS 5228:2009].

Type of Soil	Distance (m)	Measured Peak Particle Velocity (mm/s)
CFA Piling Rig		
Fill Clay	20m / 30m	0.3 / 0.03
Fill / Sand / Clay	15m / 26m	0.1 / 0.02

Type of Soil	Distance (m)	Measured Peak Particle Velocity (mm/s)
Sand and gravels over chalk	8m	0.04
Soft ground over rock	5m	0.54
Fill including pockets of gravel over London clay	5.5m	0.13
Driven sheet steel piling		
Ref. No. 6 – Canvey Island - Clay/soft silty clay/ silty sand; high water table using Drop hammer driving sheets. 4.5t Hammer Drop	35m	3.0 / 0.5

Table 10-18 outlines that the ground borne vibration levels from CFA piling vary significantly depending on the type of ground. However, even on firm ground, ground borne vibration at 20m is only 0.3mm/s PPV, which is around the onset of perceptibility in a typical residential property.

Table 10-18 outlines that the ground borne vibration levels from driven sheet steel piling at a distance of 35m ranges from 0.5 – 3.0 mm/s PPV. At a distance of 400m from the excavation site to nearest transitional waterbody and 0.5km to the edge of the main estuary channel, the ground borne vibration levels will be <0.1mm/s PPV.

The proposed closest location of low-impact vibratory piling method, such as CFA piling to the nearest transitional waterbody is 50m from the Corcanree Storm Tank. Therefore, based on interpolation of the ground borne vibration levels in Table 1, the maximum ground borne vibration levels from the CFA piling at 50m will be <0.1 mm/s PPV.

Therefore, the vibration impact from piling can be classified as an impact of ‘negligible’ significance.

TABLE 10-19 SUMMARY OF PREDICTED CONSTRUCTION PHASE IMPACTS

Assessment Topic	Predicted Impact
Noise	Slight, Short-term Negative Impact
Vibration	No impact

10.5.3 Operational Phase

10.5.3.1 Operational Noise Impact Prediction

The Proposed Development will not generate a significant number of additional traffic movements and therefore, will not result in an additional significant traffic noise impact. It requires a doubling or halving of traffic flows to result in a +/-3 dB(A) change in noise levels from traffic. As there will be no significant increase in the number of traffic movements on the surrounding road network, refer to Chapter 6 (Traffic and transport), entering and exiting the site, there will be a negligible change in noise levels from moving cars and vehicles in comparison to the existing scenario. The relative traffic noise impact due to the Proposed Development at the nearest receivers will be <3 dB(A) increases due to the predicted traffic flow increase during the daytime, evening and night-time periods. In terms of the assessment of changes in traffic noise level with the proposed mixed-use development in operation, it can be determined using the IEMA impact scale, that the Proposed Development will have a ‘negligible’ long-term traffic noise impact, with the upgraded plant in operation. The daytime, evening and night-time traffic flows on the surrounding road network will continue to dominate the noise climate in the area. Therefore, the noise impact due to vehicles entering and exiting the Proposed Development will not significantly affect the existing traffic noise levels in the area.

The existing Limerick WWTP & Corcanree PS site operational noise levels during daytime and night-time have been calculated at the nearest residential receivers based on the noise level measurements undertaken in close proximity to the main noise sources identified on the existing Limerick WWTP & Corcanree PS site.

As the Proposed Development has not developed to final detailed design stage, a detailed prediction of a precise future noise level from various noise sources cannot be prepared. However, a worst-case operational noise level increase of 3 dB(A) from the Limerick WWTP & Corcanree PS sites has been assessed. Predicted noise levels for operational phase is shown in Appendix 10.1 in Volume 4 of this EIAR.

TABLE 10-20 PREDICTED WORST-CASE 1-HOUR NOISE LEVELS AT SENSITIVE RECEIVER LOCATIONS WHEN OPERATING THE PROPOSED DEVELOPMENT UPGRADED PLANT

Receiver Location	Existing Level Lr dB(A)	With Proposed Development Level Lr dB(A)	Difference Lr dB(A)
SR1	32	35	+3
SR2	23	26	+3
SR3	22	25	+3
SR4	21	24	+3
SR5	22	25	+3
SR6	33	36	+3
SR7	27	30	+3
Noise Limit	Daytime – 55 dB(A) $L_{eq, 1 \text{ Hour}}$ Evening – 50 dB(A) $L_{eq, 1 \text{ Hour}}$ Night-time – 45 dB(A) $L_{eq, 1 \text{ Hour}}$		

In comparison to the WHO Guidelines for Community Noise (WHO 1999), the predicted 1-hour noise levels outlined in Table 10-20 due to the operation of the upgraded external plant and equipment noise sources is well in accordance with the WHO daytime guideline of 50 – 55 dB(A) for outdoor living areas and the WHO night-time external guideline of 45 dB(A) at the receiver locations.

The predicted difference in noise level Lr dB(A) between the existing Limerick WWTP & Corcanree PS site and with the upgraded plant will result in a worst-case noise level increase of <3 dB(A) at all receiver locations. This is not a significant noise level and in terms of the IEMA classification of impact from the change in sound levels the Proposed Development will result in a **Negligible, Not Significant, Long-Term Impact**.

BS 4142 Assessment

A BS 4142 assessment has been carried out to assess the potential for 'adverse impact' due to the specific plant noise sources and associated traffic noise at the nearest sensitive receivers, SR1 - SR 6. The measured daytime and night-time background noise level has been recorded in proximity to the nearest residential properties. The representative LA90 background noise level recorded during daytime and night-time has been used in the BS 4142 assessment.

TABLE 10-21 BS 4142 ASSESSMENT OF THE PREDICTED SPECIFIC NOISE LEVELS FROM THE UPGRADED PLANT DURING DAYTIME

BS4142 Assessment - DAYTIME	SR 1	SR 2	SR 3	SR 4	SR 5	SR 6	SR 7
Measured Ambient Sound Level ($L_a = L_{Aeq,T}$) (dB):	57.3	56.1	56.1	56.1	56.1	57.3	57.3
Residual Sound Level ($L_r = L_{Aeq,T}$) (dB):	57.3	56.1	56.1	56.1	56.1	57.3	57.3
Background Sound Level ($L_{A90,T}$) (dB):	51.9	49.9	49.9	49.9	49.9	51.9	51.9
Assessment period for Reference Time Interval							
1 During Daytime	Daytime	Daytime	Daytime	Daytime	Daytime	Daytime	Daytime
Reference Time Interval (T_r)							
1 During Daytime - 1 Hour	1 Hour	1 Hour	1 Hour	1 Hour	1 Hour	1 Hour	1 Hour
Specific Sound Characteristics							
1 Sound is continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous
2 Sound fluctuates at random							
3 Sound is continuous and cyclic							
4 Sound is intermittent and either steady or cyclic and on time is less than the Reference Time Interval (T_r)							
5 Sound is intermittent and either steady or cyclic and on time is equal to or greater than the Reference Time Interval (T_r)							
Specific Sound Level - Predicted	35.0	26.0	25.0	24.0	25.0	36.0	30
Acoustic Feature Correction							
1 No tonal features present = +0 dB	0	0	0	0	0	0	0
2 Tone that is just perceptible = +2 dB							
3 Tone that is clearly perceptible = +4 dB							
4 Tone that is highly perceptible = +6 dB							
Account for impulsivity features of the specific noise:							
1 No impulsivity features present = +0 dB	0	0	0	0	0	0	0
2 Impulsivity that is just perceptible = +3 dB							

BS4142 Assessment - DAYTIME	SR 1	SR 2	SR 3	SR 4	SR 5	SR 6	SR 7
3 Impulsivity that is clearly perceptible = +6 dB							
4 Impulsivity that is highly perceptible = +9 dB							
5 Neither impulsive nor tonal, though it is otherwise distinctive against the residual acoustic environment = +3 dB							
Is the specific noise continuous or intermittent?							
1 Continuous - On time correction, = $10 \cdot \log(3600/3600)$	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rating Level ($L_{Ar,T}$) (dB):	35.0	26.0	25.0	24.0	25.0	36.0	30
Background Sound Level ($L_{A90,T}$) (dB):	51.9	49.9	49.9	49.9	49.9	51.9	51.9
Excess of rating over background sound level (Rating level minus background level) (dB)	-16.9	-23.9	-24.9	-25.9	-24.9	-15.9	-21.9

TABLE 10-22 BS 4142 ASSESSMENT OF THE PREDICTED SPECIFIC NOISE LEVELS FROM THE UPGRADED PLANT DURING NIGHT-TIME

BS4142 Assessment - NIGHT-TIME	SR 1	SR 2	SR 3	SR 4	SR 5	SR 6	SR 7
Measured Ambient Sound Level ($L_a = L_{Aeq,T}$) (dB):	54.1	53.2	53.2	53.2	53.2	54.1	54.1
Residual Sound Level ($L_r = L_{Aeq,T}$) (dB):	54.1	53.2	53.2	53.2	53.2	54.1	54.1
Background Sound Level ($L_{A90,T}$) (dB):	48.8	46.7	46.7	46.7	46.7	48.8	48.8
Assessment period for Reference Time Interval							
2 During Night-time	Night-time	Night-time	Night-time	Night-time	Night-time	Night-time	Night-time
Reference Time Interval (T_r)							
2 During Night-time - 15 minutes	15 min	15 min	15 min	15 min	15 min	15 min	15 min
Specific Sound Characteristics							
1 Sound is continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous	Continuous
2 Sound fluctuates at random							
3 Sound is continuous and cyclic							
4 Sound is intermittent and either steady or cyclic and on time is less than the Reference Time Interval (T_r)							

BS4142 Assessment - NIGHT-TIME	SR 1	SR 2	SR 3	SR 4	SR 5	SR 6	SR 7
5 Sound is intermittent and either steady or cyclic and on time is equal to or greater than the Reference Time Interval (Tr)							
Specific Sound Level - Predicted	35.0	26.0	25.0	24.0	25.0	36.0	30
Acoustic Feature Correction							
1 No tonal features present = +0 dB	0	0	0	0	0	0	0
2 Tone that is just perceptible = +2 dB							
3 Tone that is clearly perceptible = +4 dB							
4 Tone that is highly perceptible = +6 dB							
Account for impulsivity features of the specific noise:							
1 No impulsivity features present = +0 dB	0	0	0	0	0	0	0
2 Impulsivity that is just perceptible = +3 dB							
3 Impulsivity that is clearly perceptible = +6 dB							
4 Impulsivity that is highly perceptible = +9 dB							
5 Neither impulsive nor tonal, though it is otherwise distinctive against the residual acoustic environment = +3 dB							
Is the specific noise continuous or intermittent?							
1 Continuous -On time correction, =10*LOG(900/900)	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Rating Level (L_{Ar,T}) (dB):	35.0	26.0	25.0	24.0	25.0	36.0	30.0
Background Sound Level (L_{A90,T}) (dB):	48.8	46.7	46.7	46.7	46.7	48.8	48.8
Excess of rating over background sound level (Rating level minus background level (dB))	-13.8	-20.7	-21.7	-22.7	-21.7	-12.8	-18.8

The negative values means the noise level from the Proposed Development will be below the measured background noise level.

BS 4142 states that '*a difference of around +5 dB is likely to be an indication of an adverse impact, depending on the context*'. In terms of context, the Proposed Development within existing Limerick WWTP & Corcanree PS sites will operate in association with the existing processes, tanks and buildings on site.

The BS 4142 assessment indicates that the Proposed Development will not cause an adverse noise impact at the nearest noise sensitive receivers in comparison to the existing noise levels in the area.

10.5.3.2 Operational Vibration Impact Prediction

The operation of the Proposed Development will not contain any aspect which have the potential to give rise to a perceptible vibration impact at any of the nearest residential noise sensitive receivers.

TABLE 10-23 SUMMARY OF PREDICTED OPERATIONAL PHASE IMPACTS

Assessment Topic	Predicted Impact
Noise	Negligible, Long-term Negative Impact
Vibration	No impact

10.6 Mitigation Measures

10.6.1 Construction Phase

During the Construction Stage, the Contractor will employ the best practical means to minimise noise and vibration produced by their works including plant maintenance and will comply with the recommendations of:

- i. BS5228-1: Code of practice for noise and vibration control on construction and open sites – Part 1: Noise
- ii. BS5228-2: Code of practice for noise and vibration control on construction and open sites – Part 2: Vibrations
- iii. Noise and Vibration and the European Communities (Noise Emission by Equipment for Use Outdoors) Regulations, 2001 and 2016 so as to acknowledge the EC (Noise Emission by Equipment for Use Outdoors) (Amendment) Regulations 2006.

A noise survey will be conducted for each Working Area before construction commences to establish the base line noise levels at the perimeter and nearest receptors. The Contractor will undertake continuous noise monitoring at the three nearest sensitive receptors to the works during the Construction Phase, to ensure compliance with limits outlined above and provide to the Employer's Representative copies of all recordings, on a daily basis. All measurements shall be made 1m outside the facade of each building in question (or at a representative location, where it is not possible to access properties) using a sound level meter conforming to EN/IS EN 61672-1. Sound levels shall be monitored by methods set out in Appendix B of BS 5228.

To avoid potentially significant construction noise impacts during the Construction Phase, the following mitigation measures will be adopted:

- To protect residential amenity, construction activities will be restricted to daytime hours as outlined (except during exceptional circumstances):
 - Monday to Friday: 07:00 hours – 19:00 hours;
 - Saturday: 08:00 hours – 14:00 hours.
- An on-site speed limit will be enforced for all traffic;
- Best practicable means will be employed to minimise noise emissions and will comply with the general recommendations of BS 5228;
- All plant will be maintained in good working order. Where practicable, machines will be operated at low speeds and will be shut down when not in use;

- Mechanical plant used on site will be fitted with effective exhaust silencers. Vehicle reverse alarms will be silenced appropriately to minimise noise breakout from the site while still maintaining their effectiveness;
- If required, compressors will be of the “noise reduced” variety and fitted with properly lined and sealed acoustic covers;
- In all cases, engine and/or machinery covers should be closed whenever the machines or engines are in use;
- All pneumatic percussive tools will be fitted with mufflers or silencers as recommended by the equipment manufactures. Where practicable all mechanical static plant will be enclosed by acoustic sheds or screens;
- Employees working on the site will be informed about the requirement to minimise noise and undergo training on the following aspects:
 - The proper use and maintenance of tools and equipment;
 - The positioning of machinery on-site to reduce the emission of noise to the noise sensitive receivers;
 - Avoidance of unnecessary noise when carrying out manual operations and when operating plant and equipment; and
 - The use and maintenance of sound reduction equipment fitted to power pressure tools and machines.
- It is recommended that if complaints are received from nearby residential properties, periodic noise monitoring will be undertaken during construction works to determine noise levels at noise sensitive receivers. Based on the findings of such noise monitoring, appropriate additional noise mitigation measures will be implemented to reduce noise impacts. Where excessive noise levels are recorded, further mitigation measures will be employed which may include temporary screening of the nearest receiver to on-site activities;
- Responsible Person - It is recommended that the Contractor will appoint a responsible and trained person (e.g. Community Liaison Officer) who will be present on site and who will be willing to answer and act upon complaints and queries from the local public; and
- To protect residential amenity, the cumulative noise level from construction activities on the development site (including plant and equipment) shall not exceed 65 dB LAeq (12 hour) at residential dwellings outside the nearest window of the occupied room closest to the site boundary (SR11).

10.6.2 Operational Phase

The Contractor shall monitor noise to ensure that levels are in compliance with the noise limits for the site according to all relevant legislation including S.I. No. 787/2005 - European Communities (Waste Water Treatment) (Prevention of Odours and Noise) Regulations 2005. The Contractor shall implement a noise monitoring programme, which shall include for the measurement of noise at noise monitoring points selected by the Contractor, which shall be agreed with the Employer's Representative during the preparation of the Operation and Maintenance Plan.

10.7 Residual Impacts

10.7.1 Construction Phase

There will be no residual effects from the Construction Phase of the Proposed Development.

TABLE 10-24 SUMMARY OF PREDICTED CONSTRUCTION PHASE IMPACTS FOLLOWING THE IMPLEMENTATION OF MITIGATION AND MONITORING MEASURES

Assessment Topic	Predicted Impact (Post Mitigation and Monitoring)
Noise	Negligible, Short-term Negative Impact
Vibration	No impact

10.7.2 Operational Phase

The noise impact of the Proposed Development will not be significant in relation to the existing background noise level in the area. There will be no significant residual impact from the operation of the Proposed Development. The Proposed Development will result in an imperceptible and negligible long-term noise impact.

TABLE 10-25 SUMMARY OF PREDICTED OPERATIONAL PHASE IMPACTS FOLLOWING THE IMPLEMENTATION OF MITIGATION AND MONITORING MEASURES

Assessment Topic	Predicted Impact (Post Construction and Monitoring)
Noise	Negligible - Imperceptible and negligible long-term noise impact.
Vibration	No impact

10.8 Cumulative and In-Combination Impact Assessment

10.8.1 Cumulative impact assessment

In relation to the in-combination construction and/or operational impact of the Proposed Development, with other proposed schemes planned in the area, the list of projects in the vicinity of the Limerick WWTP and Corcanree site have been reviewed. Projects within approximately 500m from the Proposed Development have been considered in terms of potential cumulative noise and vibration impact.

The assessment of construction noise impacts from the Proposed Development has indicated that construction noise limit criteria will not be exceeded at the nearest residential properties during typical daytime construction activities.

Noise from construction works will fluctuate throughout the course of a typical working day as well as over the course of the construction works being undertaken in any one location. Therefore, the daytime construction noise limit of 65 dB $L_{Aeq,12\text{ Hour}}$ will be achieved at the nearest residential properties. The construction noise impacts will be short-term and will not be significant. Also, while the overall construction activities for the Proposed Development will occur over several months, the nature of the proposed works and its duration at any one location will mean that noise sensitive receivers will not be exposed to continuous construction noise impact during the construction period.

Once the recommended mitigation measures have been implemented, the residual impacts from the development will not be significant. In the unlikely event of all of the projects in the vicinity of the Limerick WWTP and Corcanree site being constructed simultaneously, there may a potential for a short-term slight negative cumulative noise and vibration impact.

The construction phase of the Proposed Development will implement the mitigation measures listed in Section 9.6 Mitigation Measures, thereby minimising the potential cumulative noise and vibration impact that this project could have.

Any noise and vibration impacts from the Proposed Development will be temporary and transient in nature. Impacts will also differ between receptors, depending on distance to the works areas, and the type of works being carried out in the area. Given the mitigation measures being implemented for this scheme, and depending on the receptor location in question, there is potential for no impact or a short-term imperceptible to slight negative cumulative impact.

The list of schemes in the vicinity of the Limerick WWTP and Corcanree site have been reviewed to determine if there are any other large-scale plans or projects in the area which could realistically result in cumulative noise and vibration impact. Projects within 500m from the Proposed Development have realistically been considered in terms of potential cumulative impact. The nearest large scale projects are as follows:

TABLE 10-26 ASSESSMENT OF POTENTIAL CUMULATIVE IMPACT FROM OTHER PROPOSED DEVELOPMENTS

Reg. No.	Applicant	Brief Description of Proposed Development	Distance from Proposed Development	Decision Date	Potential cumulative impact - Yes / No
22313124	SHD DW Raheen Developments Ltd.	384 residential units (202 houses, 182 apartments), creche and associated site works.	900m	01/08/2022	No
21311588	SHD - Voyage Properties Ltd	371 residential units, proposed access road and two storey childcare facility.	545m	26/05/2022	No
TA91.312683	The Clonmacken Partnership	165 no. residential units (43 no. houses, 122 no. apartments), creche and associated site works.	1.04km	26/05/2022	No
TA91.311588	Voyage Property Limited	371 no. residential units (157 no. houses, 214 no. apartments), creche and associated site works.	765m	30/03/2022	No

Based on the assessment of the Proposed Development in combination with all other programmes and projects in the vicinity, no significant in-combination cumulative effects relating to noise and vibration are anticipated.

10.8.2 Interactions

Combined effects are by their nature interactive; the effect of one impact is dependent or influenced by another effect. Earthworks and piling during the construction phase have the potential to give rise to noise impacts, potentially giving rise to impacts on residential properties and fauna. Mitigation of combined effects is best achieved through management and control measures to prevent the individual impacts in the first instance or reduce the impacts themselves and therefore reduce the likelihood of such interactions occurring. The environmental effects on noise and vibration are interlinked with the environmental effects of:

- Chapter 4 – Construction Impacts
- Chapter 19 – Population & Human Health
- Chapter 13 - Biodiversity
- Chapter 18 – Material Assets

The excavation, movement and transport of soils and building materials along with short-term piling during the construction phase has the potential to give rise to noise and vibration impacts.

All mitigation measures outlined in the respective chapters of this EIAR will be implemented in full to ensure the potential impact is minimised in relation to construction and operation impacts.

10.9 Difficulties encountered in Compiling Information

There were no difficulties encountered in compiling the Noise and Vibration Impact Assessment.

10.10 References

British Standards Institution (BSI) (2014). BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites – Part 1 Noise & Part 2 Vibration.

British Standards Institution (BSI) (2019). BS 4142+A1:2019 Method of Rating and Assessing Industrial and Commercial Noise

Environmental Protection Agency (Ireland) (EPA) (2022). Guidelines on the information to be contained in Environmental Impact Assessment Reports.

Environmental Protection Agency (Ireland) (EPA) (2016). Guidance Note for Noise: Licence Applications, Surveys and Assessments in Relation to Scheduled Activities (NG4)

Institute of Environmental Management & Assessment (IEMA) (2014) Guidelines for Noise Impact Assessment

International Organisation for Standardisation (ISO) (2016) ISO 1996-1:2016 Acoustics — Description, measurement and assessment of environmental noise — Part 1: Basic quantities and assessment procedures

I.S. EN 61672-1:2013 Electroacoustics. Sound level meters – Specifications (Dec 2013)

ISO 9613-2:1996 'Acoustics – Attenuation of sound during propagation outdoors – Part 2: General method of calculation', International Standards Organisation, 1996.

Limerick Agglomeration Strategic Noise Maps for road traffic from the Environmental Noise Directive (END) Round Four - European Communities, Environmental Noise Regulations 2018 – 2021

S.I. No. 787/2005 - European Communities (Waste Water Treatment) (Prevention of Odours and Noise) Regulations 2005

World Health Organization (WHO) (1999). Guidelines for Community Noise.

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